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**IMPLEMENTATION OF
“EDUCATION AND TRAINING 2010”
WORK PROGRAMME**

**WORKING GROUP B
“KEY COMPETENCES”**

**KEY COMPETENCES FOR LIFELONG LEARNING
A EUROPEAN REFERENCE FRAMEWORK
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1. BACKGROUND

In March 2000, the Lisbon European Council set a new strategic goal for the European Union: to become ‘the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion’. To achieve this, Europe's education and training systems need to adapt to the demands of the knowledge society and to the need for an improved level and quality of employment. One of the main components of this approach is the promotion of new basic skills: more concretely, the Lisbon European Council called upon the Member States, the Council and the Commission to establish a European framework defining ‘the new basic skills’ to be provided *through lifelong learning*. This framework should cover *ICT, technological culture, foreign languages, entrepreneurship and social skills*¹.

A year later, the Stockholm European Council adopted the report ‘*The concrete future objectives of education and training systems*’². This document identifies three strategic objectives (quality, access and openness of the education and training systems), broken down into 13 associated objectives. The Barcelona European Council (February 2002) then adopted a detailed work programme³ for achieving these common goals and objectives by 2010. The detailed work programme extended the list of basic skills as follows: *literacy and numeracy (foundation skills), basic competences in mathematics, science and technology, ICT and use of technology, learning to learn, social skills, entrepreneurship and general culture*.

The Barcelona Council conclusions also stressed the need for action *to improve the mastery of basic skills*. In particular, it called for attention to digital literacy and foreign languages. Moreover, it was considered essential to promote the *European dimension* in education and to integrate it into pupils’ basic skills by 2004.

Following the adoption of the detailed work programme, the Commission has established expert groups to work on one or more of the thirteen objective areas. These groups consist of experts from Member States, EFTA/EEA countries, associated countries and European-level associations. The working group on **key competences** started its work in 2001⁴. The main objectives of the working group are to identify and define *what the new skills are and how these skills could be better integrated into curricula, maintained and learned through life*. There is a particular focus on *less advantaged groups, those with special needs, school drop-outs and adult learners*.

1 Presidency conclusions. Lisbon European Council 23-24 March 2000, point 26.

2 Council document 5980/01 of 14/02/2001.

3 Detailed Work Programme on the follow-up of the objectives of education and training systems in Europe (2002/C 142/01)

4 A specific working group has been established for language learning; for details, see http://www.europa.eu.int/comm/education/policies/2010/objectives_en.

In its first progress report (February 2002), the working group introduced a **framework for eight key competences** with the corresponding knowledge, skills and attitudes that relate to these domains. The call of the Barcelona European Council for the **European dimension** in education to be enhanced was reiterated in the 2004 Joint Interim Report of the Council and the Commission on the progress of the “**Education and Training 2010**” work programme⁵. Responding to this call, the working group has revised the framework to add elements of a European dimension into appropriate domains of key competences.

The 2004 joint interim report also calls for *applying common European references and principles* that can usefully support national policies. Although they do not create obligations for Member States, they contribute to developing mutual trust between the key players and encouraging reform with regard to the various aspects of lifelong learning. One such reference is suggested for *key competences that everyone should be able to acquire and on which any successful outcome of any further learning depends*.

2. DEFINITION AND STATUS OF THE FRAMEWORK

2.1. From ‘basic skills’ to ‘key competences’ — the context of the work

The Lisbon Council conclusions and the following detailed work programme called for a European framework for basic skills to be provided through lifelong learning. The mandate for defining basic skills was given at the same time as substantial work on competences was underway in other international fora. The OECD’s project **Definition and Selection of Competences** (DeSeCo)⁶ looked at what the key competences for a successful life and well-functioning society would be. A broad approach to essential competences in the context of lifelong learning was chosen by the **ASEM** initiative⁷. Competence, in this context, refers to achieving ‘a higher degree of integration between the capabilities and the broader social objectives that an individual has’.

As regards compulsory education curricula, the **Eurydice survey**⁸ revealed a heightened interest in key competences considered vital for successful participation in society. Many of these competences are defined as **generic** or **transversal** competences that are subject-independent and based on **cross-curricular objectives**. They usually relate to better management of one’s own learning, social and interpersonal relations and communication and reflect the general shift of emphasis from teaching to learning.

5 The “Education and Training 2010 work programme” integrates all actions in the fields of education and training at European level, including vocational education and training (the “Copenhagen process”). It also takes into account the Bologna process in the development of the European Higher Education Area. The interim report on the process, “Education and Training 2010”, The Success of the Lisbon Strategy Hinges on Urgent Reforms, is available at: http://europa.eu.int/comm/education/policies/2010/et_2010_en.html.

6 The OECD’s Definition and Selection of Competences: Theoretical and Conceptual Foundations (DeSeCo) Project and the ASEM initiative in lifelong learning.

7 The Asia-Europe Meeting’s lifelong learning initiative. For details, see: <http://www.asia-europe-institute.org/ASEM-LifeLong-Learning/lllcontent.htm>.

8 Key Competencies. Survey 5. Eurydice 2002.

The PISA 2000 international survey⁹ also highlighted the importance of the acquisition of broader competences needed for successful learning. In addition to performance in reading and mathematics, it also assessed some generic competences such as student motivation, attitudes and ability to regulate one's learning.

In the context of these developments, it became necessary to address the question of not only **what** the necessary competences for all in the knowledge society would be but also **what they would consist of**. Moreover, the framework for competences, as requested by the Lisbon Council, should be seen from the **perspective of lifelong learning**, i.e. acquired by the end of compulsory schooling but also learned, updated and maintained throughout life. Finally, the question arises whether it would be possible to determine a certain **level of mastery** of a competence as 'basic'.

Considering these challenges and taking into account the international developments in the field, the working group¹⁰ has defined a **framework comprising eight domains of key competences** that are considered necessary for all in the knowledge society. Given the various aspects of the task, it is necessary to outline some **principles** for the definition of the framework as well as the challenges posed by such an attempt.

2.2. The principles underlying the definition of the framework for key competences

- i. The framework is the first European-level attempt to provide a comprehensive and well-balanced list of the *key competences that are needed for personal fulfilment, social inclusion and employment in a knowledge society*. It aims to serve as a *"reference tool"* for policy-makers and for those responsible for creating learning opportunities for people at all stages of lifelong learning, allowing them to adapt the framework as appropriate to learners' needs and contexts.
- ii. The terms *'competence'* and *'key competence'* are preferred to *'basic skills'*, which was considered too restrictive as it was generally taken to refer to basic literacy and numeracy and to what are known variously as 'survival' or 'life' skills. 'Competence' is considered to refer to *a combination of skills, knowledge, aptitudes and attitudes*, and to include the disposition to learn in addition to know-how. A 'key competence' is one crucial for three aspects of life:
 - a. **personal fulfilment and development throughout life (cultural capital)**: key competences must enable people to pursue individual objectives in life, driven by personal interests, aspirations and the desire to continue learning throughout life;
 - b. **active citizenship and inclusion (social capital)**: key competences should allow everybody to participate as an active citizen in society;
 - c. **employability (human capital)**: the capacity of each and every person to obtain a decent job in the labour market.

9 OECD. Knowledge and Skills for Life. First results from PISA 2000. Paris: OECD, 2001d.

10 Progress report of Working Group B on Basic skills, foreign language teaching and entrepreneurship, November 2003. Available at http://www.europa.eu.int/comm/education/policies/2010/objectives_en.html#basic.

- iii. Given the chosen approach, namely defining the key competences in broader terms, it is neither possible nor relevant, in most of the competence domains, to distinguish between the very *'basic levels'* of mastery of a competence from more advanced levels of mastery. The term 'basic' refers to something that depends on the requirements of the situation and circumstances: mastering a skill well enough to solve a problem in one situation might not be enough in another situation. In a constantly changing society, the demands faced by an individual vary from one situation to another and from time to time. Therefore, in addition to possessing the specific basic skills for accomplishing a certain task, *more flexible, generic and transferable competences* are needed to provide the individual with a combination of skills, knowledge and attitudes that are appropriate to particular situations. For these reasons, many of the definitions describe rather *the essential elements that comprise the competence and that are crucial as the competence develops from a basic level of mastery towards a more advanced mastery of the competence*. The definitions thus leave room for judging the appropriate level of mastery of a competence with regard to the *contextual factors* involved¹¹.
- iv. Moreover, *measurement of the mastery of most of these competences* is so far limited. The existing measurement tools such as PISA and IALS give an indication of levels of mastery as regards literacy and numeracy. The Council of Europe's Common European Framework of Reference for Languages (CEF) describes levels of mastery in foreign languages and research has been done to measure the 'learning to learn' competence. In addition, there are a number of national measurement tools for identifying the appropriate levels of mastery of basic skills in order to guide policy-making at various levels. *While only some of the key competences are measurable, the framework helps to place these in the context of equally important generic and transversal competences that are more complicated to measure*.

2.3. Other remarks

It is evident that there is some *overlap between the eight domains*¹² as well as within the lists of *knowledge skills and attitudes* in certain domains. Therefore, each competence should be seen as a *combination of the three elements* above — the mastery of which varies in accordance with contextual requirements.

Moreover, for instance in the domain of interpersonal and social competence, terms such as 'solidarity', 'compromise' and 'tolerance' have *different connotations* in different socio-linguistic environments. Indeed, while 'compromising' is seen in some countries as a positive social skill, in others 'compromising' may refer to losing one's case and thus has a negative connotation. The same goes for 'tolerance': one could easily ask to what extent something should be tolerated. *With these terminological and linguistic difficulties in mind, it becomes clear that while the framework provides an overview of the competences needed, it should be adapted, as appropriate, to specific cultural, linguistic, and social circumstances*.

11 A good example of this is the "digital literacy" competence. There are only few situations where basic skills in ICT are sufficient: in most cases effective use of ICT requires an appropriate level of critical thinking and a broader understanding of media.

12 For instance, the key competence of entrepreneurship (broadly defined) overlaps to a considerable extent with interpersonal and civic competences as well as with learning-to-learn. By the same token, there is a strong interpersonal dimension to communication in the mother tongue and in a foreign language.

As regards the specific case of *language competence*, it is necessary to note that the term **‘mother tongue’** is not unambiguous, given the frequency of early bilingualism in multilingual families. However, it remains relevant for the majority of inhabitants in European countries and is therefore used to describe the language that a person acquires in his or her early years, and which generally becomes the natural instrument of thought and communication. Moreover, although the processes of acquiring the mother tongue and a foreign language have similarities, they are presented as distinct domains to reflect the distinctions drawn in basic education curricula.

3. KEY COMPETENCES FOR LIFELONG LEARNING - A EUROPEAN REFERENCE FRAMEWORK

3.1. Key competence

In accordance with the broader approach adopted by the working group on key competences, the overall definition of '**key competence**' is as follows:

Key competences represent a transferable, multifunctional package of knowledge, skills and attitudes that all individuals need for personal fulfilment and development, inclusion and employment. These should have been developed by the end of compulsory schooling or training, and should act as a foundation for further learning as part of lifelong learning.

The definition stresses that key competences should be **transferable**, and therefore applicable in many situations and contexts, and **multifunctional**, in that they can be used to achieve several objectives, to solve different kinds of problems and to accomplish different kinds of tasks. Key competences are a **prerequisite** for adequate personal performance in life, work and subsequent learning.

It is proposed to apply the framework for key competences across the full range of education and training contexts throughout lifelong learning, as appropriate to national education and training frameworks:

- a. *General compulsory education, which is increasingly characterised by a change in emphasis — a shift away from 'codified' or 'explicit' knowledge towards 'tacit knowledge' embedded in a learner's personal and social competences.'*
- b. *Adult education and training — from 'compensatory'¹³ education (including the 'foundation skills' of literacy and numeracy) — to further and higher education and continuing professional development.*
- c. *Specific educational provision for groups at risk of social exclusion — for example, migrants, ethnic minorities, young people and adults with low levels of initial educational attainment, those living in remote and isolated areas, etc.*
- d. *Educational provision for pupils with special educational needs — whilst it is recognised that not all learners with special educational needs will be able to achieve all of these competences, they have an entitlement to access educational provision to help them meet their full potential in achieving learning goals that go some way towards the key competences outlined in section 2 above. This means that learners with special educational needs should have access to suitably differentiated and individualised learning programmes based on the framework of competences.*

13 This is the term used in the Communication from the Commission, Making a European Area of Lifelong Learning a Reality, COM (2001) 678 final (p 22), to refer to 'the provision of learning that should have been acquired during compulsory schooling'.

3.2. The eight domains of key competences

Table 1 gives an overview of the key competences considered necessary for all in the knowledge-based society. This overview is followed by a more detailed description (Table 2) of the definitions and the corresponding knowledge, skills and attitudes in each of the eight domains.

Table 1. Overview of key competences

<i>Competence</i>	<i>Definition</i>
Communication in the mother tongue	Communication is the ability to express and interpret thoughts, feelings and facts in both oral and written form (listening, speaking, reading and writing), and to interact linguistically in an appropriate way in the full range of societal and cultural contexts — education and training, work, home and leisure.
Communication in a foreign language	Communication in foreign languages broadly shares the main skill dimensions of communication in the mother tongue: it is based on the ability to understand, express and interpret thoughts, feelings and facts in both oral and written form (listening, speaking, reading and writing) in an appropriate range of societal contexts — work, home, leisure, education and training — according to one’s wants or needs. Communication in foreign languages also calls for skills such as mediation and intercultural understanding. The degree of proficiency will vary between the four dimensions, between the different languages and according to the individual’s linguistic environment and heritage. ¹⁴
Mathematical literacy and basic competences in science and technology	Mathematical literacy is the ability to use addition, subtraction, multiplication, division and ratios in mental and written computation to solve a range of problems in everyday situations. The emphasis is on process rather than output, on activity rather than knowledge. Scientific literacy refers to the ability and willingness to use the body of knowledge and methodology employed to explain the natural world. Competence in technology is viewed as the understanding and application of that knowledge and methodology in order to modify the natural environment in response to perceived human wants or needs.
Digital competence	Digital competence involves the confident and critical use of electronic media for work, leisure and communication. These competences are related to logical and critical thinking, to high-level information management skills, and to well-developed communication skills. At the most basic level, ICT skills comprise the use of multi-media technology to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in networks via the Internet.

14 The European Union has for some time used as a reference document the Common European Framework of Reference for Languages (CEF) developed by the Council of Europe. The CEF sees users and learners of a language primarily as ‘social agents’ with tasks to accomplish in their specific circumstances, environments and fields of action. The learning and usage of foreign languages build on the individuals’ general and communicative language competences and allow them to develop multilingual and multicultural competences. The approach of the CEF thus broadly corresponds to the one chosen by WGB for “key competences”. For more information on the CEF, see: http://www.culture2.coe.int/portfolio/documents_intro/common_framework.html. For a fuller analysis and specific recommendations on improving foreign language learning, see the “Progress report” of the Working group on Languages at http://europa.eu.int/comm/education/policies/2010/objectives_en.html#language.

Learning-to-learn	‘Learning-to-learn’ comprises the disposition and ability to organise and regulate one’s own learning, both individually and in groups. It includes the ability to manage one’s time effectively, to solve problems, to acquire, process, evaluate and assimilate new knowledge, and to apply new knowledge and skills in a variety of contexts — at home, at work, in education and in training. In more general terms, learning-to-learn contributes strongly to managing one’s own career path.
Interpersonal and civic competences	Interpersonal competences comprise all forms of behaviour that must be mastered in order for an individual to be able to participate in an efficient and constructive way in social life, and to resolve conflict where necessary. Interpersonal skills are necessary for effective interaction on a one-to-one basis or in groups, and are employed in both the public and private domains.
Entrepreneurship	Entrepreneurship has an active and a passive component: it comprises both the propensity to induce changes oneself and the ability to welcome, support and adapt to innovation brought about by external factors. Entrepreneurship involves taking responsibility for one’s actions, positive or negative, developing a strategic vision, setting objectives and meeting them, and being motivated to succeed.
Cultural expression	‘Cultural expression’ comprises an appreciation of the importance of the creative expression of ideas, experiences and emotions in a range of media, including music, corporal expression, literature and plastic arts.

Table 2. The framework for key competences. Definitions of the domains of key competences and descriptions of the knowledge, skills and attitudes corresponding to each of the domains.

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
1. Communication in the mother tongue	<p><i>Communication is the ability to express and interpret thoughts, feelings and facts in both oral and written form in the full range of societal and cultural contexts — work, home and leisure.</i></p>	<ul style="list-style-type: none"> • <i>Sound knowledge of basic vocabulary, functional grammar and style, functions of language.</i> • <i>Awareness of various types of verbal interaction (conversations, interviews, debates, etc.) and the main features of different styles and registers in spoken language.</i> • <i>Understanding the paralinguistic features of communication (voice-quality features, facial expressions, postural and gesture systems).</i> • <i>Awareness of different types of literary text (fairy tales, myths, legends, poems, lyric poetry, theatre, short stories, novels) and their main features as well as types of non-literary text (CVs, applications, reports, editorials, essays, speeches, etc.) and their main features.</i> • <i>Understanding the main features of written language (formal, informal, scientific, journalistic, colloquial, etc.).</i> • <i>Awareness of the variability of language and communication forms over time and in different geographical, social and communication environments.</i> 	<ul style="list-style-type: none"> • <i>Ability to communicate, in written or oral form, and understand, or make others understand, various messages in a variety of situations and for different purposes. Communication includes the ability to listen to and understand various spoken messages in a variety of communicative situations and to speak concisely and clearly. It also comprises the ability to monitor whether one is getting one's message across successfully and the ability to initiate, sustain and end a conversation in different communicative contexts.</i> • <i>Ability to read and understand different texts, adopting strategies appropriate to various reading purposes (reading for information, for study or for pleasure) and to various text types.</i> • <i>Ability to write different types of texts for various purposes. monitor the writing process (from drafting to proof-reading).</i> • <i>Ability to search, collect and process written information, data and concepts in order to use them in study and to organise knowledge in a systematic way. Ability to distinguish, in listening, speaking, reading and writing, relevant from irrelevant information.</i> • <i>Ability to formulate one's arguments, in speaking or writing, in a convincing manner and take full account of other viewpoints, whether expressed in written or oral form.</i> • <i>Skills needed to use aids (such as notes, schemes, maps) to produce, present or understand complex texts in written or oral form (speeches, conversations, instructions, interviews, debates).</i> 	<ul style="list-style-type: none"> • <i>Development of <u>a positive attitude to the mother tongue</u>, recognising it as a potential source of personal and cultural enrichment.</i> • <i>Disposition to approach the opinions and arguments of others with an open mind and engage in <u>constructive and critical dialogue</u>.</i> • <i>Confidence when speaking in public.</i> • <i>Willingness to strive for <u>aesthetic quality</u> in expression beyond the technical correctness of a word/phrase.</i> • <i>Development of <u>a love of literature</u>.</i> • <i>Development of a positive attitude to <u>intercultural communication</u>.</i>

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
2. Communication in foreign languages	<i>Communication in foreign languages is the ability to understand, express and interpret thoughts, feelings and facts in both oral and written form in an appropriate range of societal contexts— work, home, leisure, education and training — in languages other than the mother tongue and the language(s) of instruction at school, according to one’s wants and needs.¹⁵</i>	<ul style="list-style-type: none"> • <i>Knowledge of vocabulary and functional grammar, intonation and pronunciation.</i> • <i>Awareness of various types of verbal interaction (for example, face-to-face and phone conversations, interviews, etc.).</i> • <i>Knowledge of an appropriate range of literary and non-literary texts (for example, short stories, poems, newspaper and magazine articles, web pages, instructions, letters, short reports, etc.).</i> • <i>Understanding of the main features of different styles and registers in spoken and written language (formal, informal, journalistic, colloquial, etc.).</i> • <i>Awareness of societal conventions and cultural aspects and the variability of language in different geographical, social and communication environments.</i> 	<ul style="list-style-type: none"> • <i>Ability to listen to and understand spoken messages in an appropriate range of communicative situations (topics that are familiar, of personal interest or pertinent to everyday life).</i> • <i>Ability to initiate, sustain and conclude conversations on topics that are familiar, of personal interest or pertinent to everyday life.</i> • <i>Ability to read and understand non-specialist written texts on a range of subjects or, in some cases, specialist texts in a familiar field and to write different types of text for various purposes in an appropriate range of situations.</i> • <i>Appropriate use of aids (for example, notes, diagrams, maps) to understand or produce written or spoken texts (for example, conversations, instructions, interviews, speeches).</i> • <i>Ability to initiate and sustain an appropriate range of autonomous language learning activities.</i> 	<ul style="list-style-type: none"> • <i>Sensitivity to <u>cultural differences</u> and resistance to stereotyping.</i> • <i>Interest in and curiosity about languages in general (including neighbouring, regional, minority or ancient languages, sign language, etc.) and to <u>intercultural communication</u>.</i>

¹⁵ Given the richness of the European languages learned as foreign languages and the variety of contexts in which these languages are used by individuals, the columns of knowledge, skills and attitudes aim to give the essential elements of communication competence in foreign languages. As regards the mastery of the languages, the reference levels are presented in the Common European Framework of References for Languages (CEF).

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
3.1. Mathematical literacy	<i>At the most basic level, mathematical literacy¹⁶ comprises the use of addition and subtraction, multiplication and division, percentages and ratios in mental and written computation for problem-solving purposes</i>	<i>Sound knowledge and understanding of numbers and measures and the ability to use them in a variety of everyday contexts is a foundation skill that comprises the basic computation methods and an understanding of elementary forms of mathematical presentation such as graphs, formulas and statistics.</i>	<p><i>Ability to apply the basic elements of mathematical literacy such as</i></p> <ul style="list-style-type: none"> • <i>addition and subtraction;</i> • <i>multiplication and division;</i> • <i>percentages and ratios;</i> • <i>weights and measures</i> <p><i>to approach and solve problems in everyday life, e.g.:</i></p> <ul style="list-style-type: none"> • <i>managing a household budget (equating income to expenditure, planning ahead, saving);</i> • <i>shopping (comparing prices, understanding weights and measures, value for money);</i> • <i>travel and leisure (relating distances to travel time; comparing currencies and prices).</i> 	<ul style="list-style-type: none"> • <i>Readiness to overcome the 'fear of numbers'.</i> • <i>Willingness to use numerical computation in order to solve problems in the course of day-to-day work and domestic life.</i>

¹⁶ Basic mathematical literacy (“numeracy”) is a foundation skill for all subsequent learning in other domains of key competences.

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
3.1. Mathematical literacy (continued)	As <i>mathematical competence</i> ¹⁷ develops further, it involves, as appropriate to the context, the ability and willingness to use mathematical modes of thought (logical and spatial thinking) and presentation (formulas, models, constructs, graphs/charts) which have universal application in explaining and describing reality.	<ul style="list-style-type: none"> • Sound knowledge of mathematical terms and concepts, including the most relevant theorems of geometry and algebra. • Knowledge and understanding of the kinds of questions that mathematics may offer an answer to. 	<ul style="list-style-type: none"> • Ability to follow and assess chains of arguments, put forward by others, and to uncover the basic ideas in a given line of argument (especially a proof), etc. • Being able to handle mathematical symbols and formulae, to decode and interpret mathematical language and to understand its relations to natural language. Ability to communicate in, with, and about mathematics. • Ability to think and reason mathematically (mastering mathematical modes of thought,: abstracting and generalising where relevant to the question and modelling mathematically (i.e. analysing and building models) by using and applying existing models to questions posed. • Being able to understand and utilise (decode, interpret and distinguish between) different sorts of representations of mathematical objects, phenomena and situations, choosing and switching between representations as and when appropriate. • Disposition towards critical thinking; ability to distinguish between different kinds of mathematical statements (between e.g. an assertion and an assumption, etc.); understanding of mathematical proofs and the scope and limitations of a given concept. • Ability to make use of aids and tools (including IT). 	<ul style="list-style-type: none"> • Respect for truth as the basis of mathematical thinking. • Willingness to look for reasons to support one's assertions. • Willingness to accept or reject the opinions of others on the basis of valid (or invalid) reasons or proofs.

¹⁷ Mathematics, although intrinsically linked to numeracy, is of higher complexity. “Mathematical behaviour” is about describing reality through constructs and processes which have universal application. It is best described as a combination of skills and attitudes. The definition emphasises the importance of “mathematical activity” and acknowledges the “links with reality” as a current emphasis in maths education.

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
3.2. Competence in science and technology	<p><i>Scientific competence is the ability and willingness to use the body of knowledge and the methodology employed in the field of science to explain the natural world. Competence in technology is viewed as the application of that knowledge in order to modify the natural environment in response to perceived human wants or needs.</i></p>	<ul style="list-style-type: none"> • <i>Knowledge of basic principles of the natural world, of technology and of technological products and processes.</i> • <i>Understanding of the relationship between technology and other fields: scientific progress (for example in medicine), society (values, moral questions), culture (for instance multimedia), or the environment (pollution, sustainable development).</i> 	<ul style="list-style-type: none"> ▪ <i>Ability to use and manipulate technological tools and machines as well as scientific data and insights to achieve a goal or reach a conclusion.</i> ▪ <i>Ability to recognise the essential features of scientific inquiry.</i> ▪ <i>Ability to communicate conclusions and the reasoning that led to them.</i> 	<ul style="list-style-type: none"> ▪ <i>Curiosity about and a critical appreciation of science and technology including safety or security issues as well as ethical questions.</i> ▪ <i>Positive yet critical attitude towards the use of factual information and awareness of the need for a logical process in drawing conclusions.</i> ▪ <i>Willingness to acquire scientific knowledge and interest in science and scientific or technological careers.</i>

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
4. Digital competence	<p><i>Digital competence involves the confident and critical use of Information Society Technologies (IST)¹⁸ for work, leisure and communication. These competences are related to logical and critical thinking, to high-level information management skills, and to well developed communication skills.</i></p> <p><i>At the most basic level, ICT skills comprise the use of multi-media technology to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in networks via the Internet</i></p>	<p><i>Sound understanding of the nature, role and opportunities of IST in everyday contexts comprises¹⁹:</i></p> <ul style="list-style-type: none"> • <i>Understanding the main computer applications, including word processing, spreadsheets, databases, information storage and management;</i> • <i>Awareness of the opportunities given by the use of Internet and communication via electronic media (e-mail, videoconferencing, other network tools); and the differences between the real and virtual world</i> • <i>Understanding the potential of IST to support creativity and innovation for personal fulfilment, social inclusion and employability;</i> • <i>Basic understanding of the reliability and validity of the information available (accessibility/acceptability) and awareness of the need to respect ethical principles in the interactive use of IST.</i> 	<p><i>As IST have many and growing applications in everyday life, such as learning and leisure activities, the required skills comprise:</i></p> <ul style="list-style-type: none"> • <i>Ability to search, collect and process (create, organise, distinguish relevant from irrelevant, subjective from objective, real from virtual) electronic information, data and concepts and to use them in a systematic way;</i> • <i>Ability to use appropriate aids (presentations, graphs, charts, maps) to produce, present or understand complex information;</i> • <i>Ability to access and search a website and to use internet-based services such as discussion fora and e-mail;</i> • <i>Ability to use IST to support critical thinking, creativity and innovation in different contexts at home, leisure and work.</i> 	<ul style="list-style-type: none"> • <i>Propensity to use IST to work autonomously and in teams; critical and reflective attitude in the assessment of available information.</i> • <i>Positive attitude and sensitivity to safe and <u>responsible use</u> of the Internet, including privacy issues and cultural differences.</i> • <i>Interest in using IST to <u>broaden horizons</u> by taking part in communities and networks for cultural, social and professional purposes.</i>

¹⁸ Information Society Technologies: offering services based on the use of Information and Communication technologies (ICT), the Internet, digital content, electronic media, etc. via for example a personal computer, a mobile telephone, an electronic banking machine, an eBook, digital television etc.

¹⁹ Advanced ICT skills are better defined as media competences that include the awareness and understanding of the technical and cultural aspects of media and are conducive to a creative and critical use of them.

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
5. Learning to learn	<p><i>'Learning-to-learn' comprises the disposition and ability to organise and regulate one's own learning, both individually and in groups. It includes the ability to manage one's time effectively, to solve problems, to acquire, process, evaluate and assimilate new knowledge, and to apply new knowledge and skills in a variety of contexts — at home, at work, in education and in training. In more general terms, learning-to-learn contributes strongly to managing one's own career path.</i></p>	<ul style="list-style-type: none"> • <i>Knowledge and understanding of one's preferred learning methods, the strengths and weaknesses of one's skills and qualifications.</i> • <i>Knowledge of available education and training opportunities and how different decisions during the course of education and training lead to different careers.</i> 	<ul style="list-style-type: none"> • <i>Effective self-management of learning and careers in general²⁰: ability to dedicate time to learning, autonomy, discipline, perseverance and information management in the learning process.</i> • <i>Ability to concentrate for extended as well as short periods of time.</i> • <i>Ability to reflect critically on the object and purpose of learning.</i> • <i>Ability to communicate as part of the learning process by using appropriate means (intonation, gesture, mimicry, etc.) to support oral communication as well as by understanding and producing various multimedia messages (written or spoken language, sound, music etc.).</i> 	<ul style="list-style-type: none"> • <i>A self-concept that supports a willingness to change and further develop competences as well as self-motivation and confidence in one's capability to succeed.</i> • <i>Positive appreciation of learning as a life-enriching activity and a sense of initiative to learn.</i> • <i>Adaptability and flexibility.</i>

20 Council Resolution 9286/04 of 18 May 2004 on Strengthening Policies, Systems and Practices in the field of Guidance calls for the promotion of learning techniques and autonomous learning in order to enable young people and adults to self-manage their learning and career paths effectively.

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
6.1. Interpersonal, intercultural and social competences	<i>Interpersonal competences cover all forms of behaviour that one must master as an individual in order to be able to participate in an efficient, constructive way and resolve conflict in social life, in interaction with other individuals (or groups) in personal, family and public contexts.</i>	<ul style="list-style-type: none"> • <i>Understanding of codes of conduct and manners generally accepted or promoted in different societies.</i> • <i>Awareness of concepts of individual, group, society and culture and the historical evolution of these concepts.</i> • <i>Knowledge of how to maintain good health, hygiene and nutrition for oneself and one's family.</i> • <i>Understanding of the intercultural dimension in European and other societies.</i> 	<ul style="list-style-type: none"> • <i>Ability to communicate constructively in different social situations (tolerating the views and behaviour of others; awareness of individual and collective responsibility).</i> • <i>Ability to create confidence and empathy in other individuals.</i> • <i>Ability to express one's frustration in a constructive way (control of aggression and violence or self-destructive patterns of behaviour).</i> • <i>Ability to maintain a degree of separation between the professional and personal spheres of life, and to resist the transfer of professional conflict into personal domains.</i> • <i>Awareness and understanding of national cultural identity in interaction with the cultural identity of Europe and the rest of the world; ability to see and understand the different viewpoints caused by diversity and contribute one's own views constructively.</i> • <i>Ability to negotiate.</i> 	<ul style="list-style-type: none"> • <i>Showing interest in and <u>respect</u> for others.</i> • <i>Willingness to overcome stereotypes and prejudices.</i> • <i>Disposition to <u>compromise</u>.</i> • <i><u>Integrity</u>.</i> • <i><u>Assertiveness</u>.</i>

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
6.2. Civic competences	<i>The scope of civic competences is broader than that of interpersonal competences by virtue of their existence at societal level. They can be described as the set of competences that allow the individual to achieve participation in civic life.</i>	<ul style="list-style-type: none"> • Knowledge of civil rights and the constitution of the host country, the scope of its government. • Understanding the roles and responsibilities of institutions relevant to the policy-making process at local, regional, national, European and international level (including the political and economic role of the EU). • Knowledge of key figures in local and national governments; political parties and their policies. • Understanding of concepts such as democracy, citizenship and the international declarations expressing them (including the Charter of Fundamental Rights of the European Union and the Treaties). • Knowledge of the main events, trends and agents of change in national, European and world history; the present situation of Europe and its neighbours. • Knowledge of emigration, immigration and minorities in Europe and in the world. 	<ul style="list-style-type: none"> • Participation in community /neighbourhood activities as well as in decision-making at national and European levels; voting in elections. • Ability to display solidarity by showing an interest in and helping to solve problems affecting the local or the wider community. • Ability to interface effectively with institutions in the public domain. • Ability to profit from the opportunities given by the EU. • Necessary skills in the language spoken in the country. 	<ul style="list-style-type: none"> • Sense of belonging to one's locality, country, the EU and Europe in general and (one's part of) the world. • Willingness to <u>participate</u> in democratic decision-making at all levels. • Disposition to volunteer and to participate in <u>civic activities</u>, support for social diversity and social cohesion. • Readiness to <u>respect the values and privacy</u> of others with a propensity to react against anti-social behaviour. • Acceptance of the concept of human rights and <u>equality</u> as a basis of solidarity and responsibility in the modern democratic societies of Europe; acceptance of equality between men and women. • Appreciation and understanding of differences between <u>value systems</u> of different religious or ethnic groups. • <u>Critical reception of information</u> from mass media.

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
7. Entrepreneurship	<p><i>Entrepreneurship has an active and a passive component: the propensity to bring about innovation oneself, but also the ability to welcome and support innovation brought about by external factors. Entrepreneurship includes welcoming change, taking responsibility for one's actions (positive or negative), setting objectives and meeting them and having the motivation to succeed.</i></p>	<ul style="list-style-type: none"> • <i>Knowledge of available opportunities in order to identify those suited to one's own personal, professional and/or business activities.</i> 	<ul style="list-style-type: none"> • <i>Skills for planning, organising, analysing, communicating, doing, de-briefing, evaluating and recording.</i> • <i>Skills for project development and implementation.</i> • <i>Ability to work co-operatively and flexibly as part of a team.</i> • <i>Being able to identify one's personal strengths and weaknesses.</i> • <i>Ability to act proactively and respond positively to changes.</i> • <i>Ability to assess and take risks as and when warranted.</i> 	<ul style="list-style-type: none"> • <i>Disposition to show initiative.</i> • <i>Positive attitude to change and innovation.</i> • <i>Willingness to identify areas where one can demonstrate the full range of enterprise skills — for example at home, at work and in the community.</i>

FRAMEWORK FOR KEY COMPETENCES IN A KNOWLEDGE-BASED SOCIETY

Domain	Definition of the competence	The competence consists of the following elements of knowledge, skills and attitudes as appropriate to the context:		
		Knowledge	Skills	Attitudes
8. Cultural expression	<i>Appreciation of the importance of the creative expression of ideas, experiences and emotions in a range of media, including music, corporal expression, literature and plastic arts²¹</i>	<ul style="list-style-type: none"> • <i>Basic knowledge of major cultural works, including popular culture, as an important testimony of human history,</i> • <i>Awareness of national and European cultural heritage and their place in the world;</i> • <i>Awareness of Europe's cultural and linguistic diversity;</i> • <i>Awareness of the evolution of popular taste and of the importance of aesthetic factors in daily life.</i> 	<ul style="list-style-type: none"> • <i>Capacity for artistic self- expression through a range of media consistent with the individual's innate capacities;</i> • <i>Ability to appreciate and enjoy works of art and performances based on a broad definition of culture;</i> • <i>Ability to relate one's own creative and expressive points of view and manifestations to those of others;</i> • <i>Ability to identify and realise economic opportunities in cultural activity.</i> 	<ul style="list-style-type: none"> • <i>An open attitude to diversity of cultural expression;</i> • <i>Willingness to cultivate an aesthetic capacity through artistic self-expression and continuing interest in cultural life;</i> • <i>A strong sense of identity combined with respect for diversity.</i>

²¹ The role of cultural and artistic expression is essential for all individuals, both for the learning process as means for acquisition of knowledge and skills, in particular in early learning, and as an enrichment of life in general. The initial education should, therefore, develop the potential which can be built on throughout life through formal, non-formal and informal learning.

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