A: GENERAL PART

1. INTRODUCTION

Present social, political, financial and cultural conditions of everyday living are being subject to change as they are affected by radical scientific and technological developments. Within this context the once indisputable role of school as an educational institution providing knowledge and developing skills seems to be questioned, as new information and knowledge spread in diverse and manifold ways. Therefore, today's reality forms a new context where new educational and social needs of the individual, especially the ones connected with pursuing, acquiring, managing and exploiting new knowledge, emerge.

Although knowledge and information explosion generally signals progress, offering new opportunities to individuals and society, it can also result in the increase of social inequity reflected also in the education system. Safeguarding access to information and knowledge necessitates providing equal opportunities for education and learning for all. In addition, continuous change, in terms of information and knowledge, that characterizes our age, makes a demand on individuals to continuously upgrade their knowledge by adopting practices of life-long learning.

At the same time as more and more nations are becoming multicultural and national economies are becoming increasingly internationalized, the fabric of society changes, becoming enriched with diverse cultural, linguistic, national and socio-economic characteristics. For this reason it is necessary for individuals to develop greater understanding and appreciation of different cultures and for the state to discard the possibility of imposing a one-dimensional cultural model, thus reinforcing xenophobia and racism.

In this newly emerging context, adopting ethical and moral standards of behavior that foster respect to intellectual pursuits and humanistic ideals is considered of utmost importance. For this reason, the main role of school, which is to assist the development of the individual, nurturing strong moral values and a strong feeling of self-awareness and responding to their emotional and intellectual needs and interests, should be reinforced.

Moreover, the well established role of school to enable pupils to develop the skills and attitudes necessary for personal and life-long growth (by promoting knowledge acquisition) and for positive interpersonal and group relationship, facilitating thus, their smooth integration

into society, should also be reinforced. This can be achieved by creating within the school a pedagogically sound educational environment and an atmosphere conducive to learning.

Consequently, in the context of present economic, cultural and social developments and having certain aims in mind, the planning and implementation of a new education policy (beginning from compulsory education) is considered necessary. The main aim of this policy should be the organization and implementation of an educational system that will respond to current social dynamics and challenges. In the face of such innovative action the following priorities are set:

I. *To provide opportunities for personal growth, nurturing in pupils personal qualities, such as self-awareness, emotional health, critical thinking and communication skills as well as a positive attitude towards co-operation and initiative taking. These factors combine to enable individuals develop as responsible citizens, embracing democratic and humanitarian values, free from religious or cultural prejudice.*
II. *To provide access to lifelong learning.*
III. *To assist the development of a critical attitude towards new information and communication technologies.*
IV. *To maintain social cohesion, by providing equal opportunities for all and nurturing common positive attitudes and values.*
V. *To assist the development of European citizenship awareness, while preserving national identity and cultural awareness.*
VI. *To promote a spirit of co-operation as well as of personal and collective responsibility.*

All the above constitute also the orientation of the European Community education policy. Maintaining democracy, religious freedom, collective spirit, internationalism, social justice and solidarity, cultural awareness, social cohesion, and providing employment and intellectual development opportunities for all in open pluralistic societies are priorities that fall within the scope of a common European education policy (as it is stated in article 126 of the Maastricht Treaty), with a simultaneous respect for each member's cultural and linguistic characteristics.

The same priorities are set by the individual member states in terms of their education policies. Within this framework our country's education system is challenged to adjust accordingly, becoming more dynamic and effective, responding to the need for providing quality education for all.

2. GENERAL PRINCIPLES OF EDUCATION

Educational process should initiate pupils into the values of democracy, of respect for human rights, of peace and freedom. Education aims at both the well-rounded development of the pupils' personality and their successful integration in society through developing new values and cognitive, affective and psycho-kinetic skills and abilities. These values and skills will enable pupils to function as informed, responsible and active citizens in continuously changing and highly demanding social settings. This effort should focus on the following:

a) To provide general education.

b) To develop pupils' skills, abilities and interests.

c) To provide equal opportunities for learning for all pupils.

d) To reinforce the pupils' cultural and linguistic identity within the framework of a multicultural society.

e) To develop environmental awareness and foster relevant patterns of behavior.

f) To prepare pupils to explore new information and communications technologies.

g) To facilitate the pupils' physical, mental and social development and

h) To sensitize pupils to issues of human rights and world peace and preserving human dignity.

a) Providing general education

The main aim of general education should be ensure the balanced development of humanistic/social and scientific/technical areas of the curriculum, assisting thus the balanced physical, mental, moral, aesthetic and emotional development of pupils. This aim should be achieved by emphasis on the following goals:

i. Contribute to the development of pupils' interests and skills.

ii. Provide opportunities for access to and exploitation of information concerning all kinds of topics.

iii. Develop the abilities of critical thinking and decision-making on the basis of personal values and needs.

iv. Develop the ability to express thoughts and views, through the development of intellectual, social and communicative skills and

v. Develop a spirit of cooperation among pupils that will enable them to accomplish common goals and act responsibly.

Furthermore, given the radical developments in technology with the continuously increasing exploitation of its applications in personal and working life, school education should enable pupils to understand the role of new technologies and use them accordingly, continuously improving their access skills.

Therefore, the new situation brings out an urgent need to provide high quality school education. General education should not contribute to accumulation and memorization of knowledge, but to familiarization with essential knowledge of the various subject matter areas and the development of cognitive and meta-cognitive skills necessary for understanding and interpreting concepts, phenomena and processes. Thus, the pupils are provided with essential knowledge, which in turn is related to everyday life through cross-thematic extensions. In this way the processes of pursuing and promoting knowledge are facilitated.

b) Developing pupils' skills and interests

It is obvious that the thematic content of school education should be broad and that school education should promote active and cooperative methods of acquiring knowledge, providing each individual with the necessary knowledge and skills that will enable them to meet the need for specialization in the job market.

The main aim of school education should be to help the pupil learn 'how to learn', and develop a positive attitude towards knowledge acquisition. Another aim of school education should be to help individuals learn 'how to function' in everyday life, applying the knowledge and skills they have acquired through schooling in their everyday social and professional life. In this way, the Individual Subject Curricula (ISC) will be of service to the fight against unemployment, social exclusion and every form of social injustice.

Today individuals are faced with countless opportunities and choices in all fields of human activity, including new professions, new fields in science and technology, new trends in art and new opportunities concerning the distribution of free time. A modern and effective educational system should facilitate the development of pupil interests and talents. In order to achieve this the adjustment of the ISC, instructional materials and methodological approaches is crucially important.

c) Providing equal opportunities for learning for all pupils

Providing equal opportunities for learning consists a basic principle of every democratic society. Therefore the educational system has a significant role to play in the fight against social inequality. Equal opportunities should be provided to all pupils and more importantly

to those that belong to 'minority groups', as well as to pupils with disabilities or special educational needs so that they can be guarded against social exclusion and unemployment. Providing equal opportunities for learning should not be interpreted as providing a sum of uniform educational benefits that lead to uniform processes and behaviors. Individuals that are physically or socially handicapped, like people with disabilities and special educational needs (PSN) as well as gifted individuals with special talents and skills, should have equal opportunities for access to knowledge.

d) Reinforcing cultural and linguistic identity in multi-cultural societies

Distance minimization and globalization of economy, coupled with new possibilities in communication and exchanging of cultural goods place individuals among a multicultural environment. Our country, as a full and equal member of the European Union, should promote development in all fields of social activity through mutual understanding and cooperation with other European countries. Furthermore, as is the case with all European societies, Greek society is continuously changing, becoming enriched with individuals of diverse linguistic, ethnic and cultural backgrounds. Supporting and promoting cultural diversity may prove a very effective policy for the revival of dominant traditions within multicultural societies.

At the same time multiculturalism as a social reality dictates that every citizen should develop understanding and appreciation of individuals belonging to social, ethnic and cultural groups other than their own, so that we can all live in peace and harmony in a society of cultural, ethnic and linguistic pluralism. Therefore, the development of social and communication skills, as well as the cooperation and participation of all citizens in ongoing social change are required. Communication skills in particular, which are necessary for the smooth integration of individuals in society, can be developed through learning the mother tongue as well as other languages, but also through familiarization with one's own history and cultural traditions as well as with those of other ethnic, religious and cultural groups. Also, cooperation skills of people working in groups, including the skill of using one's knowledge and abilities to serve collective goals, should equally be developed.

Therefore, in order to achieve the smooth integration and co-existence of individuals in society, each individual should learn how to live with others, respecting their language and culture. At the same time, school education should promote the preservation of national and cultural identity through developing national, cultural, linguistic and religious awareness. Besides, in the educational policies of all EU countries both preservation of the special char-

acteristics of each national educational system and acceptance of cultural diversity and consequently, of the elements that account for the development of the national and cultural identity of the pupil, who is to become the citizen of tomorrow, are promoted.

e) Developing environmental awareness and adopting appropriate patterns of behavior.

Given the mutual relationship between social reality and education, we can easily understand how social needs inform to a great extend the content of school education, while at the same time the educational system contributes to social development. For example, the need for improving environmental conditions and maintaining our planet's viability necessitates fostering attitudes and patterns of behavior that will help preserve natural resources, intended to cover the needs of future generations.

Sustainable development consists an unmistakable proposal for ensuring prosperity all over the world, through preservation of environmental balance. This proposal requires a reconsideration of personal and social needs, a fact that in turn leads to a re-assessment of the system of values that individuals and societies adhere to. School education has an important role to play here, concerning the development of pupils' environmental awareness on matters such as management of natural resources, preventing any speculative effort that sets our natural environment in continuous danger.

f) Preparing pupils to explore new information and communications technologies

Access to information and communications technologies can offer pupils limitless opportunities for knowledge acquisition and can promote individualized and lifelong learning. However, the introduction and use of these technologies in educational settings should not just serve the purpose of technological modernization. They should rather meet certain educational criteria ensuring the promotion of humanistic education, molding thus the society we aspire to.

Thus, the pupil will be prepared to critically access 'information society' as well as 'knowledge society'. Implementing a new educational policy and developing suitable educational software for all subjects should accompany introducing educational technology in schools. Modern educational technology can enhance learning if it is used carefully and on a regular basis. The value of modern educational means is to be found in their unique characteristics that differentiate them from traditional ones. Teacher involvement is necessary in or-

der to motivate and direct pupils in using those means. Consequently, ISC should provide for the development of supporting educational software accompanied with clear instructions for its more effective use, wherever this is considered necessary and feasible.

g) Facilitating the physical, intellectual and social development of pupils

Within a continuously changing environment, broad and continuous social interaction is the keystone for the physical, mental and social development of the individual and the successful route to self-awareness. The role of social environment in the formation of the person's character is crucial during periods of radical change. Consequently, the person's knowledge, skills and attitudes that account for the maintenance and improvement of his/her physical and mental health, should constitute fundamental elements of his/her education, molding him/her into a person responsible for the quality of his/her personal life but also of the life of other people in the social group he/she belongs to.

h) Sensitizing pupils to issues of human rights and world peace and preserving human dignity

School should be a place of exemplary application of human rights principles, such as respect for others, preservation of human dignity, prevention of every form of discrimination, freedom of thought and expression, cooperation and collaboration. Educational practice should implement and safeguard what article 1 of the International Agreement on Children's rights specifies as being 'the best to the child's benefit'.

3. GENERAL PRINCIPLES OF DIATHEMATIKON PROGRAMMA AND THE INDIVIDUAL SUBJECT CURRICULA

In Diathematikon Programma (DP), several suggestions are made concerning the theoretical and practical problems involved in the planning and organization of content in compulsory education. The Greek educational reality with its present structures, aims and objectives is taken into account. Thus, individual subjects are maintained within the DP, while at the same time the horizontal and vertical linking of subject matter content are promoted.

DP is based on fundamental principles and aims of education and teaching, which set the general framework and the guidelines that determine the content of teaching and the educational process in Primary and Secondary Education. Both the content and the processing of

various concepts and information should ensure internal cohesion, continuation and unified development, interdisciplinary approaches and correlations as well as cross-thematic extensions. These elements are included in DUCF, which is in accordance with the provisions of Greek legislation concerning education and the decisions of collective bodies of European Union.

The aims of the Greek educational system are specified by the Constitution (article 16, sec. 2) as follows:

'Education constitutes a basic responsibility of the state and its aim is the moral, professional and physical development of the Greek people, the development of their national and religious awareness as well as their development as free and responsible citizens'.

However, Law 1566/85 (article 1, sec. 1), that refers to 'Structure and function of Primary and Secondary education', specifies the following:

'The aim of Primary and Secondary education is to contribute to the well-rounded and balanced moral, intellectual and physical development of pupils, so that, irrespective of their sex and origin, they will be able to develop into well-rounded individuals with a fulfilling and creative life'.

This goal is further specified through educational objectives concerning national identity, religious awareness, love for freedom and the cultivation of responsibility and creativity.

Apart from the provisions of the Constitution mentioned above, there are certain others that concern school education. More specifically, article 5A of the Constitution provides that the right to information and the right to participation in information society are protected by the State. Also, in articles 16 and 24 of the Constitution reference is made to the need to protect art and cultural goods, and in Law 2413/96 the framework of action concerning multicultural issues in modern Greek society is set. Furthermore, Law 2525/98 provides the guidelines for the development of the DP and the ISC, while Law 2817/00 specifies the framework for the education of PSN. Finally, with the accession of our country to the European Union, the development of European citizenship awareness is considered necessary, along with the preservation of national identity and cultural awareness.

The general aims of school education and the values emerging from them are promoted through the syllabus content, the attitudes, skills and activities mentioned in the DP and the

ISC. Within this framework, the development of national awareness requires that the pupils adopt the values of national independence, international peace, security and cooperation. Furthermore, the development of religious awareness can foster respect for all religious beliefs and traditions away from prejudice, stereotypes and fanaticism.

Also, the moral, spiritual, professional and physical development of pupils contributes to the development of well-rounded personalities that attach great value to human life, human rights and the preservation of natural environment, seeking a better quality of life. Freedom, as a value, applies both to individuals and society as a whole. Closely related to the idea of freedom is the development of pupils as responsible individuals and active citizens, a process that is necessary for the smooth functioning of democracy and the promotion of social justice.

The model that dominates our educational system is based on the independed teaching of different subjects and therefore it cannot ensure the 'internal cohesion' and the 'horizontal development of subject matter content' required by the new model. What is needed is the horizontal linking of ISC. Horizontal linking at ISC level means the appropriate organization of subject matter content, ensuring a multidimensional analysis of concepts that involves different subject areas. Thus, through the ISC and teaching, we should seek the extensions and correlations of the topics intended for study within the scope of individual subjects covering the fields of sciences, art and technology and also the process of developing attitudes and values.

This more general approach in Diathematikon Programma (Cross-thematic/Cross- Curricular Approach) enables pupils to acquire a unified body of knowledge and skills, following a holistic approach to knowledge. This approach will allow them to form their own personal opinions on scientific issues that are closely interrelated and are also related with issues of everyday life. In this way, pupils can form their own perception of the world, their own cosmo-theory, their own opinions about the world they should get to know, love and live in. The Cross-thematic approach is supplemented by methods of active acquisition of knowledge, which are applied in the teaching of individual subjects, and are further explored during cross-thematic activities taking place during the teaching of each theme. Diffusing cross-thematic approach in school textbooks (wherever possible) facilitates the organization of cross-thematic activities. Fundamental concepts used across various scientific fields can facilitate the horizontal linking of school subjects. Some fundamental concepts that can be called cross-thematic a) are common in several subjects of the same grade, b) often appear in school subjects of different classes and c) contribute to the promotion of attitudes and values that are directly related to the main aims of school education. Combining these concepts by

adopting relevant practices facilitates the implementation of the cross-thematic approach, as it highlights the pupil's multidimensional perception of the world ('cosmo-idol').

For example, the concept 'system' is connected with the holistic approach to reality according to which a system is perceived as a whole made up of numerous sub-systems that interact with each other. The same happens with the parts that the system consists of. The concept of system can be described as 'a whole whose parts are closely interrelated, interdepended etc'. Within this framework it is believed that the changes occurring in one part of the system are assimilated by the system itself through regulating mechanisms that prevent its collapse. The concept of system appears both in natural and social sciences.

The understanding on the part of the pupils of the concept 'system' may contribute, among other things, to the deep understanding and promotion of specific educational values, such as, national independence, life, environment, democracy, social justice etc. Thus, for example, pupils should understand that the essential elements that constitute the concept 'nation' interact with one another in achieving national unity. National unity is considered an essential precondition for national independence, whether it concerns social groups, institutions or ideas. In the case of the system 'Greek nation' we can easily identify that this system is in continuous interaction with 'the systems of other nations' and this interaction should be sought to be mutually advantageous. Within this context relations and encounters of all kinds on a social, economic, political and cultural level are all considered to be forms of interaction.

Democracy could also be considered as a system in which different views are formed, violent conflicts are averted and the common interest is finally promoted. Therefore, understanding the concept of 'system', in combination with the concepts 'change' and 'interaction', facilitates pupils' understanding of the function of democracy and thus helps them develop citizenship awareness.

As far as Physical Sciences are concerned, the systemic perception of reality will help pupils recognize natural environment as a hyper-system that consists of several sub-systems and has (auto) prescriptive/regulating mechanisms, which are set into motion once the balance of the system is put under threat. In most cases environmental imbalance may prove fatal for human civilization. One example would be the perceivable change in the world climate (global warming, destruction of the ozone layer, sea level rise etc) caused by human activity. It is therefore obvious/evident that the systemic perception of the natural environment will increase the pupils' environmental awareness and their understanding of the consequences of human activity on our planet.

In the context of cross-thematic approach, it is possible to adopt two different in nature, but parallel and supplementary planning strategies for ISC.

a) *Planning and designing teaching subjects, the content of which is not clearly within the field of only one specific discipline. Examples of such subjects are: 'Studies of the Environment', 'Social Studies and Citizenship Education', 'Exploring the Natural World' etc in School).*
b) *Horizontal linking of the ISC of subjects taught independently at a specific grade of school education.*

This can be achieved:

i. *Through the parallel or successive (depending on the case) introduction of concepts from more than one subject namely, the fundamental cross-thematic concepts. These concepts and their cross-thematic extensions should be diffused (wherever possible) within the textbooks of different subjects, as it was mentioned before, so that pupils, when taught a specific subject, can make worthy use of knowledge and experience already acquired from other subjects. Thus, a holistic approach to knowledge is achieved through appropriate subject inter-connections.*
ii. *Through cross-thematic activities/projects-implemented in the teaching of different subjects and covering various topics–that facilitate understanding of fundamental cross-thematic concepts and thus promote the development of a unified framework of knowledge and skills. These activities should cover about 10% of the teaching time devoted to each thematic unit.*

For a more effective implementation of the innovative strategies mentioned above, the following things should be taken into consideration: the aims of school education for each level; maintaining independent teaching of each individual subject; the existing educational reality and its continuous qualitative upgrading. It should be mentioned here that in the unified planning of the educational system Nursery School education should be granted equal status as its importance to society has long been recognized. At Nursery School level, which consists the first stepping-stone to the child's socialization, children are given opportunities to learn through play. Also at this level it is easier to detect and cater for special educational needs.

At Primary School level (children aged 6-12) children's relationship with the school institution, and knowledge acquisition is further established. At this level, where pupils – especially those in the first grades – perceive/understand the world around them mostly through their senses and are able to think logically, the main aim is that the pupils acquire knowledge

on the basis of fundamental concepts and principles and develop a positive attitude towards life-long learning, cooperation and responsibility. To realize this aim the pupils' cognitive and learning abilities as well as their individual needs should be taken into consideration.

At Junior High school level (children aged 12-15), where young adolescents begin to develop abstract thought, the study of independent subjects is considered essential and is facilitated by the spiral development of subject matter. Parallel to it the horizontal interconnection of the ISC.-as it has been described above-is also considered important and should be aimed for and ensured.

Particularly for PSN, planning and implementing Individualized Educational Programs (IEP) adapted to their individual needs and interests is required. Special provision should also be made for attending the school program. Technological aids and adapted equipment should be used to this effect. For example, pupils with visual impairment should be assisted in moving around and orientating themselves, while those with a hearing impairment should be assisted in developing their natural language, namely Greek Sign Language (GSL) etc.

The specification of content of studies at each educational grade should ensure internal coherence and gradual development of different concepts. In relation to the development of specific skills and abilities the teaching of different subjects should be organized in a way that ensures objectives are met. Whilst some skills appear to be relevant to a few particular subjects, others are diffused into a much wider range, and are therefore considered essential for effective learning. There are also skills that can be characterized cross-thematic or horizontal and for this reason it is necessary to promote them through the ISC of all subjects. The most significant of them are:

a) *communicative skills (speaking, listening, reading, writing, argumentation, dialogue etc);*
b) *the skill to effectively use numbers and mathematical concepts in everyday life;*
c) *the skill to use multiple sources of information and communication tools, with the aim of finding, analyzing, assessing and communicating information whilst protecting against 'information pollution';*
d) *cooperative during group work;*
e) *the skill to critically process information, values and principles;*
f) *problems solving skills acquired through the development of the necessary skills and strategies of planning, controlling, providing feedback and remedial intervention;*
g) *the ability to make rational choices on a personal and social level;*
h) *the ability to administer resources (natural, economical, social etc.);*

i) the ability to think creatively;

j) the ability to appreciate art, and to be creatively artistic; and

k) the ability to exploit knowledge and adopt values appropriate to the formation of personal views facilitating decision-making.

It is evident that educational planning should be standardized across all pupil groups. In accord with the legislation in effect (L.2817/2000), special attention must be paid to the integration of PSN in mainstream and special schools. More specifically, it is stated that the education of people with disabilities PSN be prioritized accordingly as follows:

1. *in ordinary school classes, supported by a specialized teacher.*
2. *in specially organized and appropriately equipped integration classes, which operate within general and technical ordinary schools.*
3. *in self-contained special needs schools, in schools or classes that operate either independently or as branches of other schools within hospitals, rehabilitation centers, institutions, at home etc.*

The basic principles of the education for pupils with special educational needs require the provision of education within a school environment appropriately suited to the pupils' needs. The assessment of each pupil, and cooperation between the school and the Centers for Diagnosis Evaluation and Support (CDES) is of paramount importance. These centers consist new institutions established by Ministry of National Education and Religious Affairs, in accordance with L.2817/2000, with the aim of locating, diagnosing and supporting pupils with disabilities PSN. In terms of educational policy measures should be taken to eradicate the factors that exclude a pupil from their local, for example:

- *problems of accessibility for children with mobility problems or sight impairment;*
- *problems in the implementation of individualized supporting services due to the timetable inflexibility;*
- *problems of accessibility to teaching materials specified by the ISC due to inadequate teaching materials, or other means (for example the non-exploitation of the Greek Sign Language or the lack of books and teaching aids for the blind).*

An essential element of special needs education is provision for the development of the school unit into a community, collectively responsible for the development of every pupil. The integration of PSN should command the attention of the whole school community including all teachers and parents.

Diathematikon Programma provides PSN with the opportunity to take an active role in the teaching/learning process. This will allow them to select the kind of knowledge and skills that

would be most beneficial in satisfying their everyday needs. By involving themselves in various activities these pupils learn to use their abilities and include themselves in the learning process.

School timetables are designed on the basis of the ISC of subjects. These should provide the opportunity for adequate teaching of all subjects that contribute to the accomplishment of the statutory goals of school education. Furthermore timetable design should take into consideration the cognitive ability of pupils, their age, the degree of difficulty of the subjects taught and the particular local and national conditions.

More specifically, in Compulsory Education, the timetable will provide for the establishment of the 'Flexible Zone' program. This program comprises at least two teaching hours per week (and certainly longer in the first classes of Primary School), and involves cross-thematic activities and projects. These aim at the qualitative upgrading of the educational effort. They also promote collective effort, the development of critical thinking, active participation of pupils, whilst at the same time allowing the teacher to take the initiative and act with flexibility in the context of upgrading the teaching and learning. The Flexible Zone program may also be considered as a 'filter' through which the experience as well as the outcomes of the various innovative extra-curricular pilot programs that have been successfully applied will inform the ISC.

As regards the implementation of the Flexible Zone program in Nursery School, infants should participate in free and organized activities and short-term cross-thematic projects as part of their daily program.

With reference to the Flexible Zone and PSN, it is essential to plan a flexible timetable depending on their particular educational needs. For example during their Physical Education class, a pupil with mobility problems should be provided with a neuromotor coordination program, while a sight-impaired pupil should be provided with a tutorial lesson during the Art lesson. School in these cases should promote communication and cooperation between teachers and the pupil's family in relation to the implementation of individualized programs.

4. STRUCTURE OF DIATHEMATIKON PROGRAMMA AND THE INDIVIDUAL SUBJECT CURRICULA

The general part of the DP can be considered as the basic frame of reference for the design of the DP of the various school subjects and the relevant ISC. The DP of each school subject should be flexible enough to allow for adaptations of its content, whenever this is

thought necessary. These adaptations of content should however be made according to specific criteria regarding the aims of each individual subject at each grade level.

With regard to structure, the DP of each subject includes:

a) the general teaching/learning aim of the subject

b) the content guiding principles of the content

c) the general goals, including knowledge, values, attitudes and skills promoted through the teaching of the each subject and

d) indicative fundamental cross-thematic concepts, diffused in the texts of schoolbooks, which constitute the basis for the planning of cross-thematic activities in the corresponding ISC.

The structure of the ISC, which include specific instructions for cross-thematic approaches, is as follows:

a) Goals

Goals refer to knowledge, attitudes and values needed to satisfy personal needs and meet social demands, and generally express the results pursued through the educational process, at each grade level. Goals therefore are set to assist personal fulfillment through the development of a critical, analytic, synthetic and creative attitude, which in turn will foster creative action on a personal and collective level.

The goals of each subject should be in line with and bring out the general goals of the educational system. Goal definition should primarily consider pupils' age and perceptive ability. Age plays a significant role due to its relationship with pupils' mental development, cognitive background, skills, aspirations and social environment.

b) Objectives

Objectives constitute the guidelines for the planning and design of the content of teaching subjects and also of the processes of measuring the achievement of educational goals. Objectives should be clearly specified, thereby obviating misinterpretations.

For methodological reasons these objectives, could be divided into three groups, despite difficulties in defining the scope of each group. These groups are i) cognitive, ii) affective and iii) psycho-kinetic.

i. Cognitive objectives refer to the acquisition of essential knowledge and the development of cognitive abilities that are necessary for information processing. More spe-

cifically, these abilities include: the ability to gather and classify information, the ability to formulate hypotheses, the ability to analyze and process information and draw conclusions, etc. The accurate definition of instructional/cognitive objectives allows us to determine what exactly should be taught and how the evaluation of the accomplishment of teaching objectives is going to be carried out.

ii. *Affective objectives refer to the pupil's emotional development. Additionally they are concerned with fostering pupil motivation and cultivating their interest in scientific knowledge. Affective objectives also refer to developing a set of values, attitudes and behaviors (e.g. readiness, determination, interest etc) meaningful to the individual and essential to society.*

iii. *Psycho-kinetic objectives mainly refer to the development of the pupils' practical skills, such as:*

- *taking measurements,*
- *carrying out experiments,*
- *using instruments,*
- *constructing and operating equipment,*
- *applying acquired skills automatically,*
- *modify actions according to circumstances,*
- *carrying out new activities easily and effectively*

These skills will help pupils not only through their school career but also later in life.

Irrespective of the above groupings these objectives could have been based on the following guiding principles that are common to all levels of school education. These are the following:

i. *knowledge and methodology*
ii. *cooperation and communication*
iii. *connection of science and art with everyday life*

The first guiding principle refers to knowledge, cognitive and practical skills as well as discipline-referenced skills that pupils must have acquired after the completion of their studies at each grade level.

The second guiding principle refers to social skills including group participation and communication skills, presentation skills, etc.

The third guiding principle refers to developing awareness of and evaluating the effects of science and art applications in everyday life.

Concerning PSN and their smooth integration in ordinary school classrooms, the teacher should be given the freedom to adjust the program to the pupils' educational needs and form the teaching objectives accordingly. The Cross-thematic Framework and the ISC should function as an effective guide for the teacher when designing individualized programs and defining teaching objectives.

c) Thematic units

The content of each subject does not necessarily correspond to the content of the corresponding discipline but it should derive from it through appropriate modifications and reframing. As regards the selection of content included in the ISC of individual subjects, the following criteria should be taken into consideration:

i. *The ISC of all subjects should complement each other so as to avoid unnecessary overlapping.*
ii. *The emphasis should not be on specialized or detailed knowledge but on core areas of the curriculum, while the subject matter should be adjusted accordingly. Also the subject matter should be adjusted to the teaching time given, so that it can easily be understood by the pupils.*
iii. *Flexibility in content selection will allow for adaptations, on the basis of rapid scientific and technological developments and individual pupils' abilities.*
iv. *There is continuity and connection/linking between present, past and future knowledge and experience.*
v. *Themes are structured by integrating knowledge from different disciplines.*
vi. *Emphasis is placed on the development of critical thinking, the encouragement of collective effort and the acquisition of general knowledge.*

The teaching content is arranged into units spread across each grade level in a graded or spiral manner. The spiral arrangement of instructional materials is clearly described, so as to avoid overlapping and repetition as we pass from each grade level to the next. Furthermore, for the definition of the content of each teaching subject the content of other subjects is also taken into consideration, so as to facilitate cross-thematic links.

d) Indicative activities

Indicative activities are classified in two categories:

i. *Subject-oriented activities (activities structured around a specific subject), which promote the aims of each teaching subject, through the understanding and elaboration of fundamental concepts of the corresponding discipline and through the acquisition of discipline-referenced skills.*
ii. *Cross-thematic activities, based on the elaboration of cross-thematic concepts (like those defined in the DP), which are designed to facilitate the integration of knowledge from different school subjects with everyday life experience.*

e) Supplementary cross-thematic projects

Cross-thematic projects concern broader thematic units and are indicative. Moreover, they may alternatively supplement the 'indicative cross-thematic activities' mentioned in the ISC, which comprise almost 10% of the teaching time. In the ISC a way of developing projects is succinctly described. Also cross-thematic concepts, intended to be explored, are pointed out along with the subjects that are suitable for cross-thematic extensions.

f) Teaching time

The ISC provide time specifications for each thematic unit, depending on the content, the significance of the topics and the degree of difficulty. The allocated time is proportionate to the teaching hours provided for by the timetable and can be of assistance not only to the teacher in the yearly organization of his teaching, but also to school book writers in the organization of content.

g) Teaching Methodology

Principles of teaching methodology

Teaching methodology should substantially contribute to the accomplishment of teaching aims of each subject. This can be done through means and processes that promote also the ultimate aims of school education. Methodological choices should be ruled by clear principles in order to be pedagogically acceptable and educationally effective. The most important of these principles are the following:

i. *Learning is an extremely complicated cognitive process. Its outcomes are expressed as cognitive elements, skills, values, attitudes and behaviors.*
ii. *Personality is primarily structured by cognitive elements, experiences and values. Therefore during the learning procedure the student's personality is influenced by the*

assimilation of new knowledge. Acquisition of new knowledge is assisted by pre-existing knowledge. To achieve a smooth transition from a lower cognitive level to a higher one, pupils should be encouraged to critically appraise what they have learned, and understand or even make predictions about what might follow during teaching. Moreover, when planning, developing, implementing and evaluating teaching, the focus should not be one type of learning ability only (e.g. only information or attitudes or skills), but on a combination of all these types, which will help the student's holistic development.

iii. *Learning takes place within a specific socio-cultural framework as a process of continuous interaction.*

iv. *Teaching should expand cognitive structures. According to Piaget this can be achieved through two simultaneous processes: assimilation and accommodation. Assimilation refers to the incorporation of new knowledge into existing cognitive schemes. Accommodation refers to the modification of the child's existing schemes to incorporate new knowledge. A child's equilibrium at anyone stage may be upset by external events, such as new information he or she cannot readily assimilate, or by internal processes that bring the child to a new 'readiness' to accommodate. In this way development advances to a new, higher stage of organization.*

v. *Learning through discovery involves coordinated information processing that contributes to the organization of logical schemes thus developing the child's ability to seek and invent solutions to problems, discover attributes, evaluate behaviors and distinguish relations.*

vi. *Apart from helping pupils to gain the fundamental background, concepts and understanding of the various subject matter areas, emphasis should also be placed on acquiring cognitive skills to assist in the development of positive attitudes towards issues concerning the pupils themselves as well as their social environment. This can help bring order and depth of understanding to the learner, moving thus away from the fragmented learning of facts.*

vii. *Pupils should experience learning as a stimulating and enjoyable process that takes place within an accepting and encouraging setting that provides opportunities for experimentation and reconciliation with the possibility of a mistake.*

viii. *Learning and development take place within a social context and they are advanced through co-operative learning processes.*

The cross-thematic and holistic approach to knowledge is necessary for the development of the student's ability to examine issues and problems of the everyday life more effectively. With the application of cross-thematic approaches knowledge-centered teaching is appropriately reduced and the use of school time can be maximized. Within this framework the teacher is a mediator in self-directed learning that is effected through the pupils' active participation in relevant activities. In the DP, emphasis is placed on active methodology and the specifications for the development of supporting educational materials, which should also be made available to PSN.

h) Suggested methodological approaches

Methodological approaches refer to teaching practice and define the mode of instruction that is most appropriate for each subject, in order to achieve the set targets-the ultimate goal being the pupils' holistic development as individuals and social beings. Suggested teaching strategies that can be used separately or in combination are as follows:

i. *Exploration and discovery (active approach to learning): Its goal is to help students think, manipulate sophisticated concepts, explore and acquire knowledge by themselves by learning 'how to learn'. It mainly requires pupil's active participation. It is based on the principle that the accommodation of the above processes assists the development of critical thinking. To make teaching more efficient, practices that create the appropriate conditions making "discovery" possible should be adopted. These practices involve the processes of observation, comparison, measurement, classification, exploration, prediction, discovery of time relations, comparison of events, problem solving, formulation of inductive or deductive reasoning, brainstorming e.t.c. More specifically for Physical Sciences, carrying out experiments constitutes an integral part of their methodology.*

ii. *School trips to the environment (natural and human-made): Contact with the environment, whenever this is necessary and feasible, provides immediate information that can be put to multiple uses. This contact is consistent with the experimental approach to knowledge and in the long-term it can also be used for other purposes, for example for the pupils' future professional orientation. At present this should take the form of careers advice that will help pupils make informed choices concerning their future studies.*

iii. *Presentations using appropriate teaching aids: pupil interest is stimulated with transparencies, videotapes, computer software, models, ready concoctions etc, their attention is captured and as a result, learning becomes easier and more natural. The use of computer simulations can prove very useful in assisting the pupils' understanding of concepts and processes. Special care should be taken to help the pupil discriminate between computer-based representations and the 'real' world.*

iv. *Discussions between the teacher and the pupils or group discussions: Discussion offers pupils opportunities to speculate, evaluate, draw conclusions and express their views through the process of dialectic argumentation and debate. Pupils' engagement and active participation in the discussion is achieved through the posing of suitable questions, planned prior to the teaching session.*

v. *Direct method of teaching–Narration: humans are equipped with the ability to notify their knowledge and thoughts through speech. This gives the teacher the opportunity to directly intervene during teaching, whenever they think that indirect methods of teaching would not suit particular circumstances. An example is where the teacher has the opportunity to use narration when they refer to historical events or fictional stories.*

vi. *Collaborative teaching: dynamics developed by small groups of pupils working together can be utilized to provide an ideal setting for collective data processing, or as a vehicle for supporting personal learning. Group forms of teaching are advisable when undertaking projects, suitable for the organization of cross-thematic activities.*

The teaching strategies suggested above can be applied individually or in combination, depending on the theme being taught, pupils' needs and available resources.

5. PUPIL ASSESSMENT

a) The purposes of assessment

The basic purpose of pupil assessment is to provide feedback about both pupil progress and teacher success (or in other words, about learning and teaching processes) and also to identify learner strengths and weaknesses. More specifically pupil assessment serves the following purposes:

a. *To find out whether learning and teaching aims have been achieved.*

b. *To plan future learning.*

c. *To provide feedback on pupil performance, individual and class level, locating their skills, interests and individual differences at all grade levels and stages of learning.*
d. *To improve the quality of education in general, thereby increasing student motivation for learning.*
e. *To identify learning difficulties and plan appropriate interventions thereby allowing for improvement of the teaching process.*
f. *To cultivate an inquiring spirit, develop problem-solving abilities and acquire knowledge and skills through cross-thematic approaches.*
g. *To foster pupil responsibility for their learning, through involvement in collective work and self-assessment.*
h. *To reinforce pupil confidence and self-esteem and in general, to assist the development of their personality.*
i. *To allow the pupil to acquire meta-cognitive skills through the control and management of their learning*

b) Types of Assessment

i. Initial or Diagnostic assessment*: Used primarily at the beginning of the learning process (and sometimes also during it), to identify the level of pupils' knowledge and their interests and to identify possible difficulties that they face. In addition to the above, it helps to define the factors that contribute to pupil underachievement. This allows corrective measures to be developed. The teacher can thus adapt their teaching to the level, abilities and individual characteristics of each student, helping them to achieve pedagogical and educational targets.*

ii. Formative Assessment*: Applied during teaching and mainly of informative character, it is used to monitor pupil progress towards the achievement of specific educational goals. The final conclusions derive from the pedagogic, and creative dialogue between teacher and pupils, which informs and guides any required modification of the planning process and/or teaching method, in order that pupils achieve specified targets.*

iii. Final or Summative Assessment*: Used to summarize and offer feedback, in order to assess and compare the level of pupil achievement compared to specified and anticipated pedagogical and educational targets. Basically the level of achievement of each pupil is compared with his/her former one. Also the total class achievement is measured against the anticipated and pursued one.*

c) Basic principles of Assessment:

i. The assessment of pupils' progress is a continuous and purposive process, incorporated into the teaching and learning process.

ii. Pupil assessment relies predominantly on the evaluation of their progress on the basis on specific criteria (i.e. criterion-referencing) deriving from learning objectives and not from comparison with other learners (i.e. norm-referencing).

iii. Pupil assessment concerns not only the acquisition of knowledge and skills, but also the development of positive attitudes, values and behaviors.

iv. Pupil assessment should be characterized by validity, reliability, transparency, and objectivity. The assessment objectives and criteria should be clear and made known to pupils from the outset. The assessment results should also be communicated especially to the pupils for their benefit, and other interested parties (parents etc.)

v. Pupil assessment concerns both their performance and their progress in relation to their previous progress.

vi. During assessment different methods are used depending on the aims, content and teaching approach of each subject. The assessment methods should be appropriate for the pupils' age, learning needs and experiences.

vii. During the assessment process, the pupils' individual characteristics as well as their individual learning styles and pace of learning are taken into consideration. Factors such as the pupils' stage of linguistic development, as well as the opportunities they have for learning in their social and family environment are also taken into account.

viii. The assessment of pupils with special needs is based on the general principles of assessment. With regard to the aims of such assessment, particular attention should be paid to the knowledge and skills that each individual has developed in relation to their everyday life. Moreover, particular emphasis should be given to:

a) An holistic assessment of the pupil which takes account of all aspects of their unique educational experience, covering cognitive practical and affective elements and focusing on their strengths, rather than on their weaknesses.

b) The motivating principle of assessment (encouragement of effort) and

c) The correlation of assessment results with each pupil's individualized educational program. As the aim of assessment involves gathering information for decision-making, the student's successful class attendance, i.e. the degree of their integration,

should be taken into account when considering the special educational provisions required by the pupil.

ix. All forms of assessment should involve some degree of self-assessment depending on age and mental maturity of pupils. Assisted by their teachers, pupils will acquire increasingly effective self-assessment skills.

d) Assessment Techniques

Assessment techniques are directly correlated with the particular characteristics, the aims and content of each subject. They are connected to the basic organizational-communicative situations that ensure the educational content of assessment. They aim at exploring the pupils' cognitive achievements, whilst emphasizing their ability to acquire, manage and apply knowledge in a multiplicity of ways. At the same time they bring out the communicative skills and highlight the learning profile of each student. Assessment techniques include:

- *written or oral exams with closed or open type questions;*
- *semi-structured dynamic dialogue among the participants in the learning process;*
- *synthetic creative-exploratory tasks (projects);*
- *systematic observation;*
- *student portfolios;*
- *self-assessment or peer assessment and*
- *combinations of different techniques (e.g. written test and oral exam together) etc.*

e) Ways of expressing the assessment result

The assessment result (e.g. the final grade) should be neither an end in itself, nor a means of ranking or classifying students in any way, but rather a means of activating school authorities and teachers in order to take suitable educational and teaching measures that would upgrade education.

Considering the educational role of the school in general and more specifically the feedback function of assessment as well as the learning aims of the Diathematikon Programma, we judge the descriptive form of expressing the assessment result, (particularly regarding the first classes of Primary school) to be closer to the aims and objectives of the DP and the ISC. This way of expressing the assessment result allows for a more comprehensive and detailed description of student performance. Thus, both parents and pupils become aware not only of

pupils' weaknesses and difficulties but more importantly of positive aspects of their performance, including effort, involvement and active participation.

With this form of expressing-communicating assessment results the pressures of grade chasing, rote learning, and over-zealous competition can be minimized or even eradicated. Moreover, descriptive assessment, where the focus is on the pupil's personal course of learning, facilitates the emergence of the pupil's interests, needs and individual characteristics and highlights the factors affecting the learning process.

Concerning the needs of pupils at higher grade levels of Primary and Secondary education, there is a need to use descriptive forms of expressing the assessment result in combination with traditional quantitative forms, which should use a wide range of scales.