



Construction and Standardization of Achievement Test in Life Science of Class IX

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ABSTRACT

The study was carried out to construct a valid and reliable test in Life Science for secondary school students. The investigator conducted to construct and standardize an achievement test in Life Science for class IX students to measure their achievement. The achievement test and the lesson plans were developed on selected topics of Life Science from Class IX Text Book issued by WBBSE (West Bengal Board of Secondary Education) on the basis of the blue print prepared for the achievement test in the light of objectives. After the items were written, the investigator consulted the subject expert for checking the items framed with respect to the faulty language and defects in wordings and also to verify whether the items measure what was purports to measure at the level of achievement.

Initially Eighty five (85) items were framed on selected topics of Life Science textbook. A blue-print was prepared for the achievement test in the light of certain objectives. Individual try-out of the first draft was done on six students. Discussions with the subject experts were held and the test was modified accordingly. The second draft with Seventy-six (76) items was administered on 20 students. Then the Item difficulty Value (DV) and Item Discrimination Power (DP) were determined by adopting Kelley's (1939) method. On the basis of Item difficulty value, item discrimination power and also distractor analysis, the preliminary draft of the achievement test was again modified. In total 60 items having difficulty value (DV) ranging from 0.20 to 0.75 and the items ranging from 0.20 to 0.90 on the discriminatory power (DP) were retained in the achievement test. The reliability and validity of the test was also administered.

Key Words: Achievement test, Construction, Difficulty Value (DV) and Discriminatory Power (DP), Life Science, and Standardization.

1. INTRODUCTION:

Achievement test is a test for evaluation of student performance after a period of instructions. Achievement test in Life Science can help the students because the main purpose of an achievement test is to determine one's knowledge in a particular subject. Achievement test is an important tool in school evaluation and has great significance in measuring instructional progress and progress of the students in the subject area. It is a test of knowledge based on something taught. Achievement tests assess what the students have achieved from their courses within a period of time and provide some information with regard to their current level of progress or whether they are ready for subsequent stages of learning. An achievement test is a test of developed skill or knowledge. The most common type of achievement test is a standardized test developed to measure skills and knowledge learned in a given grade level, usually through planned instruction, such as training or classroom instruction. Science plays a significant role in our daily life and Science is important in developing scientific and analytical skills of students because it gives an insight to understand the world around them. Science is also an important school subject because it is associated with more academic and career opportunities. The general purpose of an exam is to test student knowledge, "At its most basic level, assessment is the process of generating evidence of student learning and then making a judgment about that evidence." (Elliott, 2008, p.1). Measurement and evaluation in any subject is only possible through a standardized achievement test in that concerning subject, which not only assesses the student's potentials but also give a qualitative feedback to the teachers so that they improve accordingly in their further teachings. So, overall standardization of an achievement test would be a crucial stage. Here the researcher has tried in Life Science of class-IX as per the WBBSE (West Bengal Board of Secondary Education) book for the same.

Meaning of Achievement: Academic Achievement means the attained level at which this student is functioning in school tasks such as science (Life Science, Physical Science and Mathematics) as means used by schools marks or grades earned. The term academic achievement refers to the degree of success or level of attainment by pupil in the scholastic or the curricular subjects prescribed within the syllabus in brief academic achievement is the amount of knowledge derived from learning in the classroom. Achievement this means all those behavioral changes which take place in the individual as a result of learning experience of various kinds. Academic achievement it is defined in different ways by different authors.

According to **N. M. Downie (1961)**, "Any test that measures the attainments and accomplishments of an individual after a period of training or learning is called an achievement test".

Morgan (1961) in his book "Introduction to Psychology" defines achievement as the "accomplishment on a test of knowledge (or) skills also a personal motive".

According to **Robert L. Thorndike and Elizabeth Hagen (1970)** says that "Achievements are

performance based to show that a pupil has already learnt to do”. Academic achievement is all about what students can actually do when they have finished a course of study.

According to **Norman E. Gronlund (1982, pp 1)**, “An achievement test is a systematic procedure for determining the amount a student has learned through instructions”. Gronlund stated that achievement tests aids both the teacher and the student in assessing learning readiness, monitoring learning progress, diagnosing learning difficulties and evaluating learning outcomes.

‘**Crandall**’ suggested that achievement may be viewed as behaviour directed towards the attainment of approval or the avoidance of disapproval for competence of performance in situations where standards of excellence are applied.

Types of Academic Achievement:

According to **Linderman (1967)** academic achievement tests are of three types:

- Teacher made Test
- Standardized Test
- Performance Test

The Teacher made test: The Teacher made test is the test made by teacher for local use. This test is prepared only to measure the achievement of specific instructional objectives related to particular unit of work. These are constructed by teachers for using largely within their classrooms.

The Standardized test: The standardized test is a test that has standard procedures for administration, scoring and interpretations. The Standardized test constructed by the test specialists are standardized in the sense that they have been administered and scored under standard and uniform testing conditions so that the results obtained from different samples may legitimately be compared. Items in standardized tests are fixed and not modifiable.

The Performance test: The Performance Tests are those tests that require the examiners to perform a task rather than answer some questions. Such tests prohibit the use of language in items.

Importance of Achievement:

The importance and significant of academic achievement has raised several important questions for educational researchers now a days. What factors promote achievement in students of Secondary education system? How far do the different factors contribute towards academic achievement in student? Many factors are affecting the academic achievement such as pupil’s intelligence, medium of instruction (language), socio-economic status, etc.

The school is the main concerned with the all round development of the physical, social, aesthetic and emotional qualities of the children. During the process of education of the child

has to be continuously evaluated with regard to the level of his intelligence, attainment, aptitudes and interest. Educational objectives are determined by the needs of these learners, the demands of the society and the psychology of learning. Therefore these objectives of education and the development of the physical, social, aesthetic and emotional qualities in the child are assessed only through the academic achievement of a child. It is very important in this process of education. This academic achievement of the child is assessed by the teachers in the educational progress through the process of education. **Schibeci and Riley (1986)** studied the influence of the attitudes on achievement and it was found that attitudes influenced achievement rather than achievement influencing attitudes.

In addition to the attitudes, the academic achievement is also influenced by various factors like:

1. Abilities of the students.
2. Level of intelligence of the students.
3. System of examinations
4. Methods of study
5. Medium of instruction
6. Motivation in the classroom situations.
7. Personality factors and interest of the students.
8. Organizational environment
9. Leadership style
10. Self-concept and Self esteem
11. Socio-Economic status
12. Attitude of head of the institution and teachers towards education and school etc.

C.Mc.Clell & David (1953) and Atkinson. W. John (1955) came to the conclusion that in every individual there is the need for achievement. A person who has a high need for achievement considers problems and obstacles as challenges to be met. According to them Human beings differ from one another in the strength of achievement.

2. SELECTION OF TOPICS:

There are five chapters of Life science in class IX text book issued by WBBSE (West Bengal Board of Secondary Education). So, the investigator prepared the achievement test and the instructional material for problem based learning keeping the topics pertaining to these chapters in mind. Investigator has tried to cover maximum topics of each chapter keeping the academic curriculum in mind as the chapters covered by the investigator were not to be repeated by the subject teacher afterwards.

Chapter-I: Life and Its Diversity: Basic Properties of Life: Origin of Life, Sources of Variations In Life, Biology in the study of Patterns and Processes of Life and its Diversity: Biological Studies at Different Levels and Aspects, Infusions of Knowledge from other Branches of Science into Biology, Application of Modern Biology, Classification of Diversity

of Life: Taxonomy and Taxonomic Hierarchy, Five Kingdoms of Life, Classification of Kingdom Plantae, Classification of Kingdom Animalia.

Chapter-II: Levels of Organization of Life: Biomolecules and their Behaviour: Elementary idea about the compounds of Life, Vitamins, Minerals, Cell: Cell Wall, Cell membrane, Cytoplasm, Nucleus, Mitochondria, Plastids, Endoplasmic Reticulum, Golgi Complex, Lysosome, Vacuole, Ribosome, Centriole, Microtubules, Prokaryotic cell and Eukaryotic cell, Plant Cell and animal cell, Tissue: Plant tissue, Animal Tissue, Major Organs of Human Body and their Function.

Chapter-III: Physiological Processes of Life: Plant Physiology: Photosynthesis, Mineral Nutrition, Transpiration, Movement of water, Minerals, Food and Gases, Respiration: Organ Level Respiration, Cellular Respiration, Nutrition: Concept of Nutrition, Types of Nutrition, Holozoic Nutrition, Alimentary System, Overview of Digestion, Digestive Enzymes, Absorption, Assimilation and Egestion, Metabolism, Dietary Food intake, energy requirement and associated problems, Circulation: concept of circulation, Types of circulation, Body fluid, composition of blood, Blood group and blood donation, coagulation of blood, internal structure of human heart, course of circulation of blood through human heart, Excretion: concept of excretion, process of excretion in plants, excretory products of plants, excretory organs in animals, excretory system of human, human nephron, accessory excretory organs of human.

Chapter-IV: Biology and Human Welfare: Immunity and human Diseases: Basic concept of Immunity, concept of Vaccine, pathogens and Parasites Causing human diseases, washing: basic concept of washing, components of washing, role of washing in eliminating disease burden, significance of washing, Microbes in Human Welfare: roles of microbes as biocontrol agents, biofertilizer.

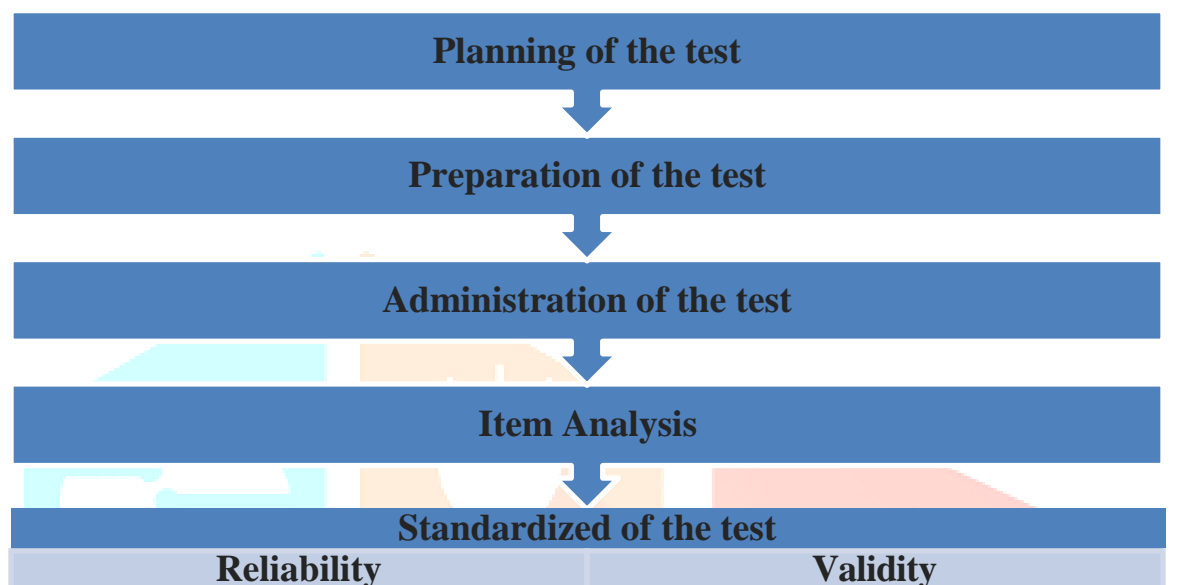
Chapter-V: Environment and Its Resources: Ecology and Ecological Organization: Different levels of Ecology, Natural resources and its sustainable use: Forest resources, Water resources, Food resources, Energy resources.

METHOD OF CONSTRUCTION AND STANDARDIZATION OF ACHIEVEMENT TEST

Development of achievement is affected by a number of variables in home, school and society. Academic Achievement of a child depends on many variables such as Socio Economic Status of the student, Study Habits and Emotional Maturity, Family Environment and Home Environment of the child, etc. Achievement test was constructed on the basis of the objectives of teaching; knowledge, understanding, application and skill in Life Science at secondary level. Many achievement tests are already available in Science. Before constructing achievement test, investigator first reviewed achievement test available in the field of Science. After reviewing them, need was felt to develop an achievement test based on the latest syllabi recommended by West Bengal Board of secondary education (W.B.B.S.E.) for Life Science at IX level. Text

books of Life Science were utilized as source for framing items. The Life Science text book was studied thoroughly and concepts were understood. Questions were selected with the help and advice of subject experts and also by choosing repeated questions by verifying many question banks. Efforts were put to identify the important units of Life Science at class-IX level. On this basis preliminary draft was prepared. Items are framed in the form of multiple choice questions.

Development Steps for Construction of an achievement Test:



A. Planning of the test:

Planning of a test is essential not only in teaching but in all spheres of life. A careful Planning is a very important step in the construction and standardized of an achievement test. For proper planning of the test, the investigator kept following aspects in mind such as: to whom, what, when and how to measure. i.e To whom, the test was to be administered? What was to be measured? When the measurement was to take place? How the measurement was to take place? These questions are important to answer, but too often they are not answered prior to item writing phase. It includes designing the test and preparation of the blue print. Keeping in view the above mentioned facts following decisions were taken by the investigator such as: objective of the test, content of the test, nature of the test, scoring procedure, number of items, types of items, length of test, weightage of objectives, weightage to questions, allotment of time and marking procedure. In this test, investigator opted Life science subject of IX standard under WBBSE for the preparation of the test. In the achievement test, investigator had decided to prepare multiple choice questions. After this a blue print was prepared.

a. Test Purpose The purpose of test was to measure the acquisition, learning and understanding the concepts of Life Science as prescribed in syllabus of grade IX to measure Knowledge, Understanding, Application and Skill of the students.

➤ The test was designed for the students of grade IX in the age group of 13-16 years studying in Government Sponsored Secondary schools in West Bengal with Bengali Medium

as a mode of instruction and affiliated to WBBSE (West Bengal Board of Secondary Education).

- The content of the achievement test was kept simple in language and easy to understand.
- Achievement test has been administered immediately before and after the experiment and also after 2 weeks (14 days) of the experiment as retention test.

b. Content of the Test

Content analysis is another very important phase in construction of an achievement test. It covered the content from five Chapter of Life science textbook of class-IX prescribed by the W.B.B.S.E. which is shown in the following table:

Table 1: Distribution of weightage to content

Chapter	Content /Topic	Weightage	Percentage
1	Life and Its Diversity	15	17.65
2	Levels of Organization of Life	17	20.00
3	Physiological Processes of Life	23	27.05
4	Biology and Human Welfare	15	17.65
5	Environment and Its Resources	15	17.65
Total		85	100.00

c. Objectives of the Test

The objectives are quite important as they help us to decide where to start from & where to end the programme. The achievement test which consisted of multiple choice items was devised by the investigator keeping in mind the content and objectives of the items. Objectives of the achievement test were defined in behavioural terms focusing on knowledge, understanding, application and skill from five units of Life Science textbook of class-IX prescribed by the WBBSE.

Table 2: Distribution of weightage to objectives

Sl.No.	Objectives	Weightage	Percentage
1	Knowledge	32	37.65
2	Understanding	24	28.24
3	Application	17	20.00
4	Skill	12	14.11
5	Total	85	100.00

Table 3: Distribution of Weightage to Content & Objectives

Content Chapter	Knowledge	Understanding	Application	Skill	Weightage	Percentage
Life and Its Diversity	6	4	3	2	15	17.65
Levels of Organization of Life	7	5	3	2	17	20.00
Physiological Processes of Life	8	6	5	4	23	27.05
Biology and Human Welfare	5	5	3	2	15	17.65
Environment and Its Resources	6	4	3	2	15	17.65
Total	32	24	17	12	85	100
Percentage	37.65	28.24	20.00	14.11	37.65	

d. Size and type of test

The size of the test refers to number of items in the test. It is difficult to prepare good items at first attempt; therefore more items are prepared in the initial draft than the desired items in the final draft. The initial draft of an achievement test contains 85 multiple choice questions.

B. Preparation of the test

Preparation of achievement test consisted of: selecting the type of questions to be included, instructional and specific objectives of the test and preparation of first draft.

a. Types of Test Items

Multiple choice questions were prepared for developing achievement test by the investigator keeping in mind the content and objectives of the research study. Each item had four alternatives out of which one was correct. According to **Osterlind (1990)** "A test item in an examination of mental attributes is a unit of measurement with a stimulus and a prescriptive form for answering; and, it is intended to yield a response from an examinee from which performance in some psychological construct (such as knowledge, ability, predisposition, or trait) may be inferred".

b. Preparation of blue print of the Test

Blue print is very important phase of planning of test which provides a path for writing items for preliminary draft. After studying thoroughly the syllabus prescribed in grade IX Life

Science textbook, the main content area was identified and the major course instructional behavioral objectives were specified. Here investigator put various types of questions in blue print and distribute the questions according to their cognitive level. For the present test a blue print with four dimensions, i.e. knowledge of content, Understanding, application and Skill was prepared. The investigator writes down his decisions in the form of a blueprint. Blueprint consists of 85 multiple choice questions which are shown in the following table 4.

Table 4: Blueprint for the first draft of the achievement test

Sl. No.	Chapter	Knowledge	Understanding	Application	Skill	of Total Items
1	Life and Its Diversity	1, 2, 12, 13, 35, 53	62, 63, 74, 75	17, 55, 57	18, 85	15
2	Levels of Organization of Life	4, 8, 9, 24, 46, 58, 79	3, 39, 40, 76, 77	23, 59, 67	68, 78	17
3	Physiological Processes of Life	5, 6, 22, 25, 26, 44, 69, 73	28, 36, 43, 65, 66, 81	27, 47, 50, 54, 60	34, 37, 61, 80	23
4	Biology and Human Welfare	29, 31, 32, 51, 71	7, 52, 72, 83, 84	56, 64, 70	38, 41	15
5	Environment and Its Resources	10, 14, 15, 16, 19, 20	11, 21, 30, 33	42, 45, 49	48, 82	15
Total		32	24	17	12	85

First Draft of the Achievement Test

The following points were considered while writing multiple choice test items:

- Single objective was assessed by each item.
- Items were expressed in precise, clear and simple language.
- Basic grammar, punctuation and spelling were checked for each item.
- Each item was laid out in a clear and consistent manner.
- Such items that provide a clue to the answer of other items were avoided.
 - Use of specific determiners like always, never, seldom, sometimes etc. were avoided.
 - Use of the alternatives “all of the above” and “none of the above” were minimized as use of the same has been found in several studies to decrease item discrimination & test score.
 - The items measured the significant aspects of knowledge and understanding i.e. it was not concerned with the non-significant aspect of the subject matter.

At the initial stage, preliminary draft was prepared corresponding to five chapter of Life Science of class IX. The items were written in view of objectives and content to be tested. The task of preparation of an achievement test in Life Science is includes three steps: Item-writing,

checking by expert and Item-Editing. Eighty Five (85) items were included in the first draft of test covering the entire content and objectives. While constructing the items, it was ensured that no objective remains untested. Language of the test items was understandable and unambiguous. It was also ensured that the instructions were clear or not. The test items were arranged properly and assembled into the test. The number of items was more than required finally. Irrelevant clauses were avoided. Adjectives like always, never, sometimes were avoided. Items were multiple choice types i.e. each item have four options in which only one option is correct. Here students were expected to answer the questions by selected the right option from among the four listed responses. The arrangement of test items was based on the finding of **Sax and Cromack (1966)** who recommended the item arrangement in order of ascending difficulty. Easy items were given a place in the beginning and difficult items towards the end.



All the items were evaluated by the experts as well as by the investigator in order to remove vagueness, ambiguous terms and language difficulty in the format of test items. 9 items were deleted and few items were modified as per suggestions received from the experts. In this way preliminary draft with Seventy Six (76) items was made.

Second draft of the Achievement test

After expert opinion few items were dropped and 76 items were retained for validation. Item no. 8, 13, 37, 48, 80, 83, 66, 76, 85 (9 items) were removed from the initial draft and second draft consisted of 76 items. The test items with their specifications have been given in table 5. The second draft of achievement test was firstly given to 10 students of grade IX, just to have an overview of the difficulties that the students can encounter in doing the achievement test. This would help in modifying the language of the test according to the level of the students. And this would also help in avoiding wastage of time when administering the same test on a large sample for analyzing discriminating power and difficulty index of each item of the test as well as finding the reliability and validity of the final achievement test.

Table 5: Table showing Specifications of the Items of Second Draft of Achievement Test

Objective Content	Knowledge	Understanding	Application	Skill	Total
Life and Its Diversity	1, 2, 12, 35, 53	62, 63, 74, 75	17, 55, 57	18	13
Levels of Organization of Life	4, 9, 24, 46, 58, 79	3, 39, 40, 77	23, 59, 67	68, 78	15
Physiological Processes of Life	5, 6, 22, 25, 26, 44, 69, 73	28, 36, 43, 65, 81	27, 47, 50, 54, 60	34, 61	20
Technology and Human Welfare	29, 31, 32, 51, 71	7, 52, 72, 84	56, 64, 70	38, 41	14
Environment and Its Resources	10, 14, 15, 16, 19, 20	11, 21, 30, 33	42, 45, 49	82	14
Total	30	21	17	8	76

Criteria for Scoring

A scheme of evaluation was prepared for scoring the Achievement test. One point of credit was to be given for each correct response if respondent marks the correct answer and no credit if wrong answer to the questions is marked. Students were given a separate response sheet for marking the answers of the achievement test.

Preliminary Try Out of the Achievement Test

Second draft of Achievement test was administered to 20 students of grade IX. During data collection proper rapport was established and maintained with the students. The respondents were explained how to take the test. Every reasonable precaution was taken to ensure normal conditions during the administration of the test. After preliminary try out, problems faced by the students were noted and given the due consideration at the time of revision of first draft. Some irrelevancies and ambiguities which were wholly unsuspected by the investigator before preliminary try out, came to light after it. In the light of the view of Science teachers, the achievement test was reviewed properly. As a result of the discussion some items were modified.

Administration of second draft of Achievement test

The modified second draft was administered individually to a sample of 112 students of IX grade in Government Sponsored schools of West Bengal who were not included in the experiment.

D. Item Analysis

After scoring the second draft of the achievement test, items were effectively evaluated by studying the students' responses to each item (item analysis) to find out how well each item in the test functioned. In item analysis suitability of each item is seen statistically one by one. In and suited to the purpose are selected and the rest are either eliminated or modified to suit the purpose. In brief, it can be said that item analysis demonstrate how effectively a given test item functions within the total test. The item-analysis procedure for achievement test provided the following information: **The item difficulty:** Item analysis helps in finding out which items are difficult, easy, moderately difficult or moderately easy. In other words, it provides an index of the difficulty value of each item.

The difficulty indices were analysed using the Henning (1987) guidelines as shown in the following table:

Table 6: Henning's Guidelines(Difficulty Value)

High Difficult	Medium	Low (easy)
≤ 0.33	0.34-0.66	≥ 0.67

The item discriminating power: Item analysis provides indices of the ability of the item to discriminate between high and low group. In other words, item analysis indicates the discrimination value of each item (discrimination index).

Thus, from item-analysis it can be found out whether an item was very easy or very difficult, how effectively high and low scorers on the test are discriminated, and whether all of the alternatives of the test fulfilled the purpose they were supposed to. Thus, item-analysis data helps us to detect specific technical flaws, and provides information for improving test items.

For the present achievement test, 27 percent upper and 27 percent lower cases were considered for calculating difficulty value and discrimination value of each item. Kelley (1939) showed that the product moment correlation between a test item score and the total score could be estimated by using only the tails of the distribution and he also showed that the most efficient division to use was the top and bottom 27 percent tails. This suggestion was followed. The test papers were arranged from the highest score to the lowest score. The top 27 percent of the students were kept in one group which constituted the high group. The lowest 27 percent of the students were kept in the other group which constituted the low group. The middle group comprising of 46 percent of papers was kept aside since the scores of the two extreme groups high and low were only needed for item analysis.

Ebel's (1979) criteria and guidelines for categorizing discrimination index is a widely quoted set of guidelines were used in this analysis.

Table 7: Ebel's Guidelines (1979) of Discrimination power

Discrimination power	Description
0.40 and above	The item is quit satisfactorily
Between 0.30-0.39	Less or no revision is required
Between 0.20-0.29	The item is marginal and need revision
≤0.19	The item should be eliminated or completely revised

The 112 answer sheets arranged in descending order of their achievement scores, upper group and lower group were taken up for computing the discriminating power and the difficulty value of the test. For calculating the difficulty value (D.V.) and discriminating power (D.P.) of items following formulae were used:

$$D.V. = \frac{RU + RL}{N} \quad D.P. = \frac{RU - RL}{N/2}$$

Where

RU = Total Number of Right Responses in the Upper Group RL = Total Number of Right Responses in the Lower Group N = Total Number of Students in Both the Groups (30)

When an equal number of students in each group answer the item correctly Zero discriminating power (.00) is obtained. When more students in the lower group than in the upper group answer correctly Negative discriminating power is obtained. Such types of items need to be removed. Table 8: Table showing the value of D.V. and D.P. for each item of the Achievement Test

Sl. No.	No. of Correct Responses		D.V.	D.P.	Remarks
	In the Upper Group RU	In the Lower Group RL			
1	20	6	0.42	0.45	A
2	25	4	0.48	0.68	A
3	25	13	0.61	0.39	A
4	19	11	0.48	0.27	A
5	20	2	0.35	0.58	A
6	27	1	0.45	0.83	A
7	8	5	0.21	0.10	R
8	15	11	0.42	0.13	R
9	25	10	0.56	0.48	A
10	22	5	0.44	0.548387	A
11	21	7	0.45	0.45	A
12	3	3	0.09	0	R
13	8	5	0.21	0.09	R
14	13	12	0.40	0.032	R
15	20	9	0.47	0.35	A
16	23	6	0.47	0.55	A
17	26	9	0.56	0.57	A
18	23	6	0.47	0.55	A
19	8	6	0.23	0.07	R
20	22	6	0.45	0.52	A
21	15	11	0.42	0.13	R
22	16	6	0.35	0.32	A
23	17	10	0.44	0.23	A
24	21	4	0.40	0.55	A
25	27	9	0.58	0.58	A
26	12	8	0.32	0.13	R

27	25	8	0.53	0.55	A
28	27	6	0.53	0.68	A
29	31	21	0.74	0.32	A
30	26	8	0.55	0.58	A
31	8	5	0.21	0.10	R
32	27	8	0.56	0.61	A
33	19	10	0.46	0.29	A
34	27	5	0.52	0.71	A
35	27	9	0.58	0.58	A
36	19	6	0.40	0.42	A
37	7	4	0.18	0.10	R
38	29	8	0.60	0.69	A
39	17	3	0.328	0.45	A
40	29	5	0.55	0.77	A
41	14	12	0.42	0.06	R
42	29	5	0.55	0.77	A
43	22	6	0.45	0.52	A
44	17	9	0.42	0.26	A
45	5	4	0.15	0.03	R
46	25	9	0.55	0.52	A
47	27	6	0.53	0.68	A
48	8	7	0.24	0.032	R
49	29	5	0.55	0.77	A
50	15	13	0.45	0.06	R
51	27	5	0.52	0.71	A
52	25	9	0.55	0.52	A
53	27	8	0.56	0.61	A
54	14	6	0.32	0.26	A
55	7	4	0.18	0.10	R
56	25	4	0.48	0.68	A
57	20	6	0.42	0.45	A
58	25	13	0.61	0.39	A
59	8	5	0.21	0.09	R
60	25	10	0.56	0.48	A
61	19	11	0.48	0.27	A
62	3	3	0.09	0	R
63	20	9	0.47	0.35	A
64	21	7	0.45	0.45	A
65	23	6	0.47	0.55	A

66	8	6	0.23	0.07	R
67	18	3	0.34	0.48	A
68	14	12	0.42	0.06	R
69	27	9	0.58	0.58	A
70	8	5	0.21	0.10	R
71	29	8	0.60	0.69	A
72	19	10	0.46	0.29	A
73	26	8	0.55	0.58	A
74	31	21	0.74	0.32	A
75	27	6	0.53	0.68	A
76	6	6	0.19	0	R
77	25	8	0.53	0.55	A
78	18	6	0.39	0.39	A
79	12	7	0.31	0.16	R
80	7	7	0.23	0	R
81	27	7	0.55	0.65	A
82	26	5	0.50	0.68	A
83	12	8	0.32	0.13	R
84	17	9	0.42	0.26	A
85	11	10	0.34	0.03	R

["A" stands for Accepted, and "R" stands for Rejected.]

Table 9: Total items of finally accepted and rejected

Accepted	Rejected
60	25

Final Draft of Achievement Test

Final draft of the achievement test was prepared on the basis of item analysis for difficulty value and discriminating power. The investigator, after selecting items for final draft, rearranged them in accordance with the principal laid down by experts; the final draft of achievement test consists of 60 items. The items with difficulty value from 0.20 to 0.90 and discriminating power from 0.20 to 0.90 were retained in the final draft of the achievement test. On the basis of this criterion the items at the serial number (7, 12, 14, 19, 21, 26, 31, 41, 45, 50, 55, 59, 62, 68, 70 and 79 (16 items) were rejected from the achievement test and the remaining 60 items were retained in the final draft after removing the items which were unable to fulfill the criteria of discriminating power and difficulty index.

Table 10: Distribution of discriminating power and Difficulty values of items of final draft of Achievement

Level of Difficulty crimination Index	Moderate –(0.34 -0.66)	Remarks	Total
0.40 and above	1, 2, 3, 4, 6, 9, 10, 11, 15, 16, 17, 18, 20, 23, 24, 25, 27, 28, 29, 30, 32, 33, 34, 35, 36, 38, 40, 42, 43, 44, 46, 47, 49, 51, 52, 53, 56, 57, 58, 60, 61, 63, 64, 65, 69, 71, 72, 73, 74, 75, 77, 81, 82, 84	Very Good Items	54
Between 0.30-0.39	5, 22, 39, 54, 67, 78	Reasonably Good	6
Total			60

Table 11: Number of items retained in the final draft of Achievement test at different cognitive levels

Cognitive levels of objectives	Serial Number of items retained	Total
Knowledge	1, 2, 4, 5, 6, 9, 10, 15, 16, 20, 22, 24, 25, 29, 32, 35, 44, 46, 51, 53, 58, 69, 71, 73	24
Understanding	3, 11, 28, 30, 33, 36, 39, 40, 43, 52, 63, 65, 72, 74, 75, 77, 81, 84	18
Application	17, 23, 27, 42, 47, 49, 54, 56, 57, 60, 64, 67	12
Skill	18, 34, 38, 61, 78, 82	6
Total		60

Table 12: Item wise Question Type set for the Achievement Test

Item No.	Question Type	Chapter	Taken from 2 nd draft	Item No.	Question Type	Chapter	Taken from 2 nd draft
1.	A	1	17	31.	U	5	30
2.	K	1	1	32.	K	3	25
3.	K	2	4	33.	S	3	61
4.	U	1	63	34.	K	2	46
5.	K	3	5	35.	U	2	40
6.	A	3	27	36.	A	3	54
7.	U	5	11	37.	S	1	18
8.	K	3	6	38.	U	4	72
9.	K	4	29	39.	K	4	51
10.	U	3	28	40.	K	3	44
11.	S	2	78	41.	U	3	65
12.	A	2	23	42.	A	5	49
13.	K	1	2	43.	U	2	77

14.	A	5	42	44.	S	5	82
15.	K	2	9	45.	U	5	33
16.	K	5	10	46.	K	4	71
17.	U	2	3	47.	K	1	35
18.	A	4	56	48.	A	4	64
19.	U	3	36	49.	U	4	84
20.	K	4	32	50.	K	3	69
21.	U	4	52	51.	K	5	20
22.	S	3	34	52.	K	3	73
23.	K	2	24	53.	U	2	39
24.	A	3	47	54.	A	2	67
25.	U	3	43	55.	S	4	38
26.	K	5	15	56.	K	2	58
27.	K	3	22	57.	U	3	81
28.	U	1	74	58.	K	1	53
29.	K	5	16	59.	U	1	75
30.	A	1	57	60.	A	3	60

Table 13: Item Analysis of Final Achievement test

ITEM NO.	D.V.	D.P.	ITEM NO.	D.V.	D.P.
1.	0.56	0.57	31.	0.55	0.58
2.	0.42	0.45	32.	0.58	0.58
3.	0.48	0.27	33.	0.48	0.27
4.	0.47	0.35	34.	0.55	0.52
5.	0.35	0.58	35.	0.55	0.77
6.	0.53	0.55	36.	0.32	0.26
7.	0.45	0.45	37.	0.47	0.55
8.	0.45	0.83	38.	0.46	0.29
9.	0.74	0.32	39.	0.52	0.71
10.	0.53	0.68	40.	0.42	0.26
11.	0.39	0.39	41.	0.47	0.55
12.	0.44	0.23	42.	0.55	0.77
13.	0.48	0.68	43.	0.53	0.55
14.	0.55	0.77	44.	0.50	0.68
15.	0.56	0.48	45.	0.46	0.29
16.	0.44	0.55	46.	0.60	0.69
17.	0.61	0.39	47.	0.58	0.58
18.	0.48	0.68	48.	0.45	0.45
19.	0.40	0.42	49.	0.42	0.26
20.	0.56	0.61	50.	0.58	0.58
21.	0.55	0.52	51.	0.45	0.52
22.	0.52	0.71	52.	0.55	0.58
23.	0.40	0.55	53.	0.33	0.45
24.	0.53	0.68	54.	0.34	0.48

25.	0.45	0.52	55.	0.60	0.69
26.	0.47	0.35	56.	0.61	0.39
27.	0.35	0.32	57.	0.55	0.65
28.	0.74	0.32	58.	0.56	0.61
29.	0.47	0.55	59.	0.53	0.68
30.	0.42	0.45	60.	0.56	0.48

Table 14: Showing Specifications of the Items of Final Draft of Achievement Test

Chapter	Content	Weightage				Total No. of Items/questions	Total marks per theme	Chapter wise marks in Percentage
		Knowledge	Understanding	Application	Skill			
1.	Life and Its Diversity	4 (4)	3 (3)	2 (2)	1 (1)	10	10	16.6%
2.	Levels of Organization of Life	5 (5)	4 (4)	2 (2)	1 (1)	12	12	20%
3.	Physiological Processes of Life	7 (7)	5 (5)	4 (4)	2 (2)	18	18	30%
4.	Biology and Human Welfare	4 (4)	3 (3)	2 (2)	1 (1)	10	10	16.6%
5.	Environment and Its Resources	4 (4)	3 (3)	2 (2)	1 (1)	10	10	16.6%
Total		24 (24)	18 (18)	12 (12)	6 (6)	60	60	100%
Percentage		40%	30 %	20%	10%	100%		

Table 15: Objective wise distribution of items of the Final Achievement test

Sl. No.	Chapter	Knowledge	Understanding	Application	Skill	Total Item
1	Life and Its Diversity	2, 13, 47, 58	4, 28, 59	1, 30	37	10
2	Levels of Organization of Life	3, 15, 23, 34, 56	17, 35, 43, 53	12, 54	11	12
3	Physiological Processes of Life	5, 8, 27, 32, 40, 50, 52	10, 19, 25, 41, 57	6, 24, 36, 60	22, 33	18
4	Biology and Human Welfare	9, 20, 39, 46	21, 38, 49	18, 48	55	10
5	Environment and Resources	16, 26, 29, 51	7, 31, 45	14, 42	44	10
Total		24	18	12	6	60

Table 16: Items of Achievement test at different cognitive levels in the final draft

Item No.	Question Type	Chapter	Item No.	Question Type	Chapter
1.	A	1	31.	U	5
2.	K	1	32.	K	3
3.	K	2	33.	S	3
4.	U	1	34.	K	2
5.	K	3	35.	U	2
6.	A	3	36.	A	3
7.	U	5	37.	S	1
8.	K	3	38.	U	4
9.	K	4	39.	K	4
10.	U	3	40.	K	3
11.	S	2	41.	U	3
12.	A	2	42.	A	5
13.	K	1	43.	U	2

14.	A	5	44.	S	5
15.	K	2	45.	U	5
16.	K	5	46.	K	4
17.	U	2	47.	K	1
18.	A	4	48.	A	4
19.	U	3	49.	U	4
20.	K	4	50.	K	3
21.	U	4	51.	K	5
22.	S	3	52.	K	3
23.	K	2	53.	U	2
24.	A	3	54.	A	2
25.	U	3	55.	S	4
26.	K	5	56.	K	2
27.	K	3	57.	U	3
28.	U	1	58.	K	1
29.	K	5	59.	U	1
30.	A	1	60.	A	3

E. Standardization of Achievement Test

60 items constituted the final form of the Achievement test. Achievement test was further standardized by experimental validation of the test that included establishing reliability and validity.

a. Reliability of the test

Reliability is one of the important characteristics of any test and measuring instrument. Reliability refers to degree of consistency of test scores obtained by same individual when re-examined with test on different sets of equivalent items or under other variable examining condition. There are different methods such as test- retest, split half, alternate form and parallel form etc. In the present research paper, the reliability of the test was measured by test-retest method. The test was administered to a group of students and was re administered to the same group of students after fifteen days and two sets of scores were correlated. The reliability co-efficient of the present test was 0.84. This shows that achievement test has high reliability.

b. Validity of the test

Validity refers to the attainment of purpose for which the test is prepared. There are different methods of estimating validity such as Face validity, Content validity, Construct validity, Predictive validity and concurrent validity.

The investigator opted for content validity. The content validity is concerned with the relevance of the contents of the items, individually and as a whole. In which expert judgement was taken into consideration. To estimate content validity of an achievement test, test was given to four Science teacher and four experts to compare test items with the content and objectives of content. Out of the eight experts, four experts have solved the test so the scoring key could be verified. The experts agreed with the investigator with the distribution of content and objective of the content as well as with the scoring procedure. In this way content validity of the achievement test was established.

3. Conclusion

The study was carried out to construct and produce a reliable and valid achievement test in Science. The test was standardized on the sample of 100 students studying in S.M.H.S School, M.N. High School, Government Sponsored Girls Sr. Sec. School Santipur, district of Nadia. Theoretical and empirical literature related to the study was reviewed. The reliability of the test was determined through Test-Retest method of reliability which was 0.84 and content validity of the test was estimated. Hence, the constructed achievement test in Science has a high reliability and validity. The test can be used by the teachers to assess student's achievement in Life Science when they have covered the content areas of IX class.

Reference:

- Agarwal R. N, "Educational Psychological measurement, Vinod Pustak Mandir, Hospital, Agra, June, 1964.
- Anandharaja, S. (2016). Development and Standardization of Academic Achievement Test in Social Science. *International Journal of Computational Research and Development (IJCRD)*, 97-101.
- Ary, D., Jacobs, L.C., Razavieh, A.: Introduction to Research in Education, 6th edn. Wadsworth, California (2002)
- Awang, M. M. (2013). Students' Attitudes and Their Academic Performance in Nationhood Education. *International Education Studies*, 21-28.

- Bhagat, P. (2013). Construction and Validation of Achievement Test in science. *International Journal of Science and Research (IJSR)* , 2277-2280.
- Bichi, A. A.: Item analysis using a derived science achievement test data. *Int. J. Sci. Res.* **4**(5). www.ijsr.net (2015)
- Buch, M. B. (editor), Second survey of Research in Education, 1972-78. Gerrett, Henry E. Testing for teacher, Eurasian Publishing House, New Delhi, 1959.
- Buch, M.B. (editor), a survey of Research of Education. 1st edition - 1974, center of advance study in education, faculty of education and Psychology, M. S. University of Baroda.
- Buch, M. B. (editor), Forth survey of Research in Education, First edition -1981.
- Chaudhary, S. (2017). Construction and Standardization of Achievement Test in Educational Psychology. *Educational Quest: An Int. J. of Education and Applied Social Science* , 817-823.
- Das, S. K., Halder ,U. K., Mishra, B. & Debnath, D. (2014). Study on relationship between attitude towards education and Academic Achievement in secondary level minority students, *Indian Streams Research Journal*, ISSN 2230-7850, Volume-4, Issue-10, Nov-2014, p.1-6, Available online at www.isrj.org
- Devi, S. & Sharma, H.L. (2013). Construction of an Achievement Test for the students of VIII class in the Subject of Mathematics. *International Journal of Scientific Research*, 2(7).
- Ebel RL. (1979). *Essential of Educational Measurement* (3rd Edition). Englewood Cliffs, NJ: Prentice Hall.
- Gerrett, Henry E. Testing for teacher, Eurasia Publishing House, New Delhi, 1959.
- Henning G. (1987). *A guide to Language Testing Development, Evaluation, Research*. London: Newbury House Publisher.
- Jayanthi, J. (2014). Development and Validation of an Achievement Test in Mathematics. *International Journal of Mathematics and Statistics Invention*, 2(4), 40-46.
- Kumar N. (2016). Construction and Standardization of an Achievement Test in English Grammar. *International Journal of Current Research and Modern Education*, 1(2).
- Kohli, T.K. (1975). Characteristic Behavioral and Environmental correlates of Academic

- Megargee, I. (2000). *Encyclopedia Of Psychology*, 8OUP. Oxford Dictionaries; Language matter
- Mendapara, D. A " To construct and standardize achievement test in science for std.9th",M.Ed disertation, Sau. University, Rajkot, 1989.
- Mishra, A. (2017). Construction and Standardization of Commerce Achievement Test for Higher Secondary Level. *IRA International Journal of Education & Multidisciplinary Studies*,7(3),250-260.
- Nandani, M. C. "To construct and standardize achievement test in science for std.9th of Gujarati medium high schools of Surendranagar district" M. Ed disertation, Sau. University, Rajkot, 1980.
- Norman E. Gronlund. *Readings in Measurement and Evaluation*. New York: MacMillan, 1968.
Retrived from
https://journals.sagepub.com/doi/abs/10.1177/00131644690290_0129?journalCode=epma
- Odukoya, J.A., Adekeye, O., Igbino, A.O. *et al.* Item analysis of university-wide multiple choice objective examinations: the experience of a Nigerian private university. *Qual Quant* **52**, 983–997 (2018). <https://doi.org/10.1007/s11135-017-0499-2>
- Parekh, P.J. (2018), *Construction and Validation of Achievement Test in Science for Standard 8th*, ISSN: 2395-6011, IJSRST, Volume 4, Issue 2, p.1205-1209
- Parmar, G. B., "To construct and standardize achievement test in chemistry for 12th std.Students of science stream". M. Ed, disertation, Education Dept., Sau. University,Rajkot, 1989.
- Rani, R.&Anisha (2017). Construction and Standardization of Mathematics Achievement Test for IXth Grade Students. *An International Journal of Education and Applied Social Science*,8(2),651-655.
- Reynolds, C. R. & Janzen, E.F. (2002).*Concise Encyclopedia of Special Education*. New Jersey: John Willy & Sons, Inc.
- Sharma, H.L.&Poonam (2017).Construction and Standardization of an achievement test in English Grammar. *International Journal of Advanced Educational Research*,2(5),230-235.
- Sharma, H. L. (2018, JUNE 29). Construction and standardization of an achievement test in science. *IJRAR* , 1037-1043.
- Sing, A. (2018). Construction and Standardization of Achievement Test in Biology. *International Journal of Research in Social Sciences* , 18-27.
- Solanki, K. V. "To construct and standardize achievement test in Biology for 12th std. Students of science stream". M. Ed, disertation, Sau. University, Rajkot, 1987.
- Tas, N. S. (2017). Developing Achievement Test: A Research for Assessment of 5th Grade Biology Subject. *Journal of Education and Learning* , 254-271.

Internet:

en.wikipedia.org > wiki > Achievement_test

ACHIEVEMENT TEST OF LIFE SCIENCE IN CLASS-IX**Constructed by:**

Mr. Rakesh Manna & Prof. (Dr.) Jayanta Mete

Directions for the respondents:

1. Fill in your particulars in the answer sheet provided.
 2. Start solving the test quickly as soon as you are asked to do so.
 3. If you don't know the answer of a particular question, don't waste the time, rather proceed further.
 4. There are 60 questions in the test. Each question has four probable answers, only one is correct.
 5. Do not write anything on the question booklet. Mark your answers on the answer sheet provided.
 6. The answer should be marked by darkening the respective circle.
 7. For every correct answer one mark will be awarded and there is no negative mark for incorrect answers.
 8. Time limit for the test is one and half hour maximum but try to complete the test as soon as possible.
-

1. Housefly, spiders and cockroaches are the organisms seen commonly at our homes as well at times in school also. All these organisms belong to which group of Animalia.
(a) Platyhelminthes (b) Reptiles (c) Poecifera (d) Arthropoda
2. The term "taxonomy" was coined by-
(a) John Ray (b) A P de- Candolle (c) Carolus Linnaeus (d) Aristotle
3. Which one of the following is produced at the final stage of breakdown of polysaccharide?
(a) Amino Acid (b) Fatty Acid (c) Nucleotide (d) Monosaccharide
4. Body covered with epidermal dry scales-which of the following type of organism has this characteristic?
(a) Mammalia (b) Echinodermata (c) Reptilia (d) Amphibia
5. Which of the following fish breathes through accessory respiratory system?
(a) Rohu (b) Catla (c) Shingi (d) Kalbaus
6. Cereals are almost eaten everyday in our day to day meal in different form. They largely fulfill which of the following energy requirement?
(a) Proteins (b) Carbohydrates (c) Fats (d) Minerals
7. A plant which can help us in detecting pollution of a place is a pollution indicator plants.

Find out the one from the following:

- (a) Mycorrhiza (b) Lichen (c) Rose (d) Marigold
8. Name the metal present in chlorophyll 'a' and 'b'?
- (a) Iron (b) Copper (c) Magnesium (d) Manganese
9. Which disease is borne by the female Aedes mosquito?
- (a) Malaria (b) Hepatitis (c) Tuberculosis (d) Dengue
10. What helps in the blood circulation in human heart to remain uni-directional?
- (a) Auricle (b) Ventricle (c) Artery (d) Valve
11. What is the total caloric value of 5gm of fat, 10 gm of carbohydrate and 10 gm of protein?
- (a) 110 cal (b) 136.5 cal (c) 126.5 cal (d) 145 cal
12. Which of the following pairs is correct?
- (a) Vitamin A-Protein Synthesis
(b) Vitamin C- Helps in the foetal growth in the womb
(c) Vitamin D-Haemoglobin Synthesis
(d) Vitamin K-Helps in Clotting of Blood (Anti haemorrhagic factor)
13. In which of the following non-flowering plant group vascular tissue can be found?
- (a) Algae (b) Bryophyte (c) Monocotyledons (d) Pteridophyta
14. A food chain comprising birds, green plants, fish and man. The concentration of harmful chemical entering the food chain will be maximum in
- (a) Green plants (b) Man (c) Birds (d) Fish
15. Name the tissue that transports water to different parts of a plant.
- (a) Xylem (b) Phloem (c) Epidermis (d) stomata
16. Which one of the following is an artificial ecosystem?
- (a) Lake (b) Forest (c) Pond (d) Crop field
17. We often hear that DNA helps in finding out the actual parents of a child. DNA is present in which cell organelle
- (a) Nucleus (b) Cell membrane (c) Cytoplasm (d) Vacuoles
18. When I attack the humans, they have sore throat as tonsil swells; they feel pain to swallow food. Name disease that I create-
- (a) Tetanus (b) Diphtheria (c) Malaria (d) Hepatitis
19. Which type of cellular respiration produces curd?
- (a) Aerobic respiration
(b) Anaerobic respiration
(c) Alcoholic fermentation

(d) Lactic acid fermentation

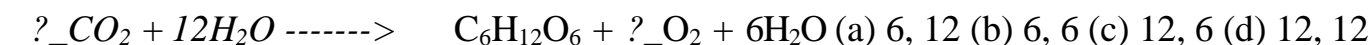
20. ORS (Oral Rehydration Solution) is most commonly used in

- (a) Diarrhea (b) measles (c) typhoid (d) tetanus

21. What do we call the coexistence of Rhizobium and Pea plant?

- (a) Parasitism (b) Symbiosis (c) Prey-predator relationship (d) Competition

22. Fill in the Blanks:



23. In which organ of human body RBC is destroyed?

- (a) Liver (b) Kidney (c) Lungs (d) Spleen

24. Which one of the following pairs is correct?

- (a) Ascent of Sap- Xylem tissue
 (b) Light-independent phase of photosynthesis-Grana
 (c) Glycolysis-Mitochondria
 (d) Oxygen transport-WBC

25. Identify the process through which oxygen is returned to the atmosphere.

- (a) Combustion
 (b) Respiration
 (c) Photosynthesis
 (d) In the formation of oxides of nitrogen

26. Which of the following chemicals causes depletion of the ozone layer?

- (a) Carbon tetrachloride
 (b) Methane
 (c) Chloro fluoro carbon
 (d) Carbon monoxide

27. The functional unit of the kidney is:

- (a) The Pelvis (b) The Nephron (c) The Neuron (d) The Medulla

28. Pinus and Cycas most commonly seen at the side of the roads in the hill stations like Shimla and Solan belongs to _____.

- (a) Angiosperms (b) Gymnosperms (c) Bryophytes (d) Pteridophytes

29. Which of the following is an autotroph?

- (a) Lion (b) Insect (c) Tree (d) Mushroom

30. Fungus and algae both are placed under the same division "Thallophyta". What is the reason that both share the same group?

(a) Both :

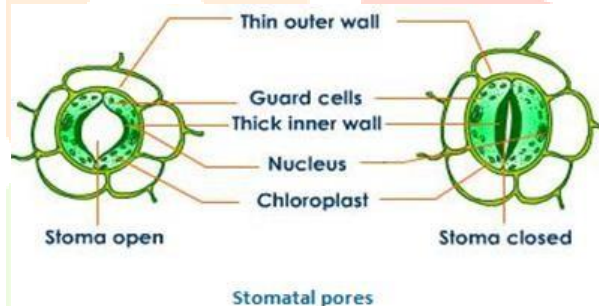


- (b) Both are saprophytic
 (c) Plant body in both is not differentiated into root, stem and leaves
 (d) Both have false roots

31. We know energy cannot be created nor be destroyed. Energy flow in the ecosystem is
 (a) Unidirectional (b) Bidirectional (c) Multidirectional (d) None of these

32. Which cell in blood helps in blood coagulation?
 (a) Platelet (b) Red Blood Corpuscle (c) Neutrophil (d) Eosinophil

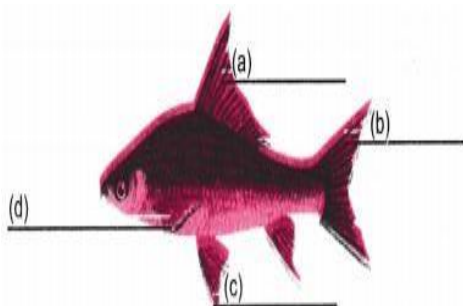
33. Tiny pores are found on the surface of the leaves of plants. These pores are called stomata. These stomata surrounded by the kidney shaped guard cells provide many vital functions to the plants. Which of the following functions is not served by the stomata for the plants?
 (a) Exchange of gases, particularly CO_2 and O_2 , with atmosphere
 (b) Loss of water in the form of vapours during transpiration
 (c) Helps to create pressure for the water to rise upward, by its process of transpiration
 (d) Helps the leaves to carry out the process of photosynthesis



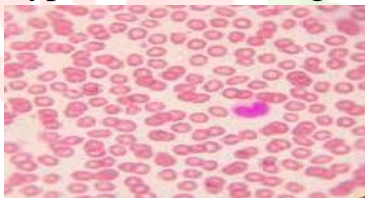
34. Who discovered the cell in a cork slice?
 (a) Robert Hooke (b) Leeuwenhoek (c) Purkinje (d) Robert Brown

35. Since my cells are closely arranged, there is no intercellular space and my cells have the power of division. What type of tissue am I?
 (a) Collenchyma (b) Parenchyma (c) Sclerenchyma (d) Meristematic tissue

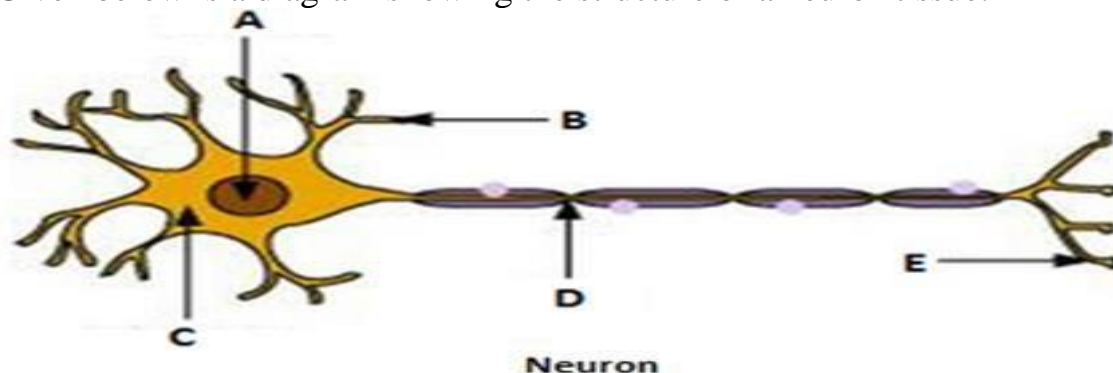
36. If we touch our ears and press it, we can easily press it. But if we do the same thing with our head, it is hard and our pressing has no effect. Select the tissue which is responsible for the elasticity of nose.
 (a) Cartilage (b) Bone (c) Blood (d) Ligament



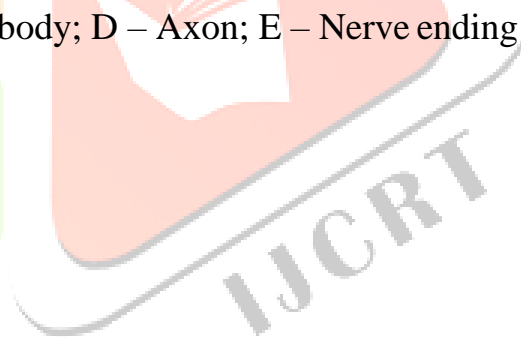
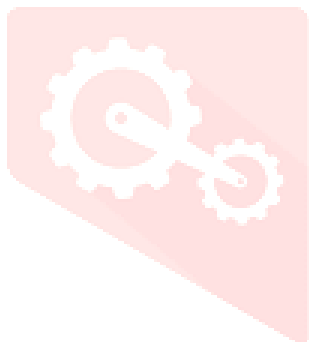
37. Label a, b, c and d given in figure.
- (a) Dorsal fin (b) Caudal fin (c) Pelvic fin (d) Pectoral fin
 - (a) Dorsal fin (b) Pectoral fin (c) Pelvic fin (d) Caudal fin
 - (a) Pelvic fin (b) Caudal fin (c) Dorsal fin (d) Pectoral fin
 - (a) Caudal fin (b) Dorsal fin (c) Pelvic fin (d) Pectoral fin
38. Which of the following is not a kind of 'organic farming'?
- Compost and vermi-compost
 - chemical fertilizers
 - green manures
 - crop rotation
39. Communicable diseases like Common cold, Pneumonia and Tuberculosis mainly spread through _____.
- Air
 - Water
 - Soil
 - Mosquitoes
40. A normal diet should contain about 75 grms of _____ per day.
- Carbohydrates.
 - Fats.
 - Proteins.
 - Vitamins.
41. Absorption of water by plant roots is an example of _____?
- Endocytosis
 - Diffusion
 - Osmosis
 - Plasmolysis
- Which of the following is a logical sequence of food chain producer → consumer → decomposer
 - producer → decomposer → consumer
 - consumer → producer → decomposer
 - decomposer → producer → consumer
42. When we visit a pond we see some plants floating on water. Name the tissue that gives buoyancy to the aquatic plants to help them float on water?
- Collenchyma
 - Aerenchyma
 - Xylem
 - Sclerenchyma
43. In the given food chain if the amount of energy at the fourth trophic level is 4 kJ, what will be the energy available at the producer level?
Grass → Grasshopper → Frog → Snake
- 4 kJ
 - 40 kJ
 - 400 kJ
 - 4000 kJ
44. First link in any food chain is usually green plants because
- They are widely distributed
 - They are fixed at one place in the soil
 - They alone have the capacity to synthesise food using sunlight
 - There are more herbivores than carnivores
45. BCG vaccine is used to develop immunity against _____ disease in infants.
- Jaundice
 - Polio
 - Influenza
 - Tuberculosis

46. Which of the following was probably not present in large amount in the atmosphere at the time of origin of life?
 (a) Water (b) Hydrogen (c) Oxygen (d) Carbon dioxide
47. Vaccination is a term often heard. It helps in controlling diseases because
 (a) It develops resistance against the pathogen attack
 (b) It kills the pathogens causing disease
 (c) It blocks the food supplied to pathogens
 (d) It does not allow pathogens to multiply in hosts
48. DPT vaccines are administered in kids to develop immunity and protect them against
 (a) Tetanus (b) Diphtheria (c) Pertussis (d) All of these
49. Movement of molecules is through Semi Permeable membrane in _____.
 (a) Cell (b) Potato (c) Water (d) Osmosis
50. Which of the following is non- biodegradable?
 (a) Wool (b) Nylon (c) Animal bones (d) Tea leaves
51. Which one of the following is macronutrient?
 (a) Ca (b) Mo (c) Mn (d) Zn
52. Leaves of a plant are green in colour due to plastids. Plastids containing green pigments are called
 (a) Chloroplasts (b) Leucoplasts (c) Chromoplasts (d) None of the above
53. Identify the type of cell in the figure:

- (a) Muscle cell (b) Bone cell (c) Nerve Cell (d) Blood cell
54. Match the following columns:
- | Column-A | Column-B |
|-----------------------|---------------------------|
| A. Cyanobacteria | 1. Hepatitis B |
| B. Bio-control agents | 2. Aulosira |
| C. Antibiotic | 3. Bacillus thuringiensis |
| D. HBV Vaccine | 4. Neomycin |
- (a) A-1, B-2, C-3, D-4 (b) A-4, B-2, C-3, D-1
 (c) A-2, B-3, C-4, D-1 (d) A-4, B-3, C-2, D-1
55. Which of the following organelle is called power house of the cell?
 (a) Nucleus (b) Centriole (c) Ribosome (d) Mitochondria

56. Which compartment of human heart receives oxygenated blood?
a) Left Auricle. b) Right Auricle c) Left Ventricle d) Right Ventricle
57. Who proposed five kingdoms of classification?
(a) Carl Woese (b) Ernst Haeckel (c) Robert Whittaker (d) Charles Darwin
58. My body is soft and undivided; mantle membrane is present in my body. Who am I?
(a) Mollusca (b) Arthropoda (c) Hemichordata (d) Annelida
59. Given below is a diagram showing the structure of a neuron tissue.



- Choose the correct labeling for the parts A, B, C, D and E.
- (a) A – Nucleus; B – Cell body; C – Dendrite; D – Axon; E – Nerve ending.
(b) A – Nucleus; B – Dendrite; C – Cell body; D – Nerve ending; E – Axon.
(c) A – Nucleus; B – Axon; C – Cell body; D – Dendrite; E – Nerve ending.
(d) A – Nucleus; B – Dendrite; C – Cell body; D – Axon; E – Nerve ending



ANSWER SHEET FOR ACHIEVEMENT TEST IN LIFE SCIENCE

Name: _____ Age: _____ Date of
 Birth: _____ Class: _____ Section: _____ Roll No.: _____ Gender:
 Male/Female _____ Name of the School: _____ Address: _____
 District: _____

Item No.	Answer Key	Item No.	Answer Key
1.		31.	
2.		32.	
3.		33.	
4.		34.	
5.		35.	
6.		36.	
7.		37.	
8.		38.	
9.		39.	
10.		40.	
11.		41.	
12.		42.	
13.		43.	
14.		44.	
15.		45.	
16.		46.	
17.		47.	
18.		48.	
19.		49.	
20.		50.	
21.		51.	
22.		52.	
23.		53.	
24.		54.	
25.		55.	
26.		56.	
27.		57.	
28.		58.	
29.		59.	
30.		60.	

ANSWER OF ACHIEVEMENT TEST IN LIFE SCIENCE

Name: _____ Age: _____ Date of
 Birth: _____ Class: _____ Section: _____ Roll No.: _____ Gender:
 Male/Female _____ Name of the School: _____ Address: _____
 District: _____

Item No.	Answer Key	Item No.	Answer Key
1.	D	31.	A
2.	B	32.	A
3.	D	33.	D
4.	C	34.	A
5.	C	35.	D
6.	B	36.	A
7.	A	37.	A
8.	C	38.	B
9.	D	39.	A
10.	D	40.	C
11.	C	41.	C
12.	D	42.	A
13.	D	43.	B
14.	B	44.	D
15.	A	45.	C
16.	D	46.	D
17.	A	47.	C
18.	B	48.	A
19.	D	49.	D
20.	A	50.	D
21.	B	51.	B
22.	B	52.	A
23.	D	53.	A
24.	A	54.	D
25.	C	55.	C
26.	C	56.	D
27.	B	57.	A
28.	B	58.	C
29.	C	59.	A
30.	C	60.	D