

## **An Analysis of Syllabus and Performance of Grade1 Students of Karnataka in the 16<sup>th</sup> National Science Olympiad.**

**Nisha K P**

Senior Research and Teaching Assistant, School of Education, G- Block, Academic Complex, IGNOU, Maidan Garhi, New Delhi- 110068, India

**\*Corresponding Author:**

Nisha K P

**Email:** [nisha.nishakp@gmail.com](mailto:nisha.nishakp@gmail.com)

---

**Abstract:** National Science Olympiad(NSO) is an initiative by the Science Olympiad Foundation(SOF) to promote development and excellence of science skills in students of grade 1 to 12 in India and few countries abroad. The 16th national Science Olympiad was held during November 2013 across many cities in India and a few countries abroad. The present study is an attempt to analyze the syllabus of National Science Olympiad for grade 1 and analyze the performance of grade 1 students of Karnataka in the 16th National Science Olympiad. The performance analysis is based on the Student Performance Report generated by the science Olympiad Foundation to all participants. Performance is analyzed based on the percentage of right answers section wise, the whole question paper and the state average marks of grade 1 students of Karnataka in the 16th NSO. The syllabus is analyzed for its prevalence of science concepts and its suitability for facilitation of science skills in grade 1 students. Hence, the major research tools are the Student Performance Report of a grade 1 participant as generated by the SOF and the NSO syllabus as available in the SOF website. The study is constrained by inherent methodological and theoretical delimitation that restrict its scope of generalization. The study has emerged with a few significant quantitative and qualitative findings on the performance of grade 1 students of Karnataka in the 16th NSO along with a few research suggestions on the syllabus of NSO for grade1. The syllabus analysis inspired the author to elucidate a framework for a model curriculum for grade 1 NSO.

**Keywords:** National Science Olympiad, Science Olympiad Foundation, Student Performance Report, Model Syllabus, Report Analysis

---

### **INTRODUCTION**

National Science Olympiad(NSO) is an initiative by the Science Olympiad Foundation (SOF), an educational foundation and a non-profit organization based at New Delhi that promotes and encourages talent identification and development in school students [1-2]. The foundation primarily organizes Olympiads in subjects viz. Science, Introductory Computer Education, Mathematics and English for school students from grade1-12 in India and countries like Singapore, Oman, Qatar, Nepal, Behrain, Srilanka, UAE and Durban. Every year, the foundation organizes four Olympiads namely National Science Olympiad (NSO), International Mathematics Olympiad (IMO), National Cyber Olympiad (NCO) and International English Olympiad (IEO) in Science, Mathematics, Introductory Computer Education and English respectively. Participation is through schools rather than individual.

National Science Olympiad (NSO) has been aspiring the students to inculcate a scientific bent of mind through the academic and scholastic aptitude

competition viz. NSO for the past 16 years. All the students of grade1-12 are eligible to participate in the Olympiad through their respective school registration. The competition is held in two levels viz. Level 1 and level 2. For classes 1to 10, the format of the exam for both levels is the same. There are a total of 35 questions divided into 2 sections. The time limit is 60 minutes and there are no negative marking for incorrect answers. The detailed syllabus is described in the sections to follow. For grades 11-12 for both levels, there are a total of 50 questions carrying 1 mark each, divided into two sections pertaining to Mathematics, Biology, Physics and Chemistry. The time limit is 60 minutes and there are no negative marks for incorrect answers. The questions of NSO for all the grades are multiple choice type and the responses are to be marked in the OMR sheet provided to the students. All the students participating in the first level receive certificate of participation along with a Student Performance Report (SPR). The SPR is explained in the section on research tool. Also, the SOF generates a performance report for all participating schools known as School Science

Quotient (SSQ). On the basis of the first level exam, a school topper medal is awarded to every class topper provided that there is a minimum of 10 enrollments in the class concerned in each participating school. Selected students appear for the second level exam and based on the performance in the second level and according to the ranks obtained in the second level, the final status of each participant is decided for further awards and recognitions. The criteria for selection to the second level are broadly the excellence of the participant in the International, state and school levels. All the participants of the second level exam are awarded Certificate of Merit. Also, the respective schools with International Rank from 1 to 3(both inclusive) is awarded a Science Intellect Trophy for having the winning students on their rolls. There are no second level exams for grades 1 and 2.

All States and Union Territories in India and International countries participating in Olympiads have been categorized into following zones. This categorization is used for determining zone toppers who qualify for the 2nd Level exams and for determining zone toppers to be awarded for performance in 2nd Level exams. Table 1 illustrates the state categorization of participating states into various zones.

**Table 1: State Categorization**

Sl. No	Zone	States
1	North	Delhi Uttar Pradesh/ Uttarakhand Punjab/Chandigarh Rajasthan Himachal Pradesh/Jammu&Kashmir Haryana
2	East	West Bengal/Andaman Nicobar Chattisgarh Bihar Jharkhand Orissa North East States
3	West	Maharashtra/Goa Gujarat/Daman Diu/Dadar Nagar Haveli Madhya Pradesh
4	South	Andhra Pradesh Karnataka Kerala Tamil Nadu/ Puducherry
5	International	All countries other than India

The first level of the National Science Olympiad was conducted in thousands of schools in over 1100 cities and 14 countries in Asia during November 2013. Based on the results at the first level, all the participants were awarded the Certificate of Participation and toppers selected. A Student Performance Report (SPR) was generated by SOF to all participants to assist in a comprehensive evaluation of the child. In the present study, the author has made an attempt to analyze the performance of grade 1 students from Karnataka ( South Zone) in the current NSO based on the Student Performance Report. Also, the author has put an effort to critically analyze the syllabus of NSO for grade 1 as available in the SOF website. The study also attempts to elucidate a framework for a model syllabus that is compatible with the National Curriculum Framework 2005 for Environmental Studies (grades-1 and 2) [5].

## MATERIALS AND METHODS

### Statement of study

The study statement reads as “ *An analysis of syllabus and performance of grade 1 students of Karnataka in the 16<sup>th</sup> National Science Olympiad.*” The study aims to analyze the performance of grade 1 students of Karnataka who participated in the 16<sup>th</sup> National Science Olympiad held during November 2013. The analysis is based on the data available in the Student Performance Report generated by the Science Olympiad Foundation. Also, the study intends to analyze the syllabus of NSO for grade 1 as available in the Science Olympiad Foundation website. The scope of the study also envisages to elucidate a framework of a model syllabus suitable for grade 1 students for NSO.

### Objectives of study

The study aims to achieve the following objectives.

1. To identify the question in each section of the question paper, that was answered right by the greatest percentage of grade 1 students of Karnataka in the 16<sup>th</sup> National Science Olympiad.
2. To identify the question in each section of the question paper, that was answered right by the least percentage of grade 1 students of Karnataka in the 16<sup>th</sup> National Science Olympiad.
3. To identify the question and area in the question paper, that was answered right by the greatest percentage of grade 1 students of Karnataka in the 16<sup>th</sup> National Science Olympiad.
4. To identify the question and area in the question paper, that was answered right by the

---

lowest percentage of grade 1 students of Karnataka in the 16<sup>th</sup> National Science Olympiad.

5. To find out from the Student Performance Report the state average marks of grade 1 students of Karnataka in the 16<sup>th</sup> National Science Olympiad.
6. To study and analyze the National Science Olympiad syllabus for grade1.
7. To elucidate a framework with the essential sections, concepts and skills for a model National Science Olympiad syllabus for grade1.

### **Methodology**

The study is primarily an analysis of an Appraisal Report viz. Student Performance Report which is generated by the Science Olympiad Foundation to all the participants so as to enable a comprehensive evaluation of individual performance at different levels. In the present study, the researcher has utilized the above report to collect the required data to analyze the performance of grade 1 students of Karnataka in the 16<sup>th</sup> National Science Olympiad .The sample of the study constituted all the grade 1 participants of Karnataka state in the 16<sup>th</sup> NSO. The sampling was purposive and the research design was essentially non-experimental.

### **Research Tools**

The study employed the following research instruments to collect the required data and achieve the research objectives.

#### **1.Student Performance Report(SPR)**

The report is made available by the Science Olympiad Foundation to all the participants after the declaration of the results of NSO. The report is basically designed to assist in the comprehensive evaluation of the child's performance on different criterion. The SPR essentially consists of six parts, each part providing different assessment results at different levels. The following section describes the SPR in detail.

##### **Part-A- Current Year's performance**

This section gives an overview of the participant's performance in the current National Science Olympiad. The performance report ranks the participant based on the marks scored and the corresponding percentile score. Also, the report highlights the rank of the participant in his/her respective school, city, state and international level.

##### **Part-B- Past 5 years' Performance Comparison**

This section illustrates the comparative performance matrix of the student based on last five years scores and ranks. The comparative data enables to evaluate the child's performance matrix ( graph) and competitive readiness.

##### **Part-C- Question Wise Performance Analysis**

The section provides the complete question paper along with the area tested and the answer key. Also, the child's answer to each question and the comparison of the child's answers with answer given by the other students from the respective state and international level is illustrated. The above pattern facilitates the analysis of the participant performance in each section of the question paper.

##### **Part-D- Topic Wise Performance Analysis**

The participant performance is described based on each individual section of the question paper. The description is based on total marks in the respective topic, obtained marks and percentage. The scores are graded and evaluated following the CBSE pattern. The student's total performance description is also given and graphically depicted in histogram.

##### **Part-E- Percentile Score Analysis**

The class percentile score, state percentile and the international percentile scores is graphically represented.

##### **Part-F- Average Marks Analysis**

This section describes the average marks of the participant, class average marks in the respective school, state average marks in the respective state and the international average marks. The same is graphically represented in histogram.

#### **2. Syllabus of National Science Olympiad for grade1**

Generally, the syllabus of National Science Olympiad is claimed to be the Science and Mathematics syllabus as prescribed by the CBSE/ICSE/ Various state boards.

As per the syllabus given in the Science Olympiad Foundation website, the actual test paper has 35 questions and the time allowed is 60 minutes. There are 2 sections with 10 questions in the first section and 25 questions in the second section. Total marks are 40.The details of the syllabus are described below.

##### **Section-I : Mental Ability**

Numeral, Number name and number sense( 2 digits), Addition, Subtraction, Length, Weight, Time, Money, Geometrical skill, Patterns, Odd one out, Series

completion, Problem based on figure. Each question carries one mark.

### Section-II: Science

Plants, Animals, Human beings and Their Needs, Good Habits and Safety Rules, Air and Water, Weather and The Sky.

In section-II, 5 questions are grouped under the sub section Achievers' Section with each question carrying two marks. All other questions carry one mark each.

### Delimitation

The study is delimited by the following methodological and theoretical constraints.

1. The study is delimited to the analysis of performance and syllabus of 16<sup>th</sup> National Science Olympiad only.
2. The sample of the study is delimited to all the grade 1 participants of Karnataka state in the 16<sup>th</sup> National Science Olympiad. Hence the study is neither a comprehensive performance analysis of grade 1 participants in the 16<sup>th</sup> NSO nor it is a reflection of the science skills of all the grade1 students of Karnataka state.
3. The analysis is strictly and exclusively based on the Student Performance Report generated

4. School wise distribution of grade 1 participants from Karnataka state has not been considered for the study.
5. 16<sup>th</sup> National Science Olympiad syllabus for grade1, as available in the SOF website has been utilized for the analysis.
6. Significant contextual and psychological variables affecting test performance has not been considered for the study.
7. No attempt has been made to make an intra-zonal or inter-zonal comparison of performance of grade 1 students in the 16<sup>th</sup> NSO in the present study.

## RESULTS AND DISCUSSION

### Data Analysis

As discussed in the previous sections, Student Performance Report (SPR) is the major research tool in the study. Part-C of this report .viz. *Question wise Performance Analysis* has been suitably adapted for the performance analysis. State Average Marks has been taken from Part-F viz. *Average Marks Analysis* of the SPR. Data pertaining to both the parts is tabulated in the Table 2 given below and the description of the tabulated data follows.

**Table 2 Question Wise Performance and State Average Marks of Grade 1 students of Karnataka**

Question Number	Area Tested/ Concepts	Right Answer %in Karnataka
<b>SECTION- MENTAL ABILITY</b>		
1	Identifying the incorrect match of number name and number formed from addition.	68.32
2	Identifying the missing shape by name in the given image	78.32
3	Identifying the day using sequence of days	47.30
4	Identifying the lightest weight in weighing scale	59.96
5	Identifying the subtraction sentence using the given image	66.77
6	Counting the number of teddies from the left of big teddy	<b>35.04</b>
7	Identifying the next figure in figure pattern	<b>78.45</b>
8	Identifying the abacus showing the number between two given numbers	77.48
9	Arranging the given numbers in descending order	73.01
10	Adding the given money	73.19

---

**SECTION- SCIENCE**

11	Analyzing the given pattern to draw the answer- Plants	20.31
12	Knowing the characteristics of the plants whose products are shown in the figure- Plants	55.40
13	Analyzing the given diagram to identify the animals that live in the asked place- Animals	66.24
14	Interpreting the given conversation based on the knowledge of animals-Animals	<b>20.13</b>
15	Knowing products obtained from plants- Plants	56.95
16	Knowing the functions of our hands and skin- Human Beings and Their Needs	53.94
17	Knowing different types of plants and their examples- Plants	50.18
18	Identifying different kinds of birds based on given flowchart- Animals	54.96
19	Understanding the features of all sense organs- Human beings and their needs	63.72
20	Knowing names of different animals and their young ones- Animals	41.24
21	Knowing food components and their rich sources- Human beings and their needs.	45.53
22	Identifying the things in different rooms in the house-Human beings and their needs	<b>67.39</b>
23	Identifying the things used in first-aid box – Good habits and safety rules	64.73
24	Knowing ways to purify water- Air and water	54.42
25	Analyzing the given relationship to choose the correct option- Air and water	25.71
26	Knowing the good habits to keep ourselves healthy- Good habits and safety rules	50.49
27	Applying the knowledge of working of flute to find the answer- Air and water	63.27
28	Knowing the name of the first person who went to the moon- Weather and the sky	62.96
29	Knowing the safety rules for 4-5 year old children- Good habits and safety rules	56.95
30	Understanding the role of physical activities which help in growth- Human beings and their needs	50.66

**SECTION- ACHIEVERS SECTION**

31	Solving the given word grid to identify animals- Animals	<b>25.66</b>
32	Analyzing the given conversation to know the weather conditions- Weather and the sky.	43.81
33	Identifying different stages of growth of a plant- Plants	<b>62.65</b>
34	Solving the word grid and matching air pollutants with their respective sources	31.33
35	Identifying objects X and Y in the given flowchart- Weather and the sky.	33.36
<b>State Average Marks Of Karnataka – 19.61</b>		

**Note-** Percentage figures in bold indicate the greatest and lowest figure in the respective section.

The table results indicated that in the section *Mental Ability* of the 16<sup>th</sup> NSO question paper for grade 1, Q. No. 7 viz. Identifying the next figure in figure pattern was answered right by the greatest percentage ( 78.45%) of grade 1 students of Karnataka. Q. No. 6 viz. Counting the number of teddies from the left of the big teddy was answered right by the lowest percentage (35.04%) of grade 1 students of Karnataka.

In the second section viz. *Science*, Q. No. 22.viz. Identifying the things used in different rooms in house ( Area- Human beings and their needs) was answered right by the greatest percentage ( 67.39%) of grade 1 students of Karnataka. In the same section, Q. No. 14 viz. Interpreting the given conversation based on the knowledge of animals ( Area- Animals) was answered right by the least percentage (20.13%) of grade 1 students of Karnataka. In the *Achievers Section*, Q. No. 33. viz. Identifying different stages of growth of a plant ( Area- Plants) was answered right by the greatest percentage ( 62.65%) of grade 1 students of Karnataka. In the same section, Q. No. 31.viz. Solving the given word grid to identify animals ( Area-Animals) was answered right by the least percentage (25.66%) of grade 1 students of Karnataka.

The table results indicated that in the whole question paper of the 16<sup>th</sup> NSO for grade1, out of the various sections, Q. No. 7 viz. Identifying the next figure in the figure pattern from the section *Mental Ability* was answered right by the greatest percentage (78.45%) of grade 1 students of Karnataka whereas Q. No. 14. viz. Interpreting the given conversation based on the knowledge of animals ( Area- Animals) from the section *Science* was answered right by the least percentage (20.13%) of grade 1 students of Karnataka. The table results also indicated that the state average marks of Karnataka in the 16<sup>th</sup> National Science

Olympiad for grade 1 was 19.61. Qualitative analysis of the National Science Olympiad syllabus is discussed in the next section.

**DISCUSSION**

***Performance analysis***

Regarding section 1- *Mental Ability* results, there were a total of 10 questions to be answered. The questions were strictly based on the prescribed syllabus. The section consisted of questions related to concepts like numeral, number name and number sense, addition, subtraction, length, weight, time, figure completion, geometrical skill, problem based on figure, odd one out etc. The table indicated that question pertaining to completing figure pattern was answered right by the greatest percentage of students and question pertaining to counting along a direction was answered right by the least number of students. The question that was answered right by the greatest percentage(78.45%) of students asked them to complete a particular figure series consisting of pictorial smiling apples holding different shaped objects in their hands. The students needed to identify the correct pattern to complete the series. Essentially, the question tested the spatial ability of students where in the student needed to visualize the arrangement of figure in a systematic manner and thereby identify the missing figure pattern. Hence, it could be assumed that the grade 1 participants of Karnataka state possessed a significantly high spatial ability, either attained through nurture or nature. The table results also revealed that Q. No. 6 was answered right by the least percentage of students (35.04%). In other words, a greater percentage of students were not successful in answering the question correctly. The question required the student to count the number of teddies to the left of the biggest teddy. Essentially, the question tested the student's concept of number,



---

direction and size which are both fundamental and crucial concepts in science and mathematics. The results showed that a majority of the participants in the state showed a poor proficiency in the understanding of the above mentioned basic concepts. This non-proficiency may be attributed to the contextual psychological variables affecting the test performance or the non-attainment of the concept due to other pedagogical or systemic elements. The in depth analysis of these intrinsic variables is beyond the scope of present investigation.

With regard to section-B *Science* the questions basically revolved around basic understanding of concepts like plants, animals, human being and their needs, good habits and safety rules, air and water, weather and sky. These concepts are the fundamentals of environmental science that comprises an integral part of the primary grade curriculum in all the state and central run schools. The table results indicated that Q. No.22 was answered correctly by the greatest percentage of students (67.39%). The question was a picture based question revolving around the area human beings and their needs. The question specifically asked the students to identify the incorrect match among the matches between things and their use in the daily life of human beings. The question essentially tested the students' awareness of his/her natural environment and the understanding of the basic life activities. The percentages of right answers reveal the significantly high proficiency of the participants in the attainment of these fundamental concepts. The table result also revealed that Q.No.14 was answered correctly by the least number ( 20.13%) of participants. In other words, a vast majority of the participants failed to answer the question correctly. The question was related to the area of animals and asked the students to correctly interpret a conversation between two boys wherein one was saying that he had found an animal having six legs and wings. The other boy commented that he must have found a flea. The question demanded the student to decide the accuracy of the content of the conversation. The question essentially tested the knowledge of students on different type of animals and the major differences between them. Yet, on in depth analysis, it could be concluded that though a majority of students knew that flea is an insect and has six legs, the classification of insects into winged and wingless was not better attained by the students. This might be a significant reason behind a majority of students not answering the question correctly. Grade 1 students having significantly advanced knowledge about animal diversity could be expected to accurately differentiate between the different types of insects based on their anatomical features and be able to answer the question

correctly. Rather, this particular question could be more suited in the achievers section that was supposed to be containing questions that demanded relatively higher order analytical skills.

Regarding section-c viz. *Achievers Section*, there were 5 questions revolving around the same concepts as in section B, but of comparatively advanced level. The table results indicated that, Q.No.33 related to the area plants was answer correctly by greatest percentage ( 62.65%) of students. The question was based on a diagram showing different stages of plant growth starting from a seed to plant. The students were asked to select the option that showed the correct order of development. The question essentially measured the students' awareness of life process viz. Growth and the process of plant growth. The results revealed that a greater majority of students possessed a significantly higher and accurate understanding of the process of plant development and could thereby successfully identify the different stages of the development process. The table results also revealed that Q.No.31 related to area animals was answered right by the least percentage (25.66%) of students. In other words, a greater percentage of students could not answer the question correctly. The question asked the student to identify the names of animals hidden in the word grid that a) ate insects and b) lived in a house made by man. The question tested the students' understanding of animal names, habits and their habitats. The lower proficiency of students might be attributed to the non-attainment of these fundamental concepts of the environmental science. Another significant reason may be the question pattern which is basically a word grid. Identification of meaningful words from a grid essentially requires a higher order verbal skill. Since the question comes under the achievers section, it is obviously expected to demand a higher order skill. Yet, the analysis intends to highlight that a significant influence in the lower percentage of right answer in this question may be equally and significantly attributed to the question pattern along with the non-attainment of accurate understanding of animal world.

In the whole question paper of 16<sup>th</sup> NSO, the table results indicated that Q.No.7 related to identifying the next figure in the figure pattern was answered correctly by the greatest percentage (78.45%) of grade 1 students in the state. The higher percentage of right answers reveal that a significantly higher percentage of grade 1 participants in the NSO possessed higher proficiency in pattern identification and series completion that essentially involves more of spatial ability. The relatively higher spatial proficiency may be attributed to both contextual and social factors. A

crucial influence might be that a significant proportion of the NSO participants from the state are from Bangalore which is the silicon city of the country. As a consequence of growing proliferation of major IT firms, children in the city are naturally assumed to be inclined towards technical streams like Science, Engineering and Mathematics that demand more of spatial ability to achieve consistent success. Hence, the students are assumed to possess the skill as a basic skill repertoire irrespective of whether they receive training for the skill refinement in the academic setting or not. The table figures also revealed that Q.No.14 related to the area animals was answered right by the least percentage (20.13%) of the participants in the state. In other words, a vast majority of students could not answer the question correctly and thereby revealed lower proficiency in the understanding of animal world and its diversity. As discussed in the previous section, this may be largely due to the failure in understanding of animals which is a basic concept of environmental science. But, it can also be due to the inherent higher order complexity of the question that demanded not only a fundamental broader understanding of the animal kingdom, but knowledge of detailed classification of animals. The study of these influencing factors provides a scope for future potent inquiries.

The table figures also indicated that the state average marks in the 16<sup>th</sup> NSO in Karnataka was 19.61 which calculated to 49.03%. The percentage score is not so impressive taking into account the revolutionary changes taking place in the content and pedagogy of science education. The results cannot be generalized to the whole population of grade1 students in Karnataka as the sample might not be a statistically adequate representation of the population. Yet, analysis of the performance emerges with a not so vibrant scenario of science education in the State.

### **Syllabus analysis**

As discussed in the introduction, the NSO syllabus for grade 1 consisted of two sections namely section-I Mental Ability (10 questions) and section-II Science (25 questions). The following section discusses and analyzes the syllabus in detail.

#### **Section-1-Mental Ability**

According to the syllabus [3] this section tested the proficiency of the participants in concepts viz. numeral, number name and number sense ( 2 digits), addition, subtraction, length, weight, time, money, geometrical skill, pattern, odd one out, series completion and problem based on figure. The concepts in this section form the syllabus of International

Mathematics Olympiad [4] that intends to encourage mathematical skills in India and abroad.

This section is entitled mental ability wherein the proficiency of the students in performing different cognitive tasks related to the above concepts is measured. The concepts under this section can be categorized as illustrated in Table 3.

**Table 3: Categorization of Concepts in Section 1**

<b>Exclusive Mathematics Concepts</b>	<b>Everyday Mathematics and Science Concepts</b>
Number Numeral and Number sense Addition Subtraction Geometrical Skill and pattern Money	Length Time Weight

The other areas viz. odd one out, problems based on figure and series completion are not concepts, but different types of questions. Hence, the section could be more appropriately designated as Numerical Ability as it primarily focuses on the students' mathematical ability rather than the scientific ability or aptitude.

Regarding the section-II, it consisted of questions that tested the understanding of students in various concepts in Environmental Science viz. plants, animals, human beings and their needs, good habits and safety rules, air and water and weather and sky. All the above concepts exclusively belong to Natural Environment and Natural Diversity. Concepts related to Social Environment and Socio-Cultural Diversity are lacking in this section. Social Science is an integral part of Environmental Studies in the primary grade in almost all the schools in the state and country. Achievers section in this part could accordingly consist of advanced level questions related to both Natural and Social Environment.

### **Findings**

The study emerged with the following findings.

- In section Mental ability of the question paper of 16<sup>th</sup> NSO, Question No.7 related to identifying the next figure in the figure pattern was answered right by the greatest percentage (78.45%) of grade1 students from Karnataka state.
- In section Mental Ability, Question. No.6 related to counting the number of teddies from



---

the left of the big teddy was answered right by the least percentage (35.04%) of grade1 students from Karnataka state.

- In section Science of the question paper, Question No.22 requiring the students to identify the things used in different rooms in house and related to the area human beings and their needs was answered right by the greatest percentage (67.39%) of grade 1 students in the 16<sup>th</sup> NSO from Karnataka state.
- In section Science, Question No. 14 asking the students to correctly interpret the given conversation based on the knowledge of animals and related to the Area Animals was answered right by the least percentage (20.13%) of grade 1 students from Karnataka state.
- In the Achievers Section of the question paper of 16<sup>th</sup> NSO, Q. No.33 requiring the students to correctly arrange the different stages of growth of a plant and related to the area Plants was answered right by the greatest percentage (62.65%) of grade 1 students from Karnataka state.
- In the whole question paper of 16<sup>th</sup> NSO, Q.No.7 of the section *Mental Ability* and related to identifying the next figure in the figure pattern was answered correctly by the greatest percentage (78.45%) of grade 1 students of Karnataka.
- In the whole question paper, Q.No.14 related to interpreting the given conversation based on the knowledge of animals ( Area-Animals) from the section *Science* was answered right by the least percentage (20.13%) of grade 1 students of Karnataka
- In the Achievers Section, Q.No..31 asking the students to accurately solve the given word grid to identify animals, related to the area Animals was answered right by the least percentage (25.66%) of grade 1 students from Karnataka state.
- The state average marks of Karnataka in the 16<sup>th</sup> NSO for grade1 was found to be 19.61 that calculated to 49.03%.
- The section Mental Ability of the 16<sup>th</sup> NSO question paper for grade 1 was found to have a predominance of exclusive mathematical concepts requiring understanding and mastery of numerical ability rather than exclusive science concepts requiring understanding and mastery of science skills or general mental ability skills..
- The content of the syllabus in mental ability section is the same as for International

Mathematical Olympiad [4].

- The concepts in the science section of the question paper were exclusively related to Natural Environment and Natural Diversity. Specific concepts related to Social and Cultural Environment were totally missing in the section.

### **Research Suggestions**

The investigation intends to highlight a few suggestions pertaining to the syllabus of NSO for grade1 based on the analysis.

- Section 1 viz. Mental Ability could be more appropriately replaced by Basic Science Process Skills focusing exclusively on Science Concepts. The questions could be primarily illustrative type testing the students' Basic Science Process Skills. Though the syllabus of NSO claims to be adopted by the Science and Mathematics syllabus prescribed by the CBSE/ICSE and various state boards, the NSO could more efficiently facilitate science skills in the students, if it could incorporate exclusive and fundamental Science Concepts than an amalgamation of Science and Mathematics Concepts
- Fundamental Science Concepts viz. Body parts and their functions, fruits, vegetables, modes of transport, flowers etc. could be included more elaborately under the natural environment.
- Both Social and Natural Science Concepts to be given equal weightage in the syllabus.
- Questions on concern and attitude towards local and global issues pertaining to both social and natural science to be included.
- Aptitude and attitude testing needs to incorporate questions with hypothetical situations demanding appropriate judgments from the students and testing students' imagination, design, fabrication and estimation.
- Biography of scientists and scientific discoveries/ inventions needs to find appropriate space in the syllabus.
- Questions testing the relationship between Natural and Social Environment needs to be incorporated.

### **A Framework for a model syllabus**

The section below describes an empirical framework for a model syllabus for NSO, grade 1. The framework is not comprehensive as it does not envisage the detailed classification of the concepts under each section. Rather, the framework broadly

mentions the components of the framework viz. Sections, Natural Science Concepts, Social Science Concepts and the Skills Evaluated. Also the components in the framework are not exhaustive and do not manifest the entire repertoire of

students' skills. The framework is a rational blend of elements from the existing syllabus and inputs from the author. The components of the framework is described in Table 4.

**Table 4: Components of framework for model syllabus of grade1 NSO**

Sections	Natural Science Concepts	Social Science Concepts	Skills/ Evaluated	Attitude
<i>Basic Science Process Skills</i>	Plant World Animal World	Me and My Family My Home, School and Neighbourhood	Observation. Communication. Identification.	
<i>Scientific attitude and aptitude</i>	Human beings and their needs Good habits and safety rules	Our Country India Community helpers	Measurement. Classification.	
<i>Everyday natural science</i>	Air and water Weather and sky	Good Manners and values	Inference and prediction. Creation.	
<i>Everyday social science</i>	Concern for environment/Natural resources Body parts and their functions Food and health Biography of scientists Discoveries and inventions Modes of transport		Scientific Attitude. Application. Spatial Skill. Reasoning. Comparison Sequencing Association Problem Solving	

## CONCLUSION

National Science Olympiad(NSO) is an initiative of Science Olympiad Foundation(SOF), based in Delhi to promote excellence of science in students of Grade1-12 in India and few countries abroad. The 16<sup>th</sup> NSO was held on november16, 1013 in thousands of schools in India and abroad. The present study intends to analyze the performance of grade 1 students from Karnataka state in the 16<sup>th</sup> NSO. The performance analysis is based on the student performance report generated by SOF. Also, the study envisages analyzing the current syllabus of NSO for grade 1 and elucidating a framework for a model syllabus for the same. The present study emerged with the quantitative results on the performance of grade 1 student from the state along with the state average marks in the NSO. The analysis of the syllabus emerged with a few significant implications and findings that could serve as a scope for further refinement of the syllabus. The present study, acknowledging its methodological delimitation,

attempts to inspire the young minds through continuous and comprehensive evaluation of the performance and syllabus of grade 1 participants in the 16<sup>th</sup> National Science Olympiad.

## REFERENCE

1. Science Olympiad Foundation website. Available from <http://www.sofworld.org/>
2. Science Olympiad Foundation Wikipedia. Available from [www.en.wikipedia.org/wiki/science\\_Olympiad\\_Foundation](http://www.en.wikipedia.org/wiki/science_Olympiad_Foundation).
3. Available online from [www.sofworld.org/nso/about-nso-exam](http://www.sofworld.org/nso/about-nso-exam)
4. Available online from Ref- [www.sofworld.org/imo/about-imo-exam](http://www.sofworld.org/imo/about-imo-exam)
5. Common Syllabus Classes I to 11-Environmental Studies: classes III to VIII-Science. Available from [www.tnscert.org/trimester/science.pdf](http://www.tnscert.org/trimester/science.pdf).