1.1 INTRODUCTION

The primary goal of education has always been to develop in each individual the desire to achieve up to his/her maximum potential. One of the most important functions of public education is to discover the interests, aptitudes, and achievements of students and then to develop educational programmes appropriate for students population under consideration. Today, promoting the full development of individual is more important than ever because of pressing national demand for high-ability man power.

One has to read the employment advertisements in the current newspapers to become aware of the demand for highly trained persons in almost every field of endeavor. If this demand has to be met, careful consideration must be given to the superior student while he/she is studying in high school. In the past, teachers, counselors, and administrators have not taken full advantage of their opportunities to develop challenging programs for superior students. Some of the reasons advanced for this situation have been: (1) a preconceived notion that student’s social development will be seriously impaired if their intellectual development greatly exceeds that of their average classmates; (2) a belief that students, if they are bright, need no intellectual challenge or stimulation; and (3) a failure to understand and modify the desire, operative in our society, to be as much like “average” as possible.
Most of the human characteristics can be distributed along a continuum. The differences between students at either extreme and those at center are so marked that instruction and services designed to fulfill the needs and interests of students at the center of distribution are likely to harm the individuals at the extremes. These differences are clearly demonstrated in cases of extreme physical variance and of extreme of severe mental retardation. The differences, however, are more difficult to observe in superior and talented boys and girls, particularly when their achievement does not measure up to their ability. The possibility of underachievement makes it doubly important that such young persons can be located, motivated, educated and evaluated in terms of their specialized abilities.

To those who argue that gifted students will "make it on their own" sensible replies are that (a) they should not be held back and required to succeed in spite of a frustrating educational system, and (b) some do not make it on their own. Rimm (1997) for example, cited research showing that 10 to 20 percent of high school dropouts are tested in the Gifted range. Almost, invariably, gifted dropouts are underachievers, talented students who are unguided, uncounseled, and unchallenged (Rimm, 1995d; Whitmore, 1980). The widely cited "A nation at Risk" report by National Commission on Excellence in Education (1983) reported that “Over half the population of Gifted students do not match their tested ability with comparable achievement in school”. It is not only the gifted students themselves who benefit from specific programs that recognize and cultivate their talents, teachers involved with gifted students learn to stimulate creative, artistic, and scientific thinking, and they learn to help students understand themselves, develop good self-concepts, and value
educational and career accomplishments. In short, teachers of the gifted become better teachers, and their skills benefit “regular” students as well. Society also reaps a profit. Realistically, it is only today’s’ gifted and talented students who will become tomorrow’s political leaders, medical researchers, artists, writers, innovative engineers, and business entrepreneurs. Indeed, it is difficult to propose that this essential talent be left to fend for itself, if it can instead of being valued, identified and cultivated. Tomorrow’s promise is in today’s schools, and it must not be ignored.

To continue the introduction, the next section presents an overview of the history of gifted education, including the recent history of gifted and talented, characteristics of gifted/talented and the concept of scientifically talented in general and their identification theoretical and empirical basis of study, objectives, nature and scope of the study.

1.2 GIFTED/TALENTED – A HISTORICAL PERSPECTIVE

Recent history underlying today’s strong interest in gifted education begins with capsule stories of the contributions of Francis Galton, Alfred Binet, Lewis Terman, and Leta Hollingworth, followed by the impact of Russia’s Sputnik, a 1990 look at the gifted movement in America and world wide, the National Research Center for gifted and talented, the anti-grouping educational movement, and the cooperative learning dilemma (Davis and Rimm, 1998).

The English scientist Sir Francis Galton (1822-1911) a younger cousin of Charles Darwin is credited with the earliest significant research and writing devoted to intelligence (or genius) and intelligence testing. Galton believed that intelligence was related to the keenness of one’s senses: for example vision, audition, reaction
time. His effort to measure the intelligence test were involved such test as those of visual and auditory acuity tactile sensitivity and reaction time. Impressed by cousin Charle’s origin of the species Galton reasoned the evolution would favour person who could more easily detect food sources or sense approaching danger. There fore he concluded that one’s sensory ability, that is intelligence is due to natural selection and hereditary. The hereditary basis of intelligence seemed to be confirmed by his observations- reported in his most famous book “Hereditary Genius” that distinguished persons are coming from succeeding generations of distinguished families. Galton initially overlooked the fact that member of distinguished aristocratic families also inherit a superior environment. Wealth, privilege and opportunity incidentals make it easier to become distinguished Modern Intelligence tests have their roots in France in the 1890s. Alfred Binet, aided by T. Simon(1905) who was hired government officials in Paris to devise a test to identify with dull children should not benefit from regular classes and therefore they should be placed in special classes where there is a special training can be given. Alfred Binet has contributed the concept of mental age.

Stanford psychologist Lewis Madison Terman made two historically significant contributions to gifted education that has earned him the title of father of gifted education movement. Terman has Americanized the test of Binet-Simon to Stanford-Binet Intelligence test. Terman second contribution was identification and longitudinal study of 1528 gifted children Genetic studies of genius series. Backed with scientific data Terman made conclusion that gifted students were psychologically, physically healthier than average students. According to Stanley
(1978a), Galton was the grand father of gifted child development Binet is the midwife, and Terman is the father and Colombia University’s Leta Hollingworth the nut rant mother. Her pioneering efforts began in 1916. Hollingworth efforts supporting gifted children and gifted education in New York are included initiating the programs for the gifted in New York city schools. Hollingworth made clearly contributions to counseling the gifted or as she put it to their “emotional education”. Unlike Terman’s overemphasis on mental health of bright children, Hollingworth (1942) underscored that highly intelligent children also are highly vulnerable.

The last significant historical event to predate the 1970s resurgence of interest in gifted education in launching in 1957 of Russian satellite Sputnik. Suddenly reports of criticizing American education, particularly neglecting gifted education. Tannebaum (1979) referred to the afterheat of sputnik as a “total talent mobilization”. Gifted students were identified. Acceleration and ability grouping are installed. The Jacob K. Javits programme of US Department of education based on the Education bill on 1987 used theme of discovering and simulating the underachievers in gifted. Nowadays a lot of programmes were conducted in US in Gifted both in Online and classroom.

In India giftedness has indeed existed in ancient times, but they are different from conception of giftedness between ancient period and British colonization (Raina and Srivastava, 2000). The national Policy of Education in 1986 suggested establishment of Navodaya Vidyalaya Samithi (NVS) is an attempt to nurture the gifted education in India. Nowadays the gifted programmes are mushroomed in the field of science and than other fields in order to nourish the gifted children.
1.3 CONCEPT AND NATURE OF THE GIFTED AND TALENTED STUDENTS

Definition of bright and gifted, the academically talented, the superior and talented, the able and ambitious, or groups with other such titles, vary widely. The gifted group studied by Lewis M. Terman comprised the upper 1 percent of the population in terms of the general intelligence.

According to Renzulli’s three ring model above average ability, high task commitment and high creativity (1997). Cohn’s model (1981) of differentiated three general gifts (intellectual, artistic, social) and each of which subdivide in to specific talents.

The academically talented were defined for a National Educational Association conference as those ability placed them 1 standard deviation or more above the mean of total secondary school population. General public and some writers see talent and giftedness are on a continuum with giftedness at the upper end. In relating to the continuum definition the programme will include students who barely meet the established criteria along with one or two others who are extra-ordinarily brilliant and astonishing talented in particular area.

In 1988 US Department of education gave a definition for the gifted and talented as “The term gifted and talented students means that children and youth who give evidence of high performance capability in the areas such as intellectual, creative, artistic or leadership capacity or specific academic fields who requires services or activities not ordinary provided by the school in order to fully develop
such abilities. Children capable of high performance include those with demonstrated achievement and or potential in any of the following area:

- General Intellectual ability
- Specific academic aptitude
- Creative or productive thinking
- Visual performing arts

**General Intellectual ability:** These students show early and rapid development of language ability large vocabulary, strong powers of reasoning, analysis or synthesis and advanced ability in critical thinking and problem solving. They have high IQ demonstrate high achievement, and are capable of being very good utmost anything they choose.

**Specific academic aptitude:** Students who appear to have single dimensional ability and excel on one or more areas or subjects. Students may demonstrate this ability in any one or more of the following areas language arts, social studies, maths and science

**Creative or productive thinking:** These students demonstrate creative abilities in oral, written, and non verbal expression though the production of many original ideas. They are flexible and elaborative in their thinking, tend to resist one-answer solutions. Posses strong visualization and imagination abilities, and tend to be different from the norm, resisting conformity.

**Visual performing Arts:** These students have demonstrated their ability or have shown high potential for significant contributions in the visual and performing arts.
Included in this category are students who have exceptional ability in acting, singing, playing a musical instrument.

1.4 CHARACTERISTICS OF GIFTED/TALENTED STUDENTS

Gifted children differ from others in various aspects like cognitive and language, learning abilities, interests, learning styles, motivation energy levels in their background and experience. Based on the studies of Frasier (1993, 1997), Preleth Lehwald and Browder (1993), Silverman (1997), Yewchuk and Lupart (1993) and others the following characteristics can be listed down. These characteristics can be classified in to positive and negative characteristics. The positive characteristics are those which will facilitate the functioning of the individual whereas the negative characteristics that hinder the functioning. It is necessary to consider with the set of characteristics while planning and preparing for gifted/talented students. (Terman and Oeden, 1947)

The positive characteristics are

1. Early and rapid learning
2. Enjoyment in learning
3. Rapid language development of child
4. Superior language ability.
5. Large knowledge base.
6. Keen observation
7. Superior reasoning, Problem solving
8. Thinking abstract, complex and insightful
9. Academic superiority
10. Advanced interests
11. Higher carrier ambition
12. Greater met cognition
13. Wide interests
14. Fascination with books
15. High alertness and attention
16. High activity level
17. High motivation
18. High internal control
19. Long attention span
20. Preference for working alone
21. Emotional sensitivity
22. High level of moral thinking
23. Curiosity
24. Good sense of humor
25. Active imagination
26. Reflectiveness
27. Self awareness
28. Good self concept

Negative characteristics
1. Uneven precocity
2. Interpersonal difficulties
3. Under achievement especially in uninteresting areas
4. Non conformity and disturbing direction

5. Perfectionism that can be extreme

6. Frustration and anger.

All the gifted individuals may not exhibit all the characteristics listed above. These are the general characteristics which can be noticed in the Gifted/Talented students.

1.5 TYPES OF GIFTED/TALENTED STUDENTS

The gifted students can be classified in to two types. Intellectually gifted and Creatively gifted (Davis and Rimm, 2002)

1.5.1 CHARACTERISTICS OF INTELLECTUALLY GIFTED STUDENTS

1. **Precocious language and thought:** The bright students are developmentally advanced in language and thought. Vaneesa bask (1997) named precocity as the first three characteristics relevant to gifted/talented curriculum planning.

2. **Early reading and advanced comprehension:** Some of the pre-schoolers not only talk and conceptualize at an advanced level, but also they may learn to read at the age of 4 or even 3 (Jackson, 1988). The advanced language ability of intellectually gifted includes superior comprehension skill.

3. **Logical thinking:** The average child thinking process of gifted are quick and logical.

4. **Early writing math, science and music and are:** The intellectually gifted child also begins writing at a precocious age. The mathematical, musical and artistic abilities also appear early.
5. **Motivation persistence, Advanced interests:** The most recurrent traits of productive gifted students and eminent adults is high motivation and urge to learn found gifted children combined with their curiosity and their advanced comprehension and logical abilities frequently lead to surprisingly advanced interests.

6. **Affective characteristics Social skills, Personal Adjustment, self concept:** It was noted in Terman studies that average gifted and talented were adjusted both socially and personally. They were more emotionally stable and less neurotics than his unselected children. As a general rule gifted students as well as better adjusted than regular students and have better self concepts. Giftedness clearly on advantage that conveys both academic and personal benefits.

7. **Independence, self confidence and internal control:** An important set of personality characteristics or fitted-confidence and independence. The concept of high internal control describes the confident of children or adolescents who feel responsible for their success and failure and who feel control the desire.

8. **Learning styles:** The learning styles of gifted student are entirely different. They prefer active participant approaches to learning rather spectator approaches and they have well integrated perceptual strength meaning that they can learn through various sensory level including auditory, visual tactile, and kinesthetic. Further they prefer quiet learning environment and they prefer to learn more.

9. **Superior humor:** The superior sense of humor of the most gifted children seems to follow quite natural from their abilities to think quickly and see relationship and from their general confidence and general aptness.
10. **High moral thinking and empathy:** Gifted children and youth are likely to develop, refine and internalize a system of values and keen sense of fair play and justice at a relatively early stage. The child not only is likely to be more fair, empathetic and honest or she will evaluate others according to some standards.

1.5.2 CHARACTERISTICS OF CREATIVELY GIFTED STUDENTS

The student who is highly intelligent may or may not be creatively gifted as well. Getzels and Jackson (1962) and Wallch and Kogan (1965) contrasted highly intelligent versus highly creative students confirming that two traits are not the same. A base level of intelligence is essential for creative productivity. Above (IQ=120) that threshold there is virtually no relationship between measured intelligence and creativity.

The characteristics of creative gifted are:

1. Creative consciousness
2. Confidence Risk taking
3. High energy adventuress
4. Curiosity
5. Humor playfulness
6. Idealism and reflectivness
7. Alone time
8. Artistic and aesthetic interests
9. Attraction to novel, complex and mysterious
10. Tolerance for ambiguity
1.6 IDENTIFICATION OF GIFTED/TALENTED STUDENTS

The identifying procedure is a cardinal part of gifted/talented program. The following recommendations of the are given by the US Department of Education (1985).

1. Because giftedness has many dimensions – abilities, personality factors, and environment-measures that go beyond academic achievement must be used to find students whose abilities are not indicated by tests and school performance. Both informal and formal data should be used for validity.

2. Subjective procedures such as rating scales, checklists, and nominations are a legitimate part of the identification process, especially in the early nomination stage. Rating scales and checklist items should include “negative” and unexpected characteristics indicated by research.

3. Nominations by teachers, parents, peers, and students are useful in the content of the nominations is clearly related to the programme plans.

4. Data from multiple measures, such as the formal tests and informal checklists should not be combined because their purposes and results are different.

There are different types of intelligence test to measure the intelligence of gifted students. Some tests are informal test. In order to identify gifted students a multidimensional assessment is required. The following instruments are formal assessment of giftedness.

1. **Standford-Binet form LM**: It consists of verbal reasoning, quantitative reasoning, visual/abstract reasoning, and short-term memory, along with its composite standard age.
2. **Wechsler Intelligence scale for children:** This tool can be used for identification of gifted students in the age between 6 and 16. It creates verbal IQ score along with non-verbal IQ score, along with combined Full-scale IQ score. Therefore a student with spatial or mechanical gifts can be identified not just verbally gifted.

3. **Group intelligence test:** The IQ scores from group intelligence test are useful for identifying gifted students because they continued to be administered routinely in many school systems. Some of the known group intelligence test are cognitive abilities test, SRA mental abilities test.

4. **Achievement test:** An excellent academic talent is measured by Standardized achievement test such as Iowa tests of Basic skills and Standford Achievement test, etc.

5. **Raven’s Progressive Matrices (SPM):** The standard Raven’s Progressive Matrices was developed for use in homes in schools, and work places as well as in the laboratories.

1.6.1 **Informal Identification Tools**

1. **Teacher Nominations:** It is very common identification methods. But some of the teachers are in favour of those who are well dressed, co-operative, non-disabled and English speaking teacher pleasers who do work neatly on time, and with no smarting off.

2. **Parent Nomination:** The parent is able to provide information about child’s special interest and hobbies, special talents, unusual accomplishments, Activities performed alone, Relationship with others etc are discussed in the above nomination.
3. **Peer Nominations:** Peers are very good naming gifted and talented classmates, which attempts for the use of peer nominations by one fourth of the gifted programmes,

4. **Self nomination:** A self nomination form used asks the students to check the areas which you think you would have special abilities and talents in this area.

The methods above are some of the few methods in order to identify gifted/talented students. These formal and informal methods can be combined anal used for identification methods.

**1.7 CONCEPT OF SCIENTIFICALLY TALENTED STUDENTS**

As per Georgia Department of Education (1984) Scientifically talented may be viewed as an individual whose potential as high level solver of scientific problems qualifies him or her for some special treatment which enhances abilities and maximizes the achievement. Inherent in this is the assumption of superior verbal and mathematical ability. In this context the scientifically talented refers to the students who is having aptitude in science and having high mental ability. In order to identify gifted in science, an approach that identifies them in terms of their aptitude for learning from more demanding science instruction (Keith S. Taber, 2007).

**1.8 CHARACTERISTICS OF SCIENTIFICALLY TALENTED STUDENTS**

According to Taber (2007), in order to identify gifted/talented in science aptitude approach is the best method. A number of characteristics of gifted in science were suggested (Stepanek, 1999; Gilbert, 2002). These characteristics may be considered to form a number of clusters. The first of these concerns with scientific curiosity. The characteristic of scientific curiosity is given below.
1. Have hobbies where they collect and compile data or scientific artifacts
2. May be interested in collecting, sorting, and classifying objects
3. Have strong curiosity about objects and environments
4. Have a tendency to make observations and ask questions
5. May have an interest in the derivation of science terms.
6. May demonstrate intense interest in one particular area of science to the exclusion of other topics
7. Want to quantify the experimental results in the derivation of science terms.
8. May demonstrate intense interest in one particular area of science to the exclusion of other topics
9. Want to quantify the experimental results by counting, weighing or otherwise measuring.

The second clusters relates to the cognitive abilities. The gifted learners in science to
1. Readily learn novel ideas
2. Recognize the use formal scientific convention
3. Have more extensive scientific vocabulary than their peers when explaining things and events
4. Have quick and extensive understanding of concepts, such as reliability and validity, when drawing conclusion form evidence
5. Relates novel ideas to familiar ideas
6. Make connections rapidly between facts and concepts they have learned, and make connection between scientific concepts and observed phenomena.
7. Move beyond the information given, and move ideas from the context in which they have been learnt from unfamiliar context.

8. Quickly understand models and theories in new situations and use these to explain phenomena.

9. Have the capacity to leap ahead or jump steps in an argument and detect flaws in reasoning of others, and rapidly perceive the direction of an investigation and anticipate outcomes.

10. Produce models, and mathematically model.

11. Generate creative and valid explanations

12. Be willing and able to think abstractly at an earlier age than usual.

13. Be prepared to live with uncertainty.

14. Be willing to hypothesize, manipulate variables fairly and make predictions.

15. Identify patterns in data where the links are not oblivious.

16. Suggest a variety of alternative strategies for testing predictions or gathering evidence.

In the third cluster gifted science learners show meta cognitive maturity.

Gifted science learners are said to

1. Be able to sustain the interest

2. Show good powers of concentration

3. Reflect on their own thinking and learning

4. Form overviews of sectors of a subject

5. Excel and perceive at their own choice of activity and produce high quality of work
6. Want a greater depth of understanding

According to Alan west gifted refers to high academic achievers, talented is frequently applied to those who have aptitude in the arts, sports, or any other areas.

A scientific aptitude is a potential for acquiring certain skills or knowledge. As such it is used in a far more specific way than intelligence. The educational programme that is devised for anyone learner needs to take in to account not only his general ability to learn but also any special training should be provided. Scientific aptitudes may be considered to be qualities, which all individuals possess in varying degrees. Scientific aptitude may also be regarded as special form of superiority in the limited field of performance. Scientific aptitude is not a special talent in the same senses that musical aptitude, it is the application of general intellectual capacity to scientific materials and problems.

Scientific aptitude tests have been developed to predict educability and performance in mechanical and clerical occupations, in engineering, in medicine and law and in other areas well.

1.9 EDUCATIONAL PROGRAMS FOR GIFTED/TALENTED STUDENTS

There are many different approaches to helping gifted students, but all of them are based on two major administrative arrangements. The educational provision can be classified mainly in to two, one is enrichment and grouping, and another is acceleration. Acceleration implies moving faster through academic content, which typically includes offering to standard curriculum to students at younger than usual age or lower than the usual grade level. Some of the procedures for acceleration are:
1.9.1 Acceleration Procedure

1. **Early admission to kindergarten or first grade:** Early admission to either Kindergarten or first grade is an acceleration strategy that accommodates gifted children high energy, enthusiasm, curiosity, imagination and their intellectual needs to investigate, observe and examine (Feldhusen, 1992). But the problem for acceleration is that accelerated children will be socially immature, they will not socialize well with older children, will have fewer friends and will not be happy.

2. **Grade skipping:** Grade skipping is the traditional method of accelerating precocious elementary school students. It requires no special materials and facilities, no gifted/talented co-coordinator, no special materials or facilities, not even a gifted/talented program. In fact it extra-ordinarily cost effective in moving the gifted/talented though and out of the school system ahead of the schedule. Grade skipping or “double promotion” usually takes place in the lowest elementary grades but some times in advanced grades.

3. **Subject skipping:** Grade skipping some times is called full accelerating and subject, kipping therefore is a partial acceleration. Subject skipping involves taking classes or studying particular subjects with students in higher grades. It is especially appropriate in sequential type of subject matters, particularly reading, math, and languages.

4. **College courses in school:** A dual enrolment program a student may be excused from high school for part of the day to take one or more courses on the college campus. The earned college credits may be used at particular college credits when he or she admitted or the credits normally can be transferred to another college.
Importantly, the courses should also be credited towards the high school graduation requirements so that the student is not burdened or punished.

5. **Correspondence courses:** Correspondences courses for talented students provide valuable opportunities for those who lives in a rural area or small city or town. Correspondence courses carry full college credit. Thus by attending the school itself, the talented student can accelerate the knowledge.

6. **Telescoped programme:** In telescoping programme collapsing three academic years work into two or four years of high school in to three. It will result in rapid learning of the ideas for the talented

Some of the accelerated programs are described above. In order to accelerate a particular subject or grade administrative provision has to be made.

**1.9.2 Salient features of Enrichment Programme**

Acceleration and enrichment programme usually requires grouping of gifted children. One common criticism of Enrichment programme that whether it is good for all children. The answer is “yes”. Enrichment programme is good for all students, but enrichment activities for gifted youth should be planned with “high order” objectives in mind. The danger to gifted programs, however, is that the programs may become sporadic flights that happen once a week with no strands of continuity with the regular program and with no long-term planning. Principles need to be delineated to establish just what enrichment is to accomplish, and administrators need to examine closely the benefits of various administrative arrangements for the gifted.

Enrichment refers to a richer and more varied educational experience, a curriculum that modified to provide greater depth and breadth than is generally
provided. Enrichment strategies essentially are delivery methods for achieving process and content goals. Process goals include developing such skills- or processes-as creative thinking and problem solving, critical thinking, scientific thinking, interrelating various subjects and concepts. The content is the subject matter, project, and activities within which the process are developed. The objectives were listed in the categories of:

- Maximum achievement in basic skill, based on needs, not age
- Content and resources beyond the prescribed curriculum.
- Exposure to variety fields of study
- Student selected the content, including the depth studies.
- High content complexity-theories, generalization and application
- Creative thinking and problem solving
- Higher level thinking skills, critical thinking, library research skills
- Affective development, including self-understanding and ethical development
- Development of academic motivation, self direction, and high career aspiration

Enrichment strategies include 1) Independent study and independent projects 2) learning enters 3) Field trips 4) Saturday programmes 6) Summer programs 7) Mentor and Mentorships 7) Future problem solving 8) Odyssey of the mind 9) Junior great Books 10) Academic Decathlon 11) Mock court 12) Other competitions and aesthetic involvements. The enrichment programmes are given in detail.

1) **Independent study and independent projects:** For the bright and energetic students, the possibility for independent study and independent project are without
limit. Students can work on library research projects, scientific research projects, Art Drama and other independent projects. Possibilities of scientific research are innumerable. But in order to obtain the right result, the infrastructure to the gifted should be in higher order. In independent study the role of the teacher is “guide on the side”.

2) **Learning centers:** A learning center is a resource centre where the information about a particular subject is there. These are tabletop work stations for individual or group work. Learning centers were located at regular classroom, the building instructional materials center or the gifted/talented resource room.

3) **Field trips:** Field trips can be used as an explanatory activity aimed at acquainting students with cultural and scientific areas or career possibilities. Field trips also can be a source of information for the independent projects. Friedman and Master (1980) emphasized that in planning a successful field trip one must evaluate the materials and exhibits and the ability to communicate effectively with the group. The fields trips are no different for gifted students than for typical students, regardless of ability, should have enrichment opportunities, including the visit to places of artistic, historic and scientific interest

4) **Saturday Programs:** In Saturday programs gifted students meet on Saturday and work with each other away from stresses and problems of daily school requirements. Saturday programs were taught by teachers, graduate students and subject experts. The advantage of the program was that gifted students interact with challenging peers, and learn material in faster pace.
5) **Mentors and mentorships:** According to Episten (1981) Mentors are devoted man and women lighting intellectual sparks and setting the passion for learning a flame. Good mentors should expertise in fields in order to spark the gifted students. The mentor also should be high integrity and strong interest in teaching young people.

6) **Future problem solving:** The future problem solving is an enrichment activity which takes place in a cluster of gifted/talented students. The main objective of this program is to develop a solution. Here the student has to discuss and create a problem. The solution of the problem is also has to be found out. The solution of the problem will be found out by different number of criteria.

7) **Odyssey of mind:** Like future problem solving, Odyssey of mind is a national and international program. It is an excellent vehicle for teaching creative thinking, problem solving along with self-confidence, a good self-image, interpersonal skills, and more. The key assumption of its founders Ted and Gourelly and Sam Mickuls is that the mind can be trained and strengthened through exercise with mental games just as body is trained with physical exercise. It consists of a kit for different grade students. Each kit contains dozens of practices problems and long term problems

8) **Junior great books:** This is an enrichment programme conducted in different countries. In a two day workshop, the junior great books foundation trains teachers to ask questions requiring interpretation of carefully selected literature. All books are proved to be comprehensible and rich in ideas for sustained discussion of interpretative questions and enjoyable to read and discuss.
9) **Academic Decathlon:** Academic Decathlon is a challenging high school program that includes regional, state, and national competitions. Students of 11 and 12 grade participate in this programme. Students compete with conversational skills, essay writing, formal speech, mathematics, physical science and super quiz.

10) **Mock court:** Mock court is a plan for very talented high school students who are interested in political career. Student can advocate for trial cases and other students prepare an argument for defense. The judgment is done by judges who are in service supported by school coach.

### 1.10 CONCEPT OF A CURRICULUM MODEL

The enrichment programme build up based on a curriculum Model. The following are some of the aspects of curriculum models. (Baska, 2007)

**A framework for curriculum design and development:** The model had to provide a system for developing and designing an appropriate curriculum for the target population. As such, it had to identify elements of such a design and show how these elements interacted in a curriculum product.

**Transferable and usable in all content areas:** The model had to be utilitarian in that it was easily applied to all major areas of school-based learning.

**K-12 applicability:** The model had to be flexible in respect to the age groups to which it would be applied. The central elements would have to work for kindergarten-aged gifted children as well as high school students.

**Applicable across schools and grouping settings:** The model had to have relevance in multiple locations and learning settings. It would need to work in tutorials as well as large classes.
**Incorporation of differentiated features for the gifted/talented learner:** The model had to spell out ways in which it responded to the particular needs of the gifted for curriculum and instruction.

There are ten model of curriculum where the enrichment activities can be made. The models are listed below:

1. Enrichment triad model (Renzulli, 1977; Renzulli and Reis, 1997)
2. School wide Enrichment model (Renzulli, 1994; Renzulli and Reis, 1985, 1997)
3. Multiple menu model (Renzulli, 1988)
4. Pyramid model (Cox, Daniel, and Boston, 1985)
7. Trenffinger’s model for increasing self-directedness
8. Autonomous learner model (Betts, 1985, 1991)
10. Multiple Talent Totem Pole Mode (Schilicher, 1997)

Each curriculum models are described below:

1. **Enrichment Triad Model:** Enrichment triad model consists of three types of activities. Type I enrichment (general exploratory activities) exposes the students to variety of topics; Type II (group training activities) focuses on creativity and other thinking skills, learning to learning skills, communication skills, and
information retrieval skills; Type III investigations of real problems. Type I and Type II are suitable for all students.

2. **School Wide enrichment model:** Renzulli’s School wide Enrichment model is based on the curriculum compacting for gifted students. Students were identified from a talent pool. It includes type I and type II activities. The interests of the gifted students were identified and explore them in type III activity.

3. **Multiple menu model:** It consists of a series of 5 planning guides or menus that suggest sequences and alternatives for teaching content efficiently; a knowledge menu, instructional objectives/student activities menu, instructional strategies menu, instructional sequence menu and artistic modification menu creativity techniques and using Future problem solving and Odyssey of the Mind. Stage 3 focuses on development independent study and research skill via independent projects.

4. **Three-stage enrichment model:** It focuses mainly on fostering creating thinking and independent learning skills and positive self-concepts. Stage I develops basic divergent and convergent thinking abilities, as well as basic skills largely with short-term exercises. Stage 2 involves more complex creative problems solving. Enrichment refers to a richer and more varied educational experience, a curriculum that modified to provide greater depth and breadth than is generally provided.

5. **Pyramid Project:** The pyramid project is a three level schooling plan intended to overcome many criticisms of gifted/talented programs especially the popular pullout plan. Above average students are mainstreamed in the regular classroom,
more able students are placed in full time special classes, and most able students
attend magnet or residential schools.

6. **Meeker’s model:** The meeker use 90 of Guilford’s (1967) 120 SOI abilities for
identifying giftedness and diagnosing and remediating specific learning abilities,
particularly those relating to reading, math, writing, creativity, and critical
thinking. The SOI approach may be used to identify gifted minority students.

7. **Treffinger model of self-directedness:** Treffinger outlined four steps in
increasing self-directedness (1) The command style is totally teacher-directed;
(2) In the task style students select from among teacher prepared activities;
(3) The peer-partner style includes more student decisions about learning goals,
activities, and evaluation and (4) in the self-directed style students create the
choices, make selections, and choose the location and the amount of working
time. In order to increase self-directedness a problem solving and inquiry were
given.

8. **Betts Autonomous learner Model:** It is relatively complete programming guide,
includes the five main dimensions of orienting students and others to giftedness
and to the content and purposes of the program; Individual development in areas
of learning skills, and career development; student selected enrichment activities;
seminars, and individual or small group in-depth studies.

9. **Williams model:** The Williams model includes classroom activities suggested
by many combinations of subject matter content (6 types) teaching strategies
(18 types) and eight thinking and feeling process.
10. **Taylor Multiple–talent totem pole model:** It suggest that learning activities focus upon developing academic ability, creativity, planning, organizing communicating forecasting/predicting and decision-making/evaluating. This program trains teachers to teach totem pole students.

**1.11 DESCRIPTION OF MULTIPLE MENU MODEL**

In the above model the researcher is based on the work on multiple menu model of Rezulli (1988). The multiple menu model consist of five submenus, 1) Knowledge Menu, 2) Instructional objectives/Students activities Menu, 3) Instructional strategies Menu 4) Instructional sequence Menu 5) Artistic modification Menu and it focus on teach content knowledge in efficient and interesting ways. The advantage of multiple menu model is that 1) The curriculum developer can identify appropriate content or skills and, examine various instructional sequences and activity options and prepare a blue print for fitting together the pieces that all together work together in a harmonious and effective fashion 2) The curriculum can be taught which is already based on a particular grade. The multiple menu model can be diagrammatically represented as shown in Figure 1.1.
Figure 1.1: Multiple menu Model by Renzulli
This section will present a brief description of each menu and point out how the menus can be used for selecting the knowledge and instructional techniques that might be considered for the differentiated curricular unit lesson, or lesson segment.

1.11.1 The Knowledge Menu

The Knowledge Menu is divided into four parts, the first three of which are considered “tools.” The final part represents the vast number of specific topics within any field to which the tools may be applied as one goes about the process of “studying” a topic. The details are given below:

I. Location, Definition, and Organization

II. Basic Principles and Functional Concepts

III. Knowledge About Methodology

IV. Knowledge About Specifics

Knowledge menu described as follows.

1.11.1.1 Location, Definition, and Organization of a Field of knowledge

The first task in analyzing a given field of knowledge is to provide learners with information about where a field is “located” within the broad spectrum of knowledge, the general nature of a field, the various subdivisions of knowledge within that field, and the specific mission and characteristics of any given subdivision. This “knowledge about knowledge” dimension of this menu is designed to help the learner locate where, within any given organizational system, she/he may be working.

1.11.1.2 Basic Principles and Functional Concepts

Every field of knowledge is built upon a set of basic principles and key concepts that help to facilitate comprehension, information processing, and
communication of information that is representative of the essence of the field. Some of these principles and concepts are applicable to several subdivisions within a given field.

Functional concepts are the vocabulary of a field and the vehicles by which scholars communicate precisely with one another. A good way to identify the functional concepts of a field is to examine the glossary that might be included in a basic textbook in that field.

1.11.1.3 Knowledge About Methodology

The subcategories dealing with methodology represent a generally standard listing of investigative procedures that are followed in most fields of inquiry. A useful source consists of the laboratory manuals that frequently accompany college level textbooks. This section of the Knowledge Menu is especially important for curriculum development because it has important implications for more active kinds of instructional techniques. By providing students with the know-how of investigative methodology there is an increase in the probability of more inductive or “hands on” kinds of learning experiences. Once students have learned basic information a field or topic and the procedures for doing some kind of research related to that topic, it can be proceed to the application level, which is considered by many to be the highest level of involvement in a field of study. Student investigations may be limited in scope and complexity, and they frequently may follow prescribed scenarios, such as the ones typically found in laboratory manuals. At the same time, however, the inclusion of even junior level investigative activities in curricular materials forces us
to go beyond the omnipresent didactic mode of instruction that has been the subject of so much criticism of education in recent years (Goodlad, 1954).

1.11.1.4 Knowledge About Specifics

This section of the menu encompasses the main body of knowledge that makes up the content of any given field. It is from this area that curriculum developers should select representative topics illustrative of basic principles, functional concepts of certain methodologies. The several subcategories listed under Knowledge About Specifics are based on the first level of Bloom’s Taxonomy (1954). This analysis of various ways in which knowledge is organized is helpful in identifying organized components of a particular field. In a content area for curriculum development, it may not always be easy to classify a topic according to the subcategories in this section of the Knowledge Menu. For this reason, it is recommended that curriculum developers also consider selecting content on the basis the ways in which topics are organized in standard (college level) text and reference books. After a unit has been developed, it is a good idea to review the material in an effort to identify facts, conventions, trends and sequences, etc. It is also a good idea to call these subcategories to the attention of students. Either through direct instruction or by asking them to analyze material according to the ways in which Knowledge About Specifics is classified.

1.11.1.5 The Instructional Objectives/Student Activities Menu

This combined menu of instructional objectives and student activities is designed to provide the curriculum developer with a wide range of both general statements and specific behaviors that are associated with various aspects of learning. It is divided into four.
1.11.2 The Instructional Objectives/Student Activities Menu

I. Assimilation and Retention

II. Information Analysis

III. Information Synthesis and Application

IV. Evaluation

The first section of the menu (Assimilation and Retention) deals with information input or pickup processes. The second section (Information Analysis) focuses on a broad range of thinking skills that describe the ways in which information can be processed in order to achieve greater levels of understanding. The third section (Information Synthesis and Application) deals with the output or products of the thinking process. The final section (Evaluation) is also an output process, but in this case the focus is on the review and judgment of information in terms of aesthetic, ethical, and functional qualities. There are three important considerations that the curriculum developer should keep in mind when using First, the four categories on the menu are to be followed in a linear and sequential fashion, In the world of thinking and problem solving, we must often cycle back to more advanced levels of information input and analysis activities in order to improve the scope and quality of our products and judgments. The overall process, therefore, must be viewed as a cyclical or spiraling sequence of interrelated activities rather than a linear chain of events. The second consideration relates to the general goal of achieving both specificity and comprehensiveness in the overall process of curriculum development. Each unit and lesson should be developed in such a way that we are as certain about the process objectives as we are about the content to be taught. And over
a given period of time, we should attempt to achieve comprehensiveness in process development by selecting a diverse range of and student activities. In this regard, this and other menus should be used as checklists that will help us to achieve balance as well as a logue of processes from which selections can be made. Finally, the objectives and activities on this menu are designed to embrace the full range of affective processes. It is assumed that processes such as attending, receiving, and valuing take place in an integrated fashion when students pursue activities set forth in this menu and when such activities are combined with certain topics (knowledge) that enhance the development of affective processes. For this reason a separate affective menu was not included in the model.

1.11.3 Instructional Strategies Menu

This menu provides a broad range of strategies that represent the ways in which teachers organize learning situations. The strategies range from highly structured situations to those in which greater degrees of selfness are placed upon the learner. Many of the strategies are, of course, used in combination with one another. It contains the following instructional strategies

I. Recitation and Drill
II. Peer Tutoring
III. Programmed Instruction
IV. Lecture
V. Lecture and Discussion
VI. Discussion
VII. Guided Independent Study or Exploration (With or without a Teacher or Mentor)

VIII. Learning or Interest Center Activity

IX. Simulation, Role Dramatization, Guided Fantasy

X. Learning Games

XI. Replicative Reports or Projects

XII. Investigative Reports or Projects

XIII. Unguided Independent Study or Exploration

XIV. Internship or Apprenticeship

As is the case with menus discussed earlier, an effort should be made to achieve a balance in the use of these strategies. An effort also should be made to develop curricular experiences for brighter students that favor the less structured end of the instructional strategies continuum. This recommendation is consistent with the overall goals of gifted education and the emphasis that most special programs place on both self-directed learning and creative productivity. Finally, attention should be given to matching certain strategies with particular types of knowledge. Thus, for example, the simulation or role playing strategy might “fit” more appropriately with content dealing with a controversial issue, and the programmed instruction strategy would undoubtedly work well with content designed to teach computer operation skills.

1.11.4 Instructional sequence menu

This menu differs from the others in that the items are likely to be followed in a sequential fashion. It is important to point out, however, that the sequence may be
“recycled” several times in a single unit and sometimes even within a given lesson.

The following are the procedures in Instructional sequence menu

I. Gaining Attention. Developing Interest and motivation

II. Informing Students About the Purpose or Objective of a Given Unit, Lesson, or Lesson Segment and Providing Advanced Organizers About the Material that will be Covered

III. Relating the Topic to Relevant Previously Learned Material

IV. Presenting the Material Through One or a Combination of Instructional Strategies and Student Activities.

V. Providing Options and Suggestions for Follow-Up Activities on an Individual Group Basis

VI. Assessing Performance and Providing Feedback

VII. Providing Advanced Organizers for Related Future Topics

VIII. Pointing Out Transfer Applications.

According to Gagne and Briggs, an important consideration in sequencing instruction is to organize material in such a way that the learner has mastered necessary. Prerequisites are broadly interpreted to include a favourable attitude toward the material to be learned as well as essential terminology: functional concepts and basic factual information.

1.11.5 The Artistic Modification Menu

The curriculum developer can take steps to stimulate or recapture intended excitement about a particular topic by encouraging teachers to approach a unit or lesson with some degree of artistic license. This license should include the right and
the responsibility to criticize and interpret curricular content, to examine content in relation to the teacher’s own values, and to add content of the teacher’s own choosing, even if additional material is in conflict with the prescribed content of a unit of study. In other words, this menu asks curriculum developers to invite teachers to make their own creative contribution to a previously developed piece of curricular material. It contains the following information.

I. Sharing with students a personal experience that is directly or indirectly related to the content

II. Sharing personal knowledge or insiders’ information about a person, place, event, or topic.

III. Sharing personal interests, hobbies, independent research, or significant involvements in personal activities.

IV. Sharing personal values and beliefs.

V. Sharing personal collections, family documents, or memorabilia.

VI. Interpreting and sharing your own enthusiasm about a book, film, television program, or artistic performance that is related to a topic you are covering.

VII. Pointing out controversies, biases, or restrictions that might be placed on books, newspapers, or other sources of information.

The goal of this aspect of the model is to create excitement and involvement in the teacher so that she or he in turn, arouse interest, curiosity, and motivation on the part of students. Reflecting upon material before it is even if it has been taught many times before, is as important to the teaching process as warm-up activities are for creating a positive and mental aptitude for athlete. The interaction between the
developed curriculum material and personal involvement will result in a spontaneous combustion that helps material to bring the life

The Multiple Menu Model is based on the belief that a curriculum for the gifted should result in both concrete and abstract products. These outcomes are reflected in the Instructional Products Menu that appears at the bottom of Figure 1.1. These two kinds of products generally work in harmony with one another and are separated here for analytic purposes only. The concrete products consist of the of specific segments of knowledge plus a broad range of tangible things that are actually produced by students (e.g., reports, stories, time lines, dances, musical compositions, etc.). It is important to emphasize that these concrete products are not considered ends in and of themselves. Rather, they are viewed as means or vehicles through which the various abstract products can be developed and applied (Renzulli, 1982).

1.12 CONTEXT, NEED AND IMPORTANCE OF THE STUDY

From the review of related literature it can be noticed that gifted students are given less importance compared to the students who are normal and disadvantaged. But the gifted/talented students are also come in disadvantaged group, when their educational needs were not cop up with the current education system (Rimm, 1998). As a result they will show some disadvantaged characteristics also. One problem for Gifted/talented students is the identification. Although there are number of intelligence test are for identification. Only one test is not sufficient for identification (David Lohman, 2005). There should be multiple criteria for identification (Young, 1957). The identification for different type of giftedness is also different. It was found that gifted with specific academic interest can be better identified by aptitude test
There are two educational approaches in the context of the gifted students. One is Enrichment programme and other is acceleration. Acceleration would result increase in the developmental changes like processing speed (Duan, 2010). The gifted student should be nurtured earlier in their life (Lee, 2006). Perlini (1978) found that the creative thinking abilities of gifted elementary students can be developed through systematic programme enrichment experiences.

It was also found that enrichment programme should be evaluated in a multidimensional approach (Jayane Stake, 2001).

According to Morgan (1996)

All students should be expected to work hard, to be challenged, and to master complex material- for gifted students, these challenges most often come from enrichment programme.

- Without being challenged, gifted students may fail to realize that meaningful learning does not always come easily.
- Many studies suggest that gifted and talented students who receive acceleration and enrichment are more successful than those who are denied such opportunities.
- When the gifted students are not supported by school system, the interest in school denied.
- Identification provides opportunities to students who would otherwise hide their talents or under achieve.
- Gifted students often have the potential to be “producers of knowledge” and should not be merely treated as “consumers of existing information”.

(Gerald, 1960).
Talent in any area is useful to mankind in one or the other way. However the contribution of the scientists to mankind is highly admirable. Despite the need for scientist, many of the gifted students are reluctant to take pure science as a course of study at higher education level. This may be more obvious in India. The number of science graduates are decreasing rapidly. Those who don’t get in to any professional courses after higher secondary level only joins science streams and they suffer from some kind of complex. There is an urgent need to motivate the youngster to join the pure science courses. Mere advises will not help in this respect. Enrichment programme in science at secondary level will take care of the motivation of these students. At the secondary stage the students should be engaged in learning science as a composite discipline in working with hands and tools to design more advanced technological modules than at the upper primary stage, and in activities and analysis on issues surrounding environment and health. Systematic experimentation as a tool to discover/verify theoretical principles, and working on locally significant projects involving science and technology are to be important parts of the curriculum at this stage (NCF, 2005). The students have to be given first hand exciting experiences in science at early stage of schooling itself. Though secondary level is late, but still more feasible in a school context. However we cannot expect all the students to become good students of science. Those with above average and high aptitude in science can be expected to join pure courses in science with greater success. Hence there is a need to identify Scientifically Talented Students and nurturer them with enrichment programme. In order to do that the teachers should have a through knowledge about the characteristic of Scenically Talented Students, the procedure to identify them, the
nature of enrichment programme to be developed. At present, the teachers are not having training in these areas, mainly because there is no proper training at either pre-service level or in-service level. This is high time to carry out researcher in the areas in Indian context about scientifically talented.

1.13 STATEMENT OF THE PROBLEM

The problem of the study was to find out the “EFFECTIVENESS OF ENRICHMENT PROGRAMME IN IMPROVING THE PERFORMANCE IN PHYSICAL SCIENCE AMONG THE SCIENTIFICALLY TALENTED STUDENTS AT SECONDARY LEVEL”.

1.14 NATURE AND SCOPE OF THE STUDY

The present study is both exploratory and experimental in nature. An attempt was made to identify scientifically talented students in Grade IX, to assess their performance in selected topics of physical science and to understand their strengths and weakness in understanding the concepts and principles, to solve the problems related to these topics and in attaining the graphical and experimental skills associated with these topics. Hence it is an exploratory study. The enrichment programme planned in the study was tried out empirically with the purpose to validate its effectiveness in improving the performance of selected topics of physical science. Thus it is an experimental in nature.

The results of the study can be used in training the teacher, in identifying the scientifically talented students, to understand their strengths and weaknesses in understanding the concepts and principles, to solve the problems related to science and in attaining the graphical and experimental skills associated with science in
general and physical science in particular. The study helps in understanding the nature of the enrichment programme and to plan the same for the scientifically talented students. The enrichment programme planned out in the study can also be used for average students to make teaching of science particularly physical science interesting to them. The enrichment programme related to other topics of physical science can be developed on similar lines not only to grade ix students, but to other grades of schooling also.

1.15 OBJECTIVES OF THE STUDY

The objectives of the present study are:

1. To identify the students who are intellectually superior and scientifically talented among Grade IX of Mysore city.

2. To construct an achievement test in Physical Science which measures.
   (a) Understanding of Concepts
   (b) Understanding of Principles
   (c) Solving the Problems
   (d) Attainment of Graphical skills
   in selected topics

3. To plan out an enrichment programme for improving the learning of selected topics in Physical Science, more specifically to improve the
   (a) Understanding of Concepts
   (b) Understanding of Principles
   (c) Solving the Problems
   (d) Attainment of Graphical skills
4. To empirically validate the effectiveness of the enrichment program for improving the learning of the selected topics in Physical Science, more specifically to improve the
(a) Understanding of Concepts
(b) Understanding of Principles
(c) Solving the Problems
(d) Attainment of Graphical skills

1.16 RESEARCH QUESTIONS

1. What percentage of students are intellectually superior and scientifically talented among the Grade IX students?

2. Is there any significant relationship between achievement in Physical science and scientific aptitude in pre and post-test experimentation?

3. Whether enrichment programme developed in the study will be effective in improving the achievement in physical science, more specifically in
(a) Understanding of Concepts
(b) Understanding of Principles
(c) Solving the Problems
(d) Attainment of Graphical skills

4. Is there any significant relationship between the achievement in physical science of Scientifically Talented Students at the pre-test and post-test stage of the experimentation?

5. Do the students with different levels of scientific aptitude differ in their performance in Physical science at the pre-test and the post-test?
6. Is there any difference between the percentage of students who passed the physical science test at the pre-test and post-test during experimentation?

1.17 HYPOTHESES OF THE STUDY

1. Enrichment programme employed in the study will be effective in improving the learning of selected topics in Physical Science, more specifically to improve the

(a) Understanding of Concepts

(b) Understanding of Principles

(c) Solving the Problems

(d) Attainment of Graphical skills

1.18 DELIMITATION OF THE STUDY

The enrichment programme was restricted to Physical science that too selected topics only.

1.19 OPERATIONAL DEFINITION OF THE KEY TERMS

1.19.1 Intellectually Superior: Scientifically talented students have high potential for solving the problems. Hence while identifying them there is a need to test their ability to solve the problems. This was done by assessing their intellectual ability. In the study it was measured by using Standard Progressive matrices (J.C. Raven 1998). According to this test the students whose raw score is at or above 95th percentile are considered as Intellectually superior. Details of the tool are given in the methodology of Chapter III and Section 3.5.3 of the thesis.

1.19.2 Scientific Aptitude: In the study scientific aptitude was measured by Scientific aptitude test battery (Dr. K.K Agarwal and Saroj Arora, 1998). There are four sections in the test, namely, Reasoning test, Numerical ability test, science
vocabulary test and science information test. The level of scientific aptitude (above average /high) was determined by using the norms given in the manual. The details are given in the methodology chapter of the thesis.

1.19.3 Scientifically talented Students (STS): As per Georgia Department of Education (1984) Scientifically talented may be viewed as an individual whose potential as high level solver of scientific problems. In the present study Scientifically Talented Students were identified by using the following criteria a) Students should be nominated at least twice from the peers. b) Students should be nominated by at least two teachers. c) Students should be intellectually superior. d) Students should be above average in scientific aptitude. For this purpose Peer nomination (Episten, 1992) Teacher nomination form (Joseph Renzulli, 1988) were administered. The details are given in the methodology chapter of the thesis. A copy of the tool is given in appendix. The Standard progressive matrices (J.C. Raven, 1998) and Scientific Aptitude test (Dr. K.K Agarwal and Saroj Arora (1998) were also administered.

1.19.4 Achievement in Physical science: Achievement in Physical Science is defined as achievement in Test prepared by the investigator. The details about the achievement test construction of the Achievement test is elaborated in Section 3.6 of the Chapter III of the thesis.

1.19.5 Understanding of the concepts: Understanding of the concepts related to the topic “Mechanics” and sub topic Motion and Work and Energy included in Achievement test in Physics constructed by the investigator. In the test 7 concepts are covered.
1.19.6 **Understanding of the principles:** Understanding of the Principles related to the topic “Mechanics” and sub topic Motion and Work and Energy included in Achievement test in Physics constructed by the investigator. In the test, 8 Principles are covered.

1.19.7 **Solving the problems:** Solving the Problems related to the topic “Mechanics” and sub topic Motion and Work and Energy included in Achievement test in Physics. In the test 6 problems are included.

1.19.8 **Attainment of the graphical skills:** Attainment of the graphical skills related to the topic “Mechanics” and sub topic Motion and Work and Energy included in Achievement test in Physics constructed by the investigator. In the test 5 Graphical skills are covered.

1.19.9 **Enrichment programme:** Enrichment programme refers to richer and more varied educational experiences, a curriculum that is modified to provide greater depth and breadth than generally provided programme in schools. The enrichment programme for scientifically talented students be built on the premise that high level of intelligence makes certain demands upon these children and in order to improve understanding or principles, concepts, Attainment of graphical skills and attainment of experimental skills in selected topic. While planning the Enrichment programme in the study most of the characteristics of the gifted and talented and STS listed in the section 1.7 are taken into consideration. It also meets the special needs of the gifted children.