

NCF – 2005 BASED

**State Curricular policy Frame Work
And Guidelines for**

**Curriculum and Text Book Revision
In
KARNATAKA**

2006-07

**Department State Educational Research & Training,
And
Karnataka Text Book Society, Bangalore.**

January – 2007

Foreword

The Department of State Educational Research and training constituted a committee under the chairmanship of Sri. D. Jagannatha Rao, Retired Director of the department, to review the NCF2005 and prepare a State Curricular Frame Work (taking in to consideration the needs of the state).

This committee held extensive discussions for the past six months with academicians, teachers and experts from various disciplines and has prepared this Curricular Framework.

The next step is to review the state syllabus in the light of these two documents – NCF and the State Curricular Frame Work and suggest changes in the syllabus. The reviewed syllabus will again be placed before the academicians and classroom teachers for feedback.

The final step in the process is to entrust the work to textbook preparation committees to write the individual textbooks as per the guidelines evolved and the revised syllabus. The recently formed Karnataka Text Book Society will be entrusted with the actual task of preparing the individual textbooks.

I sincerely thank all those who have contributed to the preparation of this curricular framework.

Bangalore
Chidre Shankarayya Swamy
Dt: 16th January 2007
Director, DSERT

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CHAPTER 1

PREAMBLE

Karnataka conducted as many as 30 workshops on the draft of the National Curriculum Framework 2005, at district and state levels and communicated its views to NCERT. Karnataka welcomes majority of the recommendations of the NCF 2005. But these recommendations have to be reviewed in the Karnataka context before implementation and revision of curricula and text books.

The National Policy of Education 1986 and the subsequent National Curricular Frame Works have all been taken in to consideration while periodically revising the state curricula and text books. The 10 common core elements and 84 core values stressed in NPE 1986. have been kept in view while revising the curricula and text books.

The 10 common core elements are: The history of India's freedom movement; the constitutional obligations; the content essential to nurture national identity; India's common cultural heritage; egalitarianism, democracy and secularism; equality of sexes; protection of environment; removal of social barriers; small family norms and inculcation of scientific temper.

After 1986, the state has revised the school curriculum twice once in 1989 – 90 and again in 1999 – 2000. The revised text books were introduced subsequently in phases. The text book revision in the second phase was done between 2000-01 and 2004-05. These text books were revised based on the philosophy of making learning joyful for the child.

The revision had also taken in to consideration the states' pre eminent position in the fields of information technology, bio technology and other allied fields. Care was also taken to keep the curriculum and text books child centered. A number of successful practices in the field of education have also been incorporated in the revised text books Nali – Kali practices, activity based methodology, child centered learning. DPEP experiments, continuous and comprehensive evaluation techniques, etc.

The curriculum revision was also discussed with subject experts and class room teachers in workshops conducted by DIETs/CTEs through out the state before finalization. The text books were also field tested by introducing them for a year in selected blocks fo the state ad feed bock obtained, before introduction in the entire state.

Every year, the state brings out 308 titles of text books for standards from 1 to X in ten languages – Kannada, English, Marathi, Telugu, Tamil, Hindi, Urdu, Sanskrit, Persian and Arabic. The state also brings out textbooks in seven media. Every year these textbooks are reviewed, updated, edited and reprinted. Nearly 10.2

million children are supplied text books every year and the print order is nearly 55 million copies.

On receiving the National Curriculum Frame Work 2005, a committee of academicians, subject experts and class room teachers was set up to review the NCF 2005 and draft a state policy frame work which will form the basis for curriculum and text book revision. This committee also considered the NCF 2005 in the state specific context and has come out with a Curricular policy Frame Work and guide lines which will help the various subject expert groups to take up curriculum and text book revision.

One of the serious problems facing the state is the issue of drop outs at the upper primary and secondary levels. The following is the estimate of children attaining different classes (Eduvision 2002):-

Enter Class I	100
Reach Class IV	89
Reach Class V	85
Reach Class VII	65
Reach Class VIII	43
Reach Class X	33
Pass Class X	25
Enter Class XI	16
Pass Class XII	12
Enter higher education	10

The second issue is the pass percentage in the X and XII classes public Examinations which indicates a large amount of wastage and stagnation in the secondary education system. Even among students who pass and go to higher education, a majority of students go to arts and commerce streams. The performance of students is especially poor in English, Maths and Science. In view of this fact we have to consider redesigning the curriculum in the various subjects.

Similarly contextualizing the school education in changing multi cultural facet of the Indian Society in general and the state scenario in particular, curriculum will have to be made more relevant to the younger population who has stepped in to the 21st century.

The committee also considered the following questions; should the curriculum and text books reflect the aspirations of 10% of children who enter higher education stream or should we also keep in mind and give adequate weight age to the requirements of more than 84% of children who drop out of the system?

Hence new employable avenues have to be explored from class VIII level itself, for the remaining children who fail to go beyond class X. We should also

address concerns of first generation learners, children of weaker sections, dropouts, ect.

The fact that learning has become a source of burden and stress on children and parents is an evidence of the deep distortion in education aims and quality. Every year we hear of student suicides before the public examinations and after announcement of results.

Hence the committee felt that there is urgent need for the state to have separate curricular policy frame work which will address some of the issues raised in this chapter.

The committee also felt that the state should develop a policy document which will guide syllabus and text book revision. The committee felt that the syllabus and text book revision should not be done in a hurry as it will jeopardize the academic work in schools.

The revised draft syllabus will have to be disseminated right up to the school level. The opinion of all the stake holders have to obtain and the finalized syllabus given to the text book preparation committees for writing text books.

Similarly the text books written have to field tested by introducing them in all schools blocks for one year before finalization and introduction in the entire state.

The Committee considered all these aspects and suggested the following tentative time lines for curriculum and text book revision:

- | | |
|--|----------------------|
| a) Preparation of State Curricular Policy Frame Work | 2006-07 – April 2010 |
| b) Revision of Syllabus for I to X standards | 2007-08 – |
| c) Text Book Revision I,III, V& VII standards | 2008-09 – 2010 Dec |
| d) Text Book Revision II, IV, VI & VIII standards | 2009-10 – 2011 Dec |
| e) Text Book Revision IX and X standards | 2010-11 – 2012 Dec |

The Committee through this policy document, has tried to address some of these issues in the following manner:

- a) Review of the NCF 2005 in the Karnataka context.
- b) Preparation of a Policy document to suit the requirements of the state
- c) Guidelines for Curriculum Revision.
- d) Guidelines for Text Book writers
- e) Changes needed in the teacher education sector to support curriculum revision
- f) Salient Features of the Trimester Scheme

CHAPTER II

Salient Features of National Curriculum Framework 2005

2.1 Salient Features:

The main features of the NCF 2005 are strengthening a National System of Education with special focus on-

- Values enshrined in the Constitution of India,
- Reduction of curriculum load,
- Ensuring quality of education for all (EFA)
- Systemic changes,
- Common school system,

The NCF 2005 has recommended five guiding principles for curricular development-

- a) Connecting knowledge to life outside school,
- b) Ensuring that learning shifts from rote methods,
- c) Enriching curriculum so that it goes beyond text books,
- d) Making examinations more flexible and integrating them with class room life.
- e) Nurturing an overriding identity informed by caring concerns with in the democratic polity of the country.

Apart from these five guiding principles, NCF also emphasises learning without burden.

NCF 2005 also emphasises on learning and construction of knowledge:

- Correspondence between learner development and learning is intrinsic to curricular practices,
- Knowledge is different from information,
- Organising learning experiences for construction of knowledge and creativity,
- Connecting knowledge across disciplinary boundaries for insightful construction of knowledge,
- Learning experiences for developing critical perspectives on social issues,
- Plurality of text books and other material incorporating local knowledge mediated through constitutional values and principles.

It has also recommended significant changes in all five areas of language, mathematics, science, social science and Health Physical Education with a view to making education more relevant to the present and future needs. It has also recommended for softening of subject boundaries to enable children get a taste of integrated knowledge and the joy of understanding.

The fact that knowledge is constructed by the child implies that curricula, syllabi and text books should enable the teacher in organizing class room experiences relating to the child's nature and environment.

Karnataka is one of the states which is already religiously implementing the three language formula as recommended by NCF. The NCF also suggests promoting proficiency in English.

The National Curriculum Framework 2005 also speaks of Curriculum Review and Text Book Revision in the context of “Learning without Burden”. The department had already issued a comprehensive in 2003 a circular incorporating some of the points to reduce the burden on children. The Concept has to be further given due importance in curriculum revision.

Some of these points have been incorporated when the Semester Scheme was introduced in the state during 2007-08. Under the Semester scheme, the state has already adapted the grading system in place of marks for assessing both scholastic and co scholastic abilities of students.

Apart from these guidelines it is necessary that the state reviews the current educational scenario in the state. Hence the State Curriculum has to be reviewed under the frame work NCF 2005 and in the light of the state specific issues. Mere curriculum revision will not usher in quality as is our past experience. We also have to move towards competency based assessment from the present content based testing.

It is suggested that the State Curricular Frame Work address these issues and prepare a suitable syllabus keeping in view the concerns of students who drop out after X or go to arts and commerce streams. The curricular Review can also address the issue of introducing vocational education at the secondary level. We also have to think of bringing local specific text books at least in language and environmental sciences.

The Revision of curriculum also to take in to consideration, various issues like suitable guidelines for student projects in various subjects, prescribing the number of science experiments for each class, etc,

It is recommended that the state formulate a state curricular frame work or policy of its own, which will take in to consideration the local specific issues and formulate a curriculum suitable to the state.

NCF also recommends computer connectivity to every school which again depends on the availability of resources at the state level.

CHAPTER III

The State Curricular Policy Frame Work

3.1 Salient Features of State Policy:

The State accepts most of the major recommendations of the NCF 2005. At the same time the state's policy takes in to consideration some of the state specific issues and suitably modifies the recommendations of the NCF 2005 to suit the states needs:

3.11 Learner and his needs:

1. The curriculum will have to focus on learners' needs, capacities and limitations in the process of learning.
2. The Revised Curriculum has to take in to consideration the requirements of not only the children who peruse higher education, but also the requirements of a vast majority of children who drop out at lower levels or who fail to pass out of X standard.
3. The Curriculum Revision also has to aim at providing new employable avenues for such children from class 8 level itself,
4. Even is that class 8 is considered part of the elementary cycle, the reality in the state is that class 8 continues to be a part of a vast majority of secondary schools in Karnataka. Hence the revised curriculum acknowledges this aspect and the syllabus for class 8 is prepared accordingly.
5. The curriculum will have to provide space for the non formal school system and open school system also for those children who cannot continue formal education beyond a particular level due to wide variety of reasons.
6. Curriculum, syllabi and text books have to be framed as per the state's language policy and the three language formula.

3.12 Assessment of children:

1. School level assessment of children is through competency based continuous and comprehensive evaluation in classes from 1 to 4. No detention policy is followed only in classes 1 to 4.
2. School level assessment and promo on of children in classes 5 to 9 is through the two semester evaluation tests and grading as per the semester scheme Informal assessment of non scholastic subjects as per the semester scheme.
3. Apart from the above school level assessment procedures, KSQAO will conduct annual assessment of children and schools to assess the learning levels of children in various classes.
4. The Public Examination at the end of X standard is retained as it suits the states' needs better.

5. As a part of education reform process in the state, semester Scheme was introduced in all the schools in the state from 2007-08 scheme has been welcomed by a majority of the stake holders as it –
 - a) makes learning more meaningful as learning takes place continuously and through out the academic year,
 - b) Removes the fear psychosis about the existing system of examinations,
 - c) Removes the habit of testing only the memory pf the learner,
 - d) The child is evaluated only about the lessons he has learnt in a particular semester so that the child does not carry the burden of memorizing what he/she has learnt through out the year.
6. Several innovative features such as evaluation of co-curricular areas. project work, grading, oral testing of the child have been introduced as a part of the semester scheme which are all learner friendly.
7. The assessment system has to be fine tuned still to test the competencies of children. Equal emphases has to be given to both process evaluation & product evaluation. Similarly there should be emphasis on oral and written tests as well as observation (To be marked on an observation schedule)
8. A system has to be developed to assess the school as a whole on a **school quality index**. This will help to grade the schools and motivate the schools to aim for higher grades in subsequent years.
9. A format for self assessment of teachers will help a majority of teachers to aim for self improvement.

3.13 Courses of study:

1. The aim of school education is to provide general education – basically five curricular areas the languages, social science, science, mathematics and Health and Physical education.
2. The syllabus committees will have to redefine the objectives of teaching each of the subjects as per the guidelines contained in the NCF 2005.
3. As attempt has been made in the next chapter to provide guidelines for selection of content by the respective syllabus committees covering general education up to secondary level.
4. The co scholastic activities have to be provided more space to help the learners acquire the necessary life skills and creative abilities.

3.14 Curriculum Transaction:

1. The curricular policy has to ensure that the nature of curriculum transaction in the class room shifts from rote methods to experiential learning and connecting knowledge to life outside school.
2. The focus will ensure on helping the students to know how to learn than what to learn.

3. This will have strong bearing on teacher preparation, teaching learning material, resource support, class room supervision, and assessment mechanisms.
4. The teacher will have to transform himself from a supplier of knowledge to a facilitator and guide.
5. Teaching should not be restricted to presentation of information. Instead teachers should assume active role in relation to process of knowledge construction in which children are engaged.
6. Teachers should follow the methods that help in the process of critical thinking. Because, critical pedagogy provides an opportunity to reflect critically on issues, in terms of their political, Social, economic and moral aspects
7. It facilitates collective decision making through open discussion and by encouraging and recognizing multiple views. Students should be encouraged to recreate the knowledge and also to relate the local knowledge with the school knowledge.
8. **The syllabus to be framed should address multigrade teaching/learning in elementary schools** the syllabus framers shall focus on areas like clustering of competencies, organization of teaching, time division cycle, sitting arrangement, monitoring system and evaluation process.
9. Health and Physical education should be treated as core part of the curricular area.

3.15 Vocational Education

1. The vocational needs of a vast number of children who drop out of the school system before they complete X standard is a matter of serious concern and avenues have to be provided for vocational education of such children.
2. Vocational subjects as per the local needs have to be introduced from class 8.
3. The schools should be provided resources needed. The schools may also use local talent and local resources.
4. Each school may be given financial aid (a certain percentage in proportion to the number of children) for providing infrastructure and teaching of vocational subjects
5. The teaching of these subjects may also be outsourced. For example there are any number of computer training institutions who train, conduct examinations and issue their own certificates.
6. The schools may have to tie up with local field departments like – agriculture, horticulture, employment and training, industries, etc,

3.16 Quality in Education

1. There are many factors contributing for the quality education such as curriculum, infrastructural facilities, quality of teachers and quality of teaching.

2. The quality dimension also needs to be examined from the point of view of the experiences designed for the child in terms of knowledge and skills.
3. Quality in education includes a concern for quality of life in all its dimensions including concern for peace, protection of the environment and a predisposition towards social change.

3.17 Teacher Education

The policy has to examine the relevance of present teacher preparation programs at both elementary and secondary level in the light of curriculum revision. There is urgent and felt need to revamp the teacher education program both at primary and secondary level (including pre service and in service programs) to help teachers to understand the philosophy behind curriculum revision and train these teachers to acquire additional skills to improve class room curricular transaction. A separate chapter is being devoted for the purpose.

3.2 General Guidelines for curriculum revision:

Apart from the five guiding principles enunciated by the NCF 2005, some of the important issues to be considered during curriculum revision are listed below:

4. The three important school stages have to be kept in view while revising the curriculum – Lower primary stage. Upper primary stage and the Secondary stage.
5. Appropriate linkages and continuity have to be provided between these stages so that the child will transit smoothly from one stage to the next stage.
6. The syllabus frames should make sure of appropriateness of topics and themes for the relevant stages of children's development from a psychological point of view.
7. Providing information for information sake should be avoided as far as possible.
8. Link school knowledge in different subjects and children's every day experiences and build on it.
9. Integrated approach and inter disciplinary and thematic linkages between topics should be maintained in the core subjects.
10. Reflect sensitivity to gender, cast and class parity, peace, health and needs of different categories of children.
11. The needs of different types of children – the gifted, average, slow learners, the physically challenged and children with learning disabilities have to be taken care of while revising curriculum and text books.
12. Environment related knowledge, proper integration of work related attitudes and values have to be included at appropriate places.
13. Nurture aesthetic sensibility and values by integrating the arts, India's heritage of crafts at appropriate places in the curriculum.
14. The curriculum and text books should provide sufficient flexibility and allow space for creativity to different types of teachers to handle class room transactions more efficiently.

3.21 Guidelines for framing syllabus

Syllabus gives guide lines for the text book writers in terms of the objectives, content scope and also outlines variety of learning experiences to be provided to the children. Hence guidelines for framing the subject wise syllabus are given below:

1. Aims & objectives of teaching a particular subject should be highlighted specifically under the concerned syllabus.
2. The scope of the content to be determined according to the level of the class. The content of the syllabus should be provided specifically under units & subunits.
3. The number of hours required for completing the units / Sub units should be specifically mentioned.
4. This will enable the text book writers and class room teachers to understand the scope and depth of the content to be taught.
5. While framing the syllabus, care should be taken to see that too much overlapping with respect to theme or core elements, Ideas, is not there.
6. In Languages selection of eminent personalities. like national leaders, scientists Poe & Literary Scholars, to be done for all the classes in a holistic manner so that the children do not get bored by reading about the same personalities again and again.
7. While framing the syllabus specially at the lower level, there should be provision to cover framing about the local culture, local environment, local leaders and gradually information about the National & global perspectives should be given at the higher level.
8. The syllabus writers should stress on integrated and concentric approaches so that the text book writers can keep these points while developing the text books.
9. The syllabus should be provided under the following format. An example is provided below.

Questions	Key concepts and/Issues	Suggested resources	Suggested activities
Broader Areas 1. Family and friends 1.1 Relationship 1.2 work and play 1.3 animals 1.4 plants 2. Food 3. Shelter 4. Water 5. Travel 6. Things we make and do			

10. The syllabus written should give indication regarding the presentation of activities, experiments. do you know this, Illustrations, scope for Integrating values....ect
11. The syllabus writers should undergo training to know more about the technicalities framing the syllabus.

3.3 Karnataka Language Policy:

1. The state is following the three language formula. Kannada has been given primacy under the formula. Learning of Kannada is compulsory under the three language formula. Children will have to learn Kannada compulsorily either as a first or as a second or as a third language under the formula.
2. The children learn in the mother tongue (Kannada, Urdu, Marathi, Telugu, Hindi and English) from classes 1 to 4.
3. Those children whose mother tongue is not Kannada have to lean Kannada as an optional non examination subject in classes 3 and 4. But these children have to compulsorily learn Kannada as a second language from class .
4. Teaching of English as a second language begins from class 1.
5. Teaching of the third language begins from class 6. Hindi/Kannada / Sanskrit/English can be learnt as a third language.
6. All languages taught as a first language have been given equal status.
7. The standard of second language and third languages are prescribed as follows. For example in class 10, the standard of second language is that of standard of the first language in class 8. The standard of the third language in class 10 is that of the standard of the first language in class 6.
8. The following table shown the various language combinations that a student can take in upper primary and secondary classes.

	First Language	Second Language#	Third Language*
A	Kannada	English	Hindi/Sanskrit
B	Urdu/Marathi/Telugu/Tamil/Hindi/Sanskrit**	Kannada/English	English/Kannada
C	English	Kannada	Hindi/Sanskrit/Kannada/Urdu/Tamil

Second language is introduced from class 5, But from 2007-08, English is introduced from class 1.

* Third language is introduced from class 6,

** Sanskrit can be taken as a I language from class 8.

*** Arabic/Persian can be taken as third languages

9. Students can choose to learn in any one of the following media up to X standard; Kannada, English, Hindi, Marathi, Tamil, Telugu or Urdu.

10. But from plus 2 stages onwards the students have to choose only Kannada or English as medium of Instruction. Hence the students have to master these two language by the time they reach the secondary level.
11. Hence clear guidelines are given to text book committees in preparing language text books.
12. Kannada has been introduced as Introductory language from class I students in English medium schools where Kannada language is not taught.
13. English has been introduced as Introductory language from class I to all medium schools apart from English medium.

3.4 Integration of culture education in school curriculum

The Central Advisory Board of Education (CABE) has recommended integration of culture education in school curriculum. The main issues are-

- a) Enhancing the quality of cultural awareness among children
- b) Introducing the learning of our traditional, folk, classical and contemporary art forms and
- c) Helping students to appreciate the world of arts, music and literature.

The school curriculum should be flexible enough to allow learning to be made culture sensitive. The entire schooling should be based on the culture of the local community. Local resources, local folk art forms, practices, places, institutions, festivals, rituals, artifacts, literature and local artists, musicians, painters, writers, story tellers could be guests who could impart culture education in schools.

Teachers should be trained to use these local resources. The text books should use illustrations reflecting local culture. The children should participate in group activities in singing, dancing, role play, amateur dramatics, story telling description of pictures etc, to understand the local culture.

In Kannada some initiatives have already been taken in this regard. Several thousand teachers have been trained in using dramatics as a teaching technique “Shikshanadalli Rangakale” All teachers should be trained phases to help teachers effectively teach culture to students.

CHAPTER IV

Curricular Areas

NCF lays emphasis on the following points which have to be taken note of while revising curriculum, syllabi and text books.

4.1 Learning of Languages

NCF 2005 has recommended recognition of child's mother tongue and also encouraging proficiency in English. This is possible only when learning builds on a sound language pedagogy. Reading, writing, listening and speech contribute to the child's progress in all curricular areas. NCF lays emphasis on reading through out the primary classes so as to give every child a solid foundation for learning of other subjects also.

Any child with average intelligence can master any language, provided, it is taught effectively. Experiments across the globe have proved that children can master a minimum of six languages between the age of five and fifteen when their language acquisition ability (I.A.D) is most active.

In language the basic learning competencies have been defined as listening, speaking, reading, writing and comprehension of ideas. Several studies and experience shows that a majority of children do not acquire the expected proficiency (basic learning competencies to be mastered by every child) of their respective classes in languages. The text book writers have to take note of this point while writing text books as per the revised curriculum.

English in India occupies the position of the second language and is an all important language of communication. Strangely there is no mention of a second language in NCF 2005. Hence it may be generally presumed that English is taught as a second language. The state has taken a welcome decision of introducing English as a second language from class I from 2007 – 08.

Unfortunately the standard of competence of the teachers of English at all levels is far from satisfactory. We need competent teachers, good teaching materials and effective methods and techniques of teaching using the mass media.

Since the state is following the three language formula with primacy for the child's mother tongue (First language), separate guide lines to be evolved for curriculum revision and text book preparation for the first, second and third languages as these are introduced in different classes.

4.2 Learning of Mathematics

Relevance of mathematics education in the present day society characterized by extraordinary and accelerating change can hardly be overemphasized. Individuals who can understand and apply mathematics are likely to have significantly better career opportunities and choices in the upcoming knowledge society.

The learning of Mathematics should enhance the child's resources to think and reason, to visualize and handle abstractions, to formulate and solve problems. These aims can be covered by teaching relevant content in Mathematics through child's experience. Relating mathematical concepts to other subject areas should be explored by the teachers.

The twin concerns of the Mathematics curriculum are: what can mathematics education do to engage the mind of every student, and how can it strengthen the student's resources? The curriculum revision and the text books on mathematics should aim to address these two issues.

There is also a need to make connections between Mathematics and other subjects of study. When children learn to draw graphs, they should also be encouraged to think of functional relationships in the sciences, including geology. Our children need to appreciate the fact that Mathematics is an effective instrument in the study of science, also, strong interlinks that exist between mathematics and art must be made to be understood and appreciated by students..

4.3 Learning of Science

There are many responses to the question why science education is so valuable in school curriculum Science education empowers children by developing in them capabilities to understand and question and think critically. Science makes use of observation, intuition, hypothesizing, experimentation and verification.

It helps children observe the world around them, link their cognitive structures with the events and phenomena in their environment, understand the interactions and act as change agents in bringing about behavioral changes in him/her and the society. It enables children to reflect (think) and interact and develop a rational and objective outlook. Science education helps students understand the need for change and progress of the society and manage the same effectively.

NCF 2005 looks at science curriculum as an instrument for achieving social change. In order to bring about any qualitative change, science education should undergo a paradigm shift.

In this context, NCF 2005 is progressive in its outlook and incorporates linkage of science curriculum with the immediate surroundings of the child and the society at large. It aims at making of learning of science meaningful and relevant for the social needs.

NCF recommends that teaching of science has to be recast so that it enables children to examine and analyse every day experiences, acquire methods and processes that will nurture thinking process, curiosity and creativity.

Concerns and issues pertaining to environment to be emphasized in every subject and through a wide range of activities involving project work.

4.4 Learning of Social Sciences

NCF emphasis's teaching of social sciences from disciplinary perspective while emphasizing integrated approach in the treatment of significant themes. The social sciences curriculum should also enable pedagogic practices which are critical for developing thinking process. decision making and critical reflections on social issues.

The NCF has recommended a paradigm shift proposing the study of social sciences from the perspective of marginalized groups. Civics should be recast as political science and sociology and the significance of history as a shaping influence on the child's conception of the past and civic identity should be recognized.

Most of the children from rural and socially and economically weaker sections in the urban areas face/suffer not only social disabilities but also some form of violence against the body and mind.

A study was conducted in Bangalore rural district in 2001-2004 by the Department of Economics, University of Manitoba, Canada. It came to light that 98% of school drop outs who worked as child laborers were victims of alcoholic fathers and brothers. Many of the children were working to pay off the debt incurred by the parents to pay dowry of their older siblings. So drinking-child labour-dowry has deeper linkages than apparent to the public eye. The inroads made by dowry into the heart of all sections of the rural and urban society have resulted in the spread of female foeticide as represented in falling sex ratio. The adverse sex ratio in the certain northern districts of north Karnataka is already a cause for concern.

So it is vital to inculcate ethically correct behaviour and emphasise state interventions in the form of laws, police protection and legal action towards creating a generation of responsible and proactive citizens.

The importance of social science curriculum in school education is to be emphasized in the context of a plural society like ours and the impact of globalization. The social

science curriculum which comprises components of History, Geography, and Political science, Sociology, Economics and Commerce will help the learners to understand the society in which they live to address themselves to the social economic and environmental problems and to face challenges. The study of social science and commerce will help in producing responsible citizens who can help in building a healthy society. This will also improve employability of students who pass out of class X

Hence it is recommended that the social science curriculum of classes VIII to X may be framed with the following proportion of weight age given to the different studies:-

History	30%
Geography	15%
Political science	15%
Sociology	15%
Economics	15%
Commerce	10%

	100%

Drastic education in the portions related to Geography is not unwarranted as several chapters in the existing syllabus related to agriculture, industry and trade has been maps are the basic tools of geography. They create us to depict spatial phenomenon on paper. There are conventions used in cartography which allow a map to be read effectively and quickly. Various aspects like orientation, scale projection colour schemes, elevation are to be emphasized.

4.5 Health and Physical Education

This subject area should adopt the holistic definition of health with in which Physical education and yoga constitutes to the physical, social, emotional and mental aspects of child development. As early as 1940, a comprehensive school health programmes were conceived covering medical care, hygienic school environment, school lunch, health and physical education.

Given the interdisciplinary nature of this are cross cutting themes across subjects leading to cross curricular planning integrating it with general sciences, social sciences, work experiences, and Bharath Sevadal.

It is suggested that health and physical education is treated as a core subject and must deal introduced from primary level onwards The subject must be compulsory units from 10th class, after which it is an elective subject.

4.6 Other Curricular Areas

NCF draws attention to four other curricular areas: work, the arts and heritage crafts, and peace. The revision should take steps to make these critical components of the school curriculum. NCF expresses concerns pertaining to environment, peace oriented issues, sensitivity towards gender parity, SC/ST and minorities. These concerns and issues should be included in appropriate places and subjects.

A separate committee needs to look in to the present content regarding arts, heritage crafts and suggest changes to be made in the light of the recommendations made in NCF-2005.

4.7 Learning without Burden

The NCF and Semester Scheme lay special emphases on learning with out burden. Hence the syllabus framers have to give special attention to weed out unnecessary and irrelevant information from the syllabus and content.

For example in history, the children are made to memorize a large number of dates unnecessarily which can be avoided. Similarly in science books the dates of births of scientists/or dates of discoveries are given which again can be avoided. The syllabus framers and text book writers are required to take special care to weed out unnecessary information from text books.

4.8 Systemic Reforms

Apart from provision of providing minimum infrastructure and material facilities to schools. NCF lays emphasis on improved teacher performances, locally planned and flexible school calendars and time tables. It also places greater emphasis on perspectives and access to interactive technologies.

Recasting of teacher education programs, vocational education and training are some of the areas which are to be implemented in a mission mode.

NCF also recommends examination reforms with due stress on shifting from content based testing to problem solving and competency based assessment, examinations of shorter durations and flexible time limits. Some of these reforms have already been made under the semester scheme in the state.

NCF also recommends for partnership between the school system and other civil society groups NGOs and teacher associations.

CHAPTER V

Curriculum Revision

5.1 Languages

The curriculum revision and text books writing have to be in accordance with the states language policy. As stated earlier, there should be a clear difference in levels of text books for first, second and third languages for any particular class.

The state has introduced English as a second language from class I and Kannada as introductory language for I to IV English medium schools, At this stage, rather than preparing text books for students, importance has to be given for preparation of a comprehensive hand book for teachers and work books for students.

More importance needs to be given to spoken English in classes I and II. Extensive training has to be designed for the lower primary teachers who are going to handle English at these levels.

As for as English, Kannada and Hindi are concerned the comparison with NCF and suggested modifications are given separately as annexure.

5.2 Science Education

NCF 2005 lists six criteria of validity of science curriculum which in essence characterized a framework for developing a good science curriculum.

- a) Cognitive Validity
- b) Content Validity
- c) Process Validity
- d) Historical Validity
- e) Environmental Validity
- f) Ethical Validity.

NCF 2005 keeps the following as the basic aims of science education:

- Knowledge about the facts and principles of science and its applications, consistent with the stage of cognitive development,
- Acquire the skills and understand the methods and processes that lead to generation and validation of scientific knowledge.
- Develop a historical and developmental perspective of science and to enable one to view science as a social enterprise.
- Relate to the environment (natural/artifacts and people), local as well as global, and appreciate the issues at the interface of science, technology and society.

- Acquire the requisite theoretical knowledge and practical technological skills to enter the world of work.
- Nature of natural curiosity, aesthetic senses and creativity in science and technology,
- Imbibe the values of honesty, integrity, cooperation, concern for life and conservation of environment,
- Cultivate Scientific Temper – Objectivity, critical thinking and freedom from fear and prejudice.

The present Karnataka Science Curriculum when viewed from the above perspective reflects many positive features and some of the focuses mentioned in the NCF are already incorporated. But there is enough scope for a paradigm shift to make it more child centered, experimental, relevant, meaningful and making it less of a mental burden on the child.

Keeping the NCF 2005 guidelines in view, the syllabus committee will have to review the proportion and relevancy of the science content in environmental studies taught at the lower primary stage.

- Emphasizes has to be given on first hand experiences through practical activities.
- Provision for development of process skills – observation, classification, recording, etc,
- Create opportunities to link content with the immediate environment of the child
- Stress to be given through health and physical education.
- Instructional methodology should be according to the age group, nature of content and available local resources.
- Flexibility in teaching for the teachers to be incorporated in the curriculum as per the nature of target groups under the trimester scheme.
- Avoid unnecessary content over loading.

At the Upper Primary stage the syllabus committee will have to review as to how far the integrated approach in teaching of the various branches of science has been incorporated.

- Develop right perspective about learning principles of science by doing science.
- To take the children through a gradual transition from environmental studies to the elements of science and technology,
- Laying emphasis on knowledge construction through doing simple experiments, surveys, etc,
- Design and construct simple models to provide practical knowledge about common mechanical and electrical devices

- Encourage students to take up contextualized projects.
- Adapt teaching styles to the nature of target groups by providing locally relevant examples and projects.

At the secondary stage encourage learning science as a discipline and bring an integrated approach among various branches of science.

- Enable children to understand environmental and health issues,
- Draw inferences and make interpretations through conducting systematic experiments.
- Develop skills in discovering/verifying theoretical principles
- Encourage children to work in locally relevant projects.

Standards I to V

As in NCF	As is State Curriculum	Suggested modification
1. Arouse curiosity 2. Explanatory and hand-on activity 3. Basic cognitive and psychomotor skills through language and process skills. 4. Internalize values: cleanliness, honesty, cooperation, concern for life and environment. 5. Instructional Methodology should be activity based & provide interactive experience 6. No formal testing, no grading, no detention	1. Spirit of Inquiry 2. Creativity 3. Objectivity 4. Couage to question 5. Aesthetic sensitivity 6. Search for truth 7. Acquire observation and 8. analytical skills 9. Ability to use tools and apparatus according to the needs 10. Understand basic science concepts, laws and principles and apply them to solve problems. (Science is part of E.V.S) Concrete, situations relating to the immediate environment. Semester chances have no testing but grades without detention.	1. Emphases to be given to first-hand experiences through practical activities 2. provision for development of process skills – observation, classification, recording etc 3. Create opportunities to link content with the environment. 4. Stress to be given to health education. Methodology should be according to age group, nature of content & available resources. To adopt flexible teaching styles according to the nature of the target group as per semester scheme.

Standards VI to VII

As in NCF	As in State Curriculum	Suggested modification
<p>1. Developing right perspective about doing science-learning principals of science.</p> <p>2. To have gradual transition from environmental studies to the elements of science and technology.</p> <p>3. Emphases on Knowledge construction through doing simple experiments, surveys etc.</p> <p>4. Design and fabricate simple models, practical knowledge about common mechanical and electrical devices, contextualized projects.</p> <p>5. Continuous as well as periodic assessment. Term and test, system of direct grades No detention.</p>	<p>1. Strengthen and consolidate abilities</p> <p>semester scheme has periodic assessment and grading No detention</p>	<p>Consider for gradual transition from environmental studies to the elements of science and technology.</p> <p>To adopt teaching styles according to the nature of target groups, providing locally relevant projects.</p> <p>A combination of both NCF and semester scheme</p>

Standards VIII to X

NCF	As in the State Curriculum	Suggested modifications
<p>1. Learn science as a discipline.</p> <p>2. Understand and analyze environmental and health issues.</p> <p>3. To draw inferences and make interpretations from conducting systematic experiments.</p> <p>4. Skill in discovering / verifying theoretical</p>	<p>1. To learn basic structure and principles with reference to industry and contemporary technology.</p> <p>Terminal examination at the end of tenth standard</p>	<p>1. To provide opportunities to collect information, consolidate and draw inferences.</p> <p>2. To stress on interdisciplinary nature of science.</p> <p>3. To emphasize construction of knowledge.</p> <p>Equal emphases for both process and product</p>

principals 5. Continues and terminal examination.		evaluation. Information assessment of co-scholastic performance.
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- (1) Day to day experiences
- (2) Using the experiences.

5.3 Teaching of Mathematics

Some of the issues affecting a good Mathematics curriculum are:

1. A majority of children have a sense of fear and failure regarding Mathematics. Hence, they give up early on, and drop to of serious mathematical learning.
2. The curriculum is disappointing not only to this non-participating majority, but also to the talented minority by offering them no challenges.
3. Problems, exercises and methods of evaluation are mechanical and repetitive, with too much emphases on computation.
4. Areas of Mathematics such as spatial thinking are not developed enough in the curriculum.
5. Teachers lack confidence, preparation and support.

In order to overcome some of the above issues curriculum and text books should take to positive approaches to make learning of Mathematics interesting.

The table below gives a comparative picture and suggested changes in curriculum revision.

Classes I to IV

NCF 2005	State curriculum	Suggested modifications
<ol style="list-style-type: none"> 1. Math learning occurs through play rather than through didactic communication 2. Discourage rote learning 3. Skill development such as comparison, classification and identification is focused 4. Developing positive attitude and liking towards mathematics through games, puzzles and stories 5. Math learning is linked 	<ol style="list-style-type: none"> 1. Comparison and classification of physical quantities 2. Emphasis on the development of skill to use and apply mathematical vocabulary, mathematical symbols, signs, symbolic representations 3. Stress on measurement of money, time, volume, length, weight, angle non-formal and sophisticated means 4. Estimation on 	<ol style="list-style-type: none"> 1. Retain NCF Frames 2. Discourage rote learning in mathematics 3. Discourage algorithmic learning and instead promote understanding mathematical processes 4. Addressing math phobia through non-standard techniques like jokes, puzzles, riddles, story and childhood games 5. Encourage art in mathematics learning – Rangoli, plane figures,

<p>to child's everyday life</p> <p>6. Emphasis is given not only to numbers and its operations but math learning is extended to shapes, spatial understanding, patterns, measurements and data handling</p> <p>7. Stress is laid on identifying, expressing and explaining problems, estimation approximation and connections</p> <p>scope is given to the development of language in communication and reasoning.</p>	<p>approximation on physical quantities</p> <p>5. Importance is given to shapes, spatial relations and geometric patterns from the environment</p> <p>6. Accuracy and speed in performing fundamental mathematical operations</p> <p>7. Scope is given to appreciate the utility of mathematics in the real life.</p>	<p>bangles etc. Introduce simple frieze patterns</p> <p>6. Ensure pre-number learning/concepts</p> <p>7. Generate math learning from child's familiar environment through natural settings</p>
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Classes V to VII

NCF 2005	State curriculum	Suggested modifications
<p>1. Consolidation of previously learnt mathematical concepts</p> <p>2. Thus facilitate universal mathematical literacy</p> <p>3. Experience and enjoy the power of mathematics</p> <p>4. Learn new and powerful concepts by compressing the previously learnt concepts</p> <p>5. Introducing the children to the algebraic notation</p> <p>6. Use of algebra in problem solving and generalization</p> <p>7. Systematic study of shapes and space (both 2 D and 3 D)</p> <p>8. consolidate the knowledge of measurements</p>	<p>1. Create awareness about mathematical terms, symbols, concepts and important processes</p> <p>2. Develop skills in problem solving and specialization in other fundamental processes</p> <p>3. Develop skills in Drawing. Measurement, Approximation and Explanation</p> <p>4. Develop abilities in using tables and ready recknors and collect information from them</p> <p>5. utilizes the mathematical knowledge in solving simple problems in daily life situations.</p> <p>6. Develop abilities in</p>	<p>1. Discourage algorithmic learning and instead promote learning of mathematical processes.</p> <p>2. Emphasis on sophistication of measurement of time, money length area, volume etc.</p> <p>3. Stress on estimation of physical quantities and computations</p> <p>4. Address deliberately math phobia through non-standard techniques like jokes, puzzles, riddles, story childhood games, etc</p> <p>5. Linking folk math, metric mela to class room instruction – teaching</p>

<p>9. Representation and interpretation of data</p> <p>10. Understanding of data and its application to real life</p>	<p>reading and explaining data in graphs</p> <p>7. Develop awareness about the programmes and achievements of the Government and other organizations in Social and Economic Development of the Nation</p> <p>8. Develop Common understanding about a national Unity, National Integration, Protection of Environment, Small Family norms, Observation, removal of social barriers and gender bias</p> <p>9. Appreciate the contributions of great Indian Mathematicians</p> <p>10. Inculcate interest in Mathematics</p>	<p>mathematics in nature and in a natural setting.</p> <p>6. Introducing Arts in mathematics education.. Rangoli, Escher's Lithographs, Islamic architecture</p> <p>7. Create opportunities to know the History of Mathematics including mathematics across several continents</p> <p>8. Generate a vision – Mathematics as a human endeavour</p> <p>9. Gradual increase in mathematical sophistication should be reflected in both syllabus and the text books.</p>
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Class VIII to X

NCF 2005	State curriculum	Suggested modifications
<p>1. Understand and appreciate Mathematics as a discipline</p> <p>2. Focus on precise mathematical communication</p> <p>3. Experience algebra as a tool in problem solving- both “real life” and “mathematical”</p> <p>4. Integrate mathematical skills and concepts into problem solving ability</p> <p>5. Consolidation of mathematical literacy</p>	<p>1. Consolidate the knowledge of numbers, number system, numerals, basic operations with numbers and the basics of algebra operations, manipulations and base geometrical knowledge learnt at the primary stage</p> <p>2. Acquire knowledge of mathematical terms like factors, square roots, exponents etc, concepts like factorization concurrence, mathematical</p>	<p>1. Provide opportunities and challenges to promote abstract thinking in the context of problem solving</p> <p>2. Usage of computers should be optional and usage of other ids, especially low cost and innovative ones must be encouraged.</p> <p>3. Mathematics laboratory must be made mandatory in high schools to ensure that the learner experiences mathematics. This would also reduce mathematics</p>

<p>through mathematical modeling, data analysis and interpretation</p> <p>6. Facilitate the process of visualization, abstraction, patterns etc through concrete aids including computers</p> <p>7.</p>	<p>principles and geometric truth and proofs</p> <p>3. To develop understanding of process involved in calculation with numbers, algebraic manipulation and theorems</p> <p>4. To develop skills of substitutions, calculations, simplifications, drawing, approximation and estimation of quantities</p> <p>5. To develop ability to think and reason logically, communicate, develop the ability to estimate measures, to calculate orally</p> <p>6. To develop the skills in the use of mathematical tables like interest tables, for solving problems</p> <p>7. To develop necessary skills for solving problems of day to day life situations</p> <p>8. To acquaint with the use of technological devices such as calculators, computers</p> <p>9. To analyse and see inter-relationship between and among variables in mathematical problems</p> <p>10. To develop interest in mathematical contributions (especially Indian) to daily life transactions in pursuing higher studies and progress of other situations</p> <p>11. To develop interest in solving mathematics puzzles, riddles and such recreational mathematics.</p>	<p>anxiety and Mathsphobia</p> <p>4. Awareness of relevance of mathematics across other disciplines and professions should be developed</p>
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	<p>12. To develop the ability to apply mathematical knowledge in solving problems allied sciences and life</p> <p>13. Appreciate use of mathematical symbols, interpretations of certain natural phenomenon, mathematically different patterns and structures in environment, evolution of mathematical symbols and sequence, symbols and sequence, symmetry, chronology.</p>	
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5.4 Social Science

The NCF – 2005 lists the following as the basic objectives of social science education.

- To understand the society in which the learner lives.
- To appreciate the social values like liberty, social equality, justice and the values enshrined in the Indian Constitution,
- To develop scientific outlook in analyzing the problems faced by the society and the Nation and to face the challenges of the time,
- To develop skills for social interaction in human relationships,
- To grow up as responsible members of society.

A social science curriculum, which contains socially sensitive issues like gender sensitivity, social hierarchies, inequalities among the people, will make the learner to think positively. Objectives of teaching each subject may be kept in mind while writing Social Science Text Books.

More importance to be given to local, regional and national factors in developing concepts as we proceed from lower classes to higher classes in either history or geography. Information about other countries may be limited to only such information as may be required in learning about our country.

Essentials of Indian Constitution such as Justice, liberty, fraternity, secularism, democracy, social justice, unity and integrity, rights and responsibilities will be made known to children. This will make them grow up as responsible and constructive citizens.

Elementary economic aspects like money, and its utility, banking, trade and commerce, income, expenditure and elementary records and accounts keeping shall be included in the curriculum. This will enable the learner to develop interest in economics and commerce for their higher studies, since a large number of students after their schooling will go for arts and commerce at+2 and university level. Learning about the economic, social and commercial institutions will benefit even the school dropouts at this level.

Hence introduction of commerce in social science curriculum is essential from VIII and continued till X standard. The students will learn the basics of business operation management and interaction skills. They will develop interest in activities of trade and commerce and learn the techniques of accounting systems, which will be of great value in their daily life.

CHAPTER VII

Text Book Revision

Curriculum and syllabus for each subject, guides the text book writers in terms of the content, scope, objectives and the variety of learning experiences. Hence there is a need to frame the text books with in the frame work of a syllabus prepared on a strong scientific and psychological grounds.

A good textbook should reflect the totality of experiences provided to the learners. It motivates the teacher to structure his / her class lesson. Text books should be learner friendly and should be written on sound psychological principles.

Text book committees should consist of a healthy mix of subject experts, good and experienced class room teachers. The class room teachers can give vital inputs such as difficulty level that can be taught in any class, method to be used for explaining a certain concept, etc,

The text book writers should be aware of the reasons for change of curriculum and text books and hence they should be given orientation on curriculum and syllabus revision.

The following are the guiding principles for textbook writers, They are:

- Child centeredness
- Inclusion of social concerns
- Integrated Approach and totality of experiences in subjects
- Use of Activities for understanding of concepts
- The child constructs knowledge
- Environmental Concerns and conservation of nature.
- The content selected should stand the tests of Cognitive Validity, Content Validity, Process Validity, Historical Validity, Environmental Validity and Ethical Validity.
- The text book should have easy readability. The students should be able to understand the content on their own specially in situations where there are long absences of teachers.
- Text books should be written with in parameters defined by the prescribed syllabus keeping in view its consistency with the curricular objectives.
- There should be widespread field trails of text books with the involvement of teachers at all stages. Testing, research inputs and feedback mechanisms must be institutionalized as part of text book development.
- Text books at different stages should be spit into suitably small sizes to avoid the physical burden of the school bag. The semester scheme advocates preparation of text books semester wise.

- Presentation of the content should be done in such way that it should psychologically help the learners to construct from their own experiences.
- The textbook should arouse in the children a desire and curiosity to learn and sustain interest.
- It should have verity of activities: a learning experience can be repeated differently over a period of time with different materials.
- The activities to be in the text book should full exploit the locally available material, it should give scope for local specific information. (e.g. giving open ended questions, collection of locally available materials, etc.,)
- There should be place for imagination and fantasy but it should be done carefully. Science stories can be included in Science text book.
- The text book should have scope for practice:
- Group work should find a place in the textbook.
- Total teaching time available in a year should be taken into account while writing text book.
- The textbook should have a place for spiral learning
- The text book should have inbuilt evaluation measures which children take up with the same spirit as the other learning activities.
- Gender equality should have situations wherein values are put into action.
- The text book should enable the child to meet the challenges posed by the present times.
- The text should bring out the total potential of the child.
- The text book should be written in such a way that children learn through thinking/working on their own.
- The text book should make children to be creative and express their ideas.
- The text book should help children unlearn the misconceptions already formed.
- The text book should have learning situations or context in which children involve them and learn. The context should be suitably adjusted to the age group
- The cause and effect concept, if to be included in the text book, should be within the experience of the children.
- The text book should be written in such a way that the activities given can be carried out even at home.
- The text book should meet the individual differences in children to the extent possible.
- The needs of girls, tribal children, physically challenged children, children with learning disabilities and working children should be taken into account while writing the text book.
- The text book should provide sufficient resource even to a teacher who is not a specialist in the subject.
- The text book should make the teacher's task most enjoyable, effective and practical.

- The text book should help the teachers to prepare the lessons in advance and thus increase children's learning effectively.

Science Text Books

- There should be comprehensive integration of activities and experiments in the science textbooks.
- Since a number of teachers do not conduct science experiments in classes and prefer only blackboard experiments, each science text book should give a list of experiments which have to be compulsorily done in class rooms, so that the inspecting officers can verify them during their visits.
- Text books may also give additional activities that can be taken up by science clubs in these schools.
- Giving emphasis to acquisition of knowledge, understanding, reasoning and application in science.
- Providing scope for questioning and exploring in science learning.
- Giving emphasis to analyzing the content stage wise.
- providing opportunities for observation, collection of data, consolidation and inferencing in learning science concepts. The information could be multi-sourced: observations, teachers, community resource persons, projects and internet.
- Providing linkages of the content with the environment – events/phenomena/problems and issues (local to global).
- Giving emphases to interdisciplinary nature of science. For example, providing learning opportunities for children to understand interrelationships of different branches of science like physics, chemistry, biology, geology, etc and applying the same for problem solving and carrying out projects.
- Stress on 'knowledge construction' rather than mere memorization of scientific facts and definitions/explanations by the students by incorporating well designed activities/experiments and projects.
- Giving emphasis to 'first-hand experience' and 'hands-on' activities in the learning of science concepts. Hands on experience either in the classroom or through tips.
- Giving emphasis to development of Process skill in children such as observation, classification, differentiation, measuring, drawing inferences, etc.
- Incorporating different learning approaches to suit the content and age level characteristics of students.
- Adopting different teaching styles, providing space and time for various target groups.
- Providing scope in the science the science text books for both teachers and students to explore and learn together.

- Giving importance to the influence of science on society, with its role in the present context of achieving sustainable development (rural and urban context).
- Giving importance to scientific method and development of interest, curiosity, scientific attitude and skills.
- Emphasizing both process and product evaluation. Providing scope for development and use of appropriate tools and techniques for the measurement and evaluation of process skills.

Languages:

1. In languages selections of passages, stories, poems should be done from standard works, authors and poets only.
2. Selection of eminent personalities, like national leaders, scientists, Poets & Literary Scholars, to be done for all the classes in a holistic manner so that the children do not get bored by reading about the same personalities again and in class after class.
3. Separate Guidelines are essential for syllabus framers and text book writers for first, second and third languages

Mathematics:

A good mathematics text book should aim at:

1. Children learn to enjoy mathematics rather than fear it.
2. Children learn important concepts in mathematics which they can easily apply in their daily lives.
3. Children see mathematics as something to talk about, to communicate through, to discuss among themselves, to work together on.
4. Children pose and solve meaningful problems.
5. Children use abstractions to perceive relationships, to see structures, to reason out things, to argue the truth or falsity of statements.
6. Children understand the basic structure of Mathematics: Arithmetic, algebra, geometry, the basic content areas of school mathematics, all offer a methodology for abstraction, structuring and generalization.
7. Teachers engage every child in class with the conviction that everyone can learn mathematics and find ways to ensure success for all
8. Children appreciate mathematics (like music etc) and derive joy in the process.

Many general tactics of problem solving can be taught progressively during the different stages of school: a abstraction, quantification, analogy, case analysis, reduction to simpler situations, even guess-and-verify exercises, are useful in many problem-solving contexts.

Moreover, where children learn a variety of approaches (over time), their toolkit becomes richer, and they also learn which approach is the best. Children also need

exposure to the use of heuristics, or rules of thumb, rather than only believing that Mathematics is an 'exact science'.

The estimation of quantities and approximating solutions is also essential skill. When a farmer estimates the yield of a particular crop, he use considerable skills in estimation, approximation and optimization. School Mathematics can play a significant role in developing such useful skills. In addition to the more familiar skills of estimation in measurement children must also develop estimation in computations. For instance: Is 23×37 more than 700? Is $564/68$ around 7?

Visualization and representation are skills that Mathematics can help to develop. Modeling situations using quantities, shapes and forms are the best examples of use of mathematics. Mathematical concepts can be represented in multiple ways, and these representations can Serve a variety of purposes in different contexts. All of this adds to the power of Mathematics. For example, a function may be represented in algebraic form or in the form of a graph. The representation p/q can be used to denote a fraction as a part of the whole, but can also denote the quotient of two numbers, p and q . Learning this about fractions is as important, if not more, than learning the arithmetic of fractions.

The importance of systematic reasoning in mathematics cannot be overemphasized, and is intimately tied to notions of aesthetics and elegance so dear to mathematicians. Proof is important, but in addition to deductive proof, children should also learn when pictures and constructions provide proof.

Proof is a process that convinces a skeptical adversary; school mathematics should encourage proof as a systematic way of argumentation. The aim should be to develop arguments, evaluate arguments, make and investigate conjectures, and understand that there are various methods of reasoning.

Besides, children must be dissuaded from memorizing prescriptive definitions of mathematical terms and encouraged to construct and use descriptive definitions. Etymology of the technical terms offers an excellent way to get insight into the history and concepts beside making the learning of these terms meaningful and interesting.

Introduction of puzzles, riddles and similar problems offers a wonderful opportunity to the Mathematics teacher to achieve several of the learning objectives. They are all the more welcome as they are intrinsically motivating. This must be encouraged at all levels without making them a part of their examination.

Mathematics anxiety and fear arising out of partial understanding and wrong learning approaches is a serious impediment to school mathematics education and this needs to

be addressed urgently. Pressure of times tests and examinations compounds this problem. Examination reforms are absolutely necessary to eliminate this or at the least dramatically reduce the issue.

Considering the way technology is growing and changing our lives is imperative to make optimum use of calculators in the school mathematics program. This does not necessarily mean the use of these calculating devices in the classroom and in the examination. It is possible to promote their use in performing long & tedious computations to explore number patterns, relationships etc.

Children should be encouraged to explore, understand and appreciate the elements of mathematics in our culture and society. For instance, they can do projects to study temple architecture, geometry in Islamic art, dance, Rangoli, local computational methods and ideas and so on....

Mathematical communication is precise and employs unambiguous use of language and rigor in formulation, which are important characteristics of mathematical treatment. The use of jargon in Mathematics is deliberate, conscious and stylized. In discussing many of these skills and processes, we have referred to a multiplicity of approaches and procedures. These are all crucial for liberating school Mathematics from the tyranny of applying them only to those algorithms that are taught.

Mathematics laboratory is an ideal and effective way to achieve all or most of the objectives of mathematics teaching at school mentioned above. The same may be introduced gradually all the levels: primary, upper primary and secondary. It seems appropriate to formally begin it with high school as some amount of material based pedagogy is being done at the other levels currently. Around 10-15% of the instruction time can be devoted to the laboratory work where children use using extremely low cost and locally available materials to understand mathematical concepts. Children should perform the 'experiments' and do activities rather than simply 'see' a demonstration.

Social Science

It is suggested that necessary steps may be taken to create awareness among the text book writers and the teachers regarding the Six-criteria of a good curriculum in social science education (Six validities – refer page 19) as listed in NCF-2005

The text books should stress on local and regional geographic factors with an understanding of the environment, is very essential for learners of social science. Basic geographic and historic factors remaining the broad platform and the main stay of social science curriculum.

Same examples of activities for inter disciplinary approach in Social Science

V to VII	Temple – its History, Art, Religion, Social life and Economic activity of the wealth
VII to X	Family – relationship, function, hospitality neighborhood

Examples of individual and inter disciplinary concepts development among Social science curriculum

V to VII	1. Observe the surroundings of your village or town. Make a list of different types of trees and animals
	2) what is the source of drinking water to you village or town make a list of wells and tanks
VIII to X	a) Total no of people in your locality. How many male and Female workout the sex ratio.
	b) Topography of your district (Physical Features) – clarify them according to the economic activation of people

Inter disciplinary

1. Crops grown in your area and the Industries development on the basis of crops grown.
2. Transport facility and accessibility to govt and other offices located in neighboring towns.
3. Social and political institutions and the economic and social benefits derived from them in your areas.
4. Crops production to be shown on maps.
5. Changes in values of curriculum for exchange.
6. Learn simple function of banking, Post office.

CHAPTER VIII

Teacher Training

“Studies suggest that in a single year an average student with a good teacher can progress more than a full grade level faster than an average student with a poor teacher”

Improvement of Quality of schooling is crucially dependent upon the teacher himself. Issues related to teachers and teacher education is always directly linked to developments in the school education sector.

Over the years the profile of children entering school has changed radically. Due to constant efforts to universalize elementary education, the schools are now getting children (who are at present entering school) who are first generation learners, children of economically weaker sections, children of urban slums who had no access to education previously.

The average primary teacher is not equipped to handle such children because the training methods have by and large remained the same. The pre service curriculum is still dominated by out dated theoretical concepts and not related to realities in the field.

The quality of education in these teacher training institutions may be gauged from the fact that there are virtually no failures and there are a large number of first classes and distinctions.

The quality in pre service program has further suffered in recent years, due to proliferation of a large number of teacher training institutions with out proper infrastructure, poor facilities and having in experienced teaching staff

The teaching practice sessions which the students undergo during pre service training, do not enable them to handle multi grade, multi level situations in the class rooms or the meaningful and creative learning activities which are emphasized by modern experiments in the field. The student teacher is also unable to use technology aids to enhance his teaching skills as majority of teacher training institutions in the country lack computers and other multi media aids.

Apart from changes in the profile of children entering schools, the knowledge base and skills that teachers have to teach has changed and expanded tremendously over the years. This calls for increase in use of technology and mass media which are still lacking in our teacher training institutions: Our teachers are sill unable to

use OHP. Computers and other multi media tools in their class rooms to enhance the effectiveness of their teaching.

Apart from the above, the raising aspirations of parents to get good quality education (especially English education) for their children, has made the task of the teacher more demanding.

If teacher education has to meet these challenges, the nature and structure of both pre service and in service education has to be transformed. We have made some recommendations below to improve the teacher education sector.

Pre Service Training (primary):

- a. There is poor integration of education theory and supervised teaching practice. Teacher education specially in private teacher training institutions are not really aware of changes and new experiments in the field. Once the teacher education enter service, there are not in service training programs fro them and hence they are not aware of various department academic programs. DIETs should take up training programs periodically for all the teacher education belonging to government, aided and un aided institutions and keep them up dated with the latest developments in the field.
- b. Teachers trained in urban schools and one class one teacher atmosphere, after appointment, end up in rural schools teaching Multigrade classes. Hence all the student teachers should be compulsorily sent to rural school for at least 4 weeks to get experience of teaching in rural schools and multigrade situations.
- c. Teacher training curriculum in both elementary and secondary teacher training institutions is rigid, out dated and irrelevant. It cannot support adoption of new methods. Pedagogy taught is unrelated to specific support adoption of new methods. Pedagogy taught is unrelated to specific subject matter. There is urgent necessity to revise the D.Ed. curriculum to make it more flexible and adapt to situations in the field.
- d. There is no necessary follow up once the training is completed. This has to be rectified in the induction courses given to newly recruited teachers.
- e. Teacher educations have limited education and are poorly prepared. For example a B.Ed/M.Ed graduate having secondary education experience and who has not taught in a primary school, suddenly becomes a teacher education in a primary teacher training institute without having any knowledge of problems and issues at the primary level.
- f. The Pre service programs are prepared by teacher educations who have a very limited knowledge of the field. These programs fail to take into account teachers' needs at the primary level.

- g. The primary teacher education also suffers from lack of sufficient resource book and materials. They largely depend on poor quality guides.
- h. The Teacher Training Curriculum should have the following elements-
 - A solid foundation of subject matter of the level for which the teacher is being prepared
 - An understanding of the children whom he is going to teach
 - Exposure to new teaching and assessment strategies
 - Exposure to classroom management techniques
 - Practice teaching in real field situations

Pre Service Teacher Training (Secondary):

- a. Where as primary and secondary school curriculum is periodically revised as per guidelines contained in the National policy of Education 1986 and the Curriculum Frame Works prepared under it, the teacher training curriculum (prescribed by universities) is not revised in tune with the curriculum revision in schools.
- b. There is no uniform secondary teacher training curriculum across the state. Each university is following its own curriculum, examination pattern and assessment standards. It is essential that a common B.Ed. curriculum is introduced across the state.
- c. For getting better quality primary teacher education separate B.Ed/M.Ed course in primary education has to be introduced by all the universities. This is because, in respect of elementary teacher training institutions. as per NCTE norms, the faculty should have a minimum M.Ed degree. Since very few institutions in the country offer M.Ed (Elementary Education) course, the faculty after completing B.Ed and M.Ed courses pertaining to secondary education, become teacher educators in elementary teacher education institutions with no experience of teaching in elementary schools at all. Hence they confine themselves to teaching theory resulting in poor standards in student teachers. This situation needs rectification urgently education urgently.
- d. Due to a mismatch of academic calendars between the teacher training institutions and schools, practice teaching has suffered fully. The schools are not willing to give classes for student teachers in the latter half of the academic year as they are under pressure to complete the portions. Efforts should be made to start classes in both the elementary and secondary teacher training institutions latest by August first every year.
- e. There is lack of teachers to teach Geography in schools. Gradutes who have not studies geography at degree level are constrained to teach the subject. This issue needs urgent attention.

In-service teacher training:

- A huge gap exists in in – service training as it has become largely ritualistic and mechanical due to the insistence of a mandatory training of 20 days of training for every teacher every year. This has largely contributed to teacher absenteeism in schools. Even though instructions have been given to hold the maximum training programs during summer and October holiday, it has not been able to meet the set targets fully.
- Maintenance of a data base of teachers at the block level will help to ensure that the right teacher attends the right program. This has to be taken up by BRCs/CRCs under the supervisions of DIETs/
- Several of these in service programs may be out sourced and conducted through agencies working in the field through accreditation which will enhance the quality of the programs.
- Block resource Centres which conduct these in service programs themselves require capacity building as the capabilities of the resource persons are not of uniform quality and high standards.
- Block Resource Centres need to be technologically equipped to improve the delivery and quality of these programs.
- A proper evaluation system should be put in place for these programs as otherwise the teacher tends to go back to his old methods of teaching even after attending these programs.
- Open learning programs may also be devised so that teachers may choose and attend these programs during their spare time.
- At the secondary level in service training is totally inadequate both in terms of coverage and content.
- Improving subject mastery of teachers should also be given top priority Subject enrichment programs and equipping the Cluster Resource Centres with adequate resource support should be done at least in phases.
- Every advancement courses which will also help him to become a better teacher.
- There is also an urgent need to ensure quality of pre service training taking place in our training institutions. Mere setting of norms and standards will not ensure quality in these institutions.

- Establishment of strong linkages between state/district/block level bodies. The linkages between these various levels of institutions should always be a two way process and this can be done by establishment of regional advisory academic bodies consisting of academicians from all these institutions.
- The Centrally Sponsored Scheme of Restructuring and reorganization of Teacher Education launched in 1987 has to be revamped in view of the existing scenario in the country:
- As per the existing norms there is uneven distribution of DIETS across the country. For example a city like Bangalore, which is having nearly one fifth the population of the state has only one DIET as the city is considered as a single revenue district. One DIET has not been able to meet the demands of teacher training in the City.
- Even among other districts, even in larger districts having more than 10,000 teachers, the existing DIETs have not been able to fulfill their mandate effectively. Norms for setting up of DIETs needs revision – probably on DIET for 5000 teachers.
- As per the existing norms, one Block Resource Centre (BRCs) is sanctioned at present, for one revenue block. This again has led to a lopsided establishment of BRCs across the country. In several situations, one BRC is catering to the needs of two or more educational blocks. Hence these norms need to be revised and the number of BRCs should be based on the number of teachers (approximately 600 teachers)
- As regards secondary teacher education is concerned, the colleges of teacher education sanctioned so far do not adequately cover all the secondary schools. For example, the nine colleges of teacher education sanctioned in Karnataka are inadequate (as the jurisdiction of each CTE is spread over a number of districts) and hence are unable to cover the ninety thousand teachers in nearly ten thousand secondary schools spread across the state.
- Hence it is recommended that a secondary education wing will be created in each DIET to cater to the needs of secondary teachers in each district.
- Improvement in the quality of programs DIETs/CTEs (both in service and pre service) so that they can effectively perform their function as nodal centers for teacher education in the state.

- In all the in service teacher training programs, invariably teachers of un aided institutions (who form a large percentage) are left out. leading to gaps in teaching standards in un aided institutions which directly effects quality.
- Merging of the central scheme of teacher education in SSA is a welcome move. But separate norms have to be developed and retained for DIETS/CTEs. The state level and district level training and other academic programs cannot be taken up under the existing SSA norms.
- Restructuring of DIETS have to be taken up on priority basis, as several wings of DIETs have always remained non functional due to various reasons – lack of qualified staff, the work of a wing like curriculum development being handled by another agency, etc, Non functional units may be closed and the number of academic staff to be reduced. The number of staff in a DIETs, should be always in proportion to the work load in the DIETs.
- A certain percentage of posts in DIETs may be earmarked for elementary teachers which will enrich the experience of the DIET faculty.
- Encouraging academic research in institutions at all levels needs development of certain capabilities in the academic staff of these institutions. Qualified and experienced staff in these fields have to be recruited in DIETs/CTEs.