A CONTEXT SPECIFIC QUALIFICATIONS
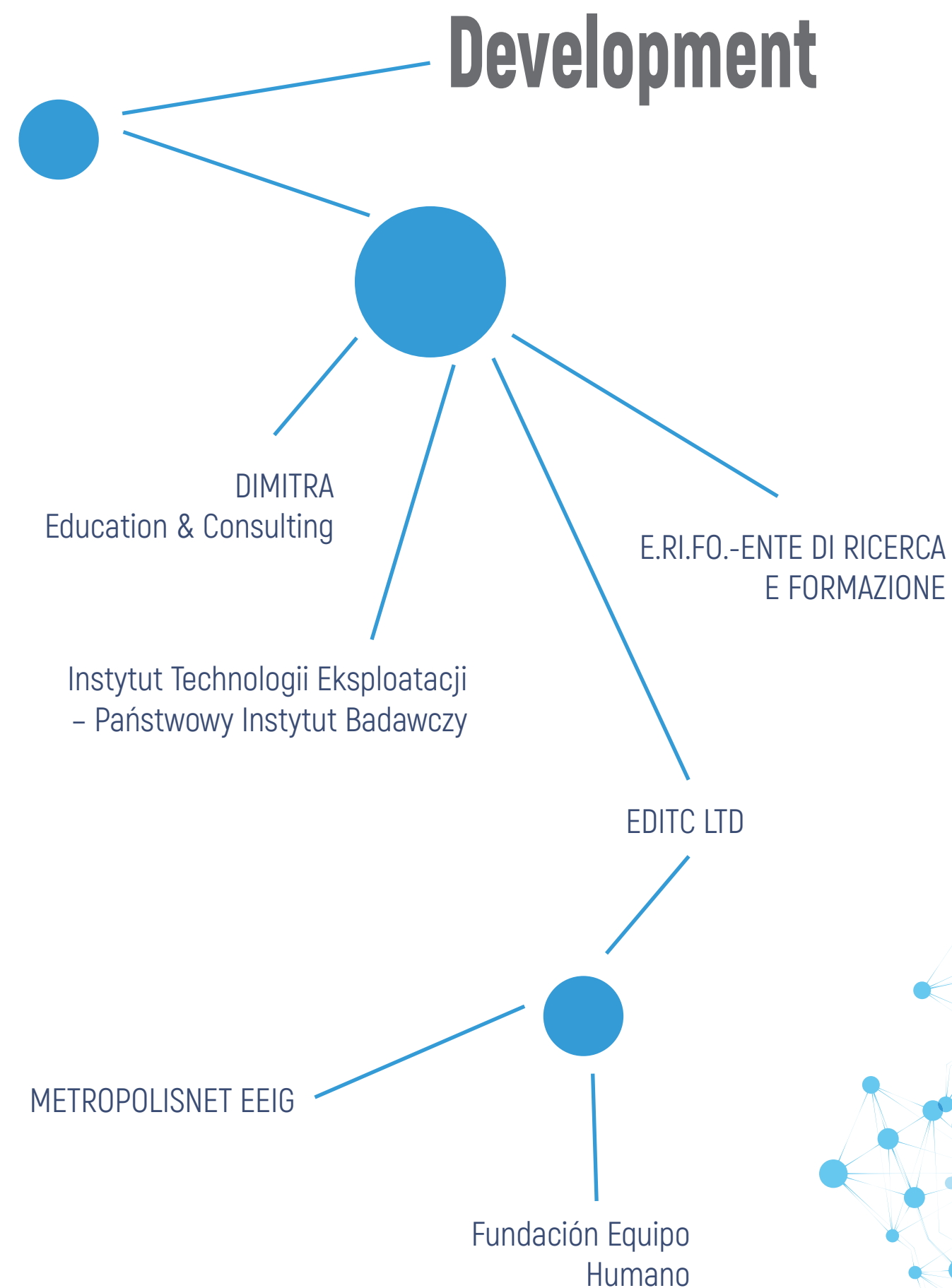# FRAMEWORK/PROFILE FOR THE NUMERACY COMPETENCE

linked to the Active Citizenship ladder

into digits

Co-funded by the
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A context Specific Qualifications Framework/Profile
for the Numeracy Competence linked to the Active Citizenship ladder

into
digits

Development

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Contents

1. Introduction

Low skilled adults are one of the groups that is strongly influenced since the beginning of the EU financial crisis. One of the problems that prevent the integration of low-skilled adults in labour market is their lack of proper training.

IntoDIGITS aims to fill the gap by suggesting integrated approaches and providing a mix of skills for numeracy and digital literacy therefore responding to the exact needs of the target group. IntoDIGITS suggests the empowerment of low skilled adults by developing 42 trainer's digital tools for the implementation of innovative workshops/activities that develop the numeracy and digital skills.

The project builds on the Active Citizenship ladder (scale). This scale suggests that an adult who is living in isolation (stage1) must progress through all stages in order to achieve AC. These stages are:

1. Isolation
2. Going Outside
3. Joining In
4. Voluntary Work
5. Working on Professional Qualifications
6. Active Citizenship

At this first stage, IntoDIGITS develops a Qualification Framework (QF) for the Numeracy Competence (KC3) tailored for the specific target group in a specific context. Specifically, the QF for KC3, identifies those Work Areas (WA) and Learning Outcomes (LOs) in order to enable low skilled adults gaining those Knowledge, Skills and Competences to effectively engage in the society and labour market.

This QF on KC3 will serve as a guide for trainers & organizations working with low skilled adults (within and outside he consortium) to identify the Knowledge, Skills, Competences needed in the Numeracy domain.

Introduction

1

2. Objectives that aims to fulfil

The Qualification Framework/ Profile (QF/P) is a guide, which aims to identify the Knowledge, skills and competences needed in the numeracy domain. Furthermore, it underlines the necessary knowledge, skills and competences that will help the low skilled adults to progress on the Active citizenship scale.

3. Target group (who is it for, who is the reader)

The Qualification Framework/ Profile (QF/P) serves as a guide, which is developed to be used by the trainers and youth organizations, training institutions and VET centers working with low skilled adults (within and outside the consortium).

2-3 Target and target group

4. Work Area and Learning Outcomes (LOs) for each of the 6 stages of the Active Citizenship (AC) Ladder

4.1 Work Area 1 – NUMBERS

Overall description:

This Work Area focuses on the ability to make calculations using sequences, fractions, decimals and percentages. All the Learning Outcomes are strictly related to problematic situations, also reflected in the last Unit of the Work Area. The Work Area Numbers provides the necessary instruments to approach a calculation and to follow a standardised procedure that can help the learner solving problems easier and rapidly.

The Work Area helps trainers with a set of concrete models that can be taught to give the learner fundamentals tools (such as multiplication tables) to elaborate different strategic mental calculations. The aim is to give learners a series of concepts that will help them develop a mathematical thinking. Trainees will thus be able to solve problems in all life situations using mathematical concepts and processes. The tools offered will give learners a broad base of knowledge and skills to further expand their mathematical competences.

4

Work Area and Learning Outcomes

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1. NUMBERS			
Competences			
Be able to describe the different numeral systems; make calculations using sequences, fractions, decimals and percentages; be able to solve problems using a standardised procedure.			
UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[1]	AC Ladder Stages:[2]
1.1 Integers – natural numbers	**Decimal numeral system**		
	List, read and write Arabic numerals: 0 1 2 3 4 5 6 7 8 9.	K	1
	Distinguish the digit of unity from tens, symbolic and verbal recording of a two-digit number.	S	1
	Distinguish the digit of unity from tens and hundreds, symbolic and verbal recording of a three-digit number.	S	1
	Distinguish the digit of unity from tens, hundreds and thousands, it records symbolic and verbal four-digit numbers.	S	1
	List, read and symbolic and verbal registration of any multi-digit number in the decimal positional system.	S	2
	Roman numeral system		
	Read and write numbers with use of symbols "I" and "V".	S	1
	Read and write numbers with use of symbols "I", "V", and "X".	S	1
	Read and write numbers with use of symbols "I", "V", "X", and "C".	S	1
	Read and write numbers with use of symbols "I", "V", "X", "C", and "L".	S	1
	Read and write numbers with use of symbols "I", "V", "X", "C", "L", "D", and "M".	S	2
1.2 Basic calculations on integers	**Addition and subtraction**		
	Addition of natural numbers within the range of 20 (so-called endings).	S	1
	Subtraction of natural numbers within the range of 20.	S	1
	Addition and subtraction within the scope of 100 full tens.	S	1
	Addition and subtraction within the scope of 100 without crossing the decimal threshold.	S	1

UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[1]	AC Ladder Stages:[2]
	Addition and subtraction of one-digit numbers to two-digit numbers with crossing of the decimal threshold.	S	1
	Long addition and subtraction of any numbers.	S	1
	Difference comparison (how much more, how much less; symbols < = >).	S	2
	Multiplication and division		
	Interpretation of multiplication as the addition of equal components.	S	1
	Multiplication of numbers within the range of 100 (multiplication table).	S	1
	Division of numbers within the range of 100.	S	1
	Divisibility of natural numbers (by 2, 5, 10).	S	1
	Long multiplication.	S	2
	Long division (with and without remainder).	S	2
	Ratio comparison (how much less, how much more).	S	2
1.3 Solving easy equations	Solve equations with addition or subtraction.	S	1
	Solve equations with multiplication or division.	S	1
	Solve simple equations with various operations.	S	1
	Use equations to solve simple text tasks.	S	1
1.4 More advanced calculations on integers	Define rules concerning the sequence of operations.	K	1
	Commutativity and associativity of addition and multiplication (operations with brackets).	K	1
	Distribution of multiplication towards addition (operations with brackets).	K	2
	Make complex operations.	S	2
	Calculate squares of natural numbers (e.g. area of the square, area of the rectangle).	S	2
	Make simple calculations related to the clock and calendar.	S	2
1.5 Negative numbers and basic calculations	Recognise concept of the negative number. Opposite numbers (thermometer, number line).	K	1
	Add negative numbers.	S	2
	Subtract negative numbers.	S	2
	Make multiplication and divide negative numbers.	S	2
	Operations on negative numbers.	S	2
1.6 Working with Ratio & Proportions	Understanding basic concept of ratios and proportions.	S	2
	Being able to describe shares/quantities.	S	1
	Recognise which share is bigger/smaller.	S	1
	Divide a whole figure in different shares.	S	1

[1]Please indicate with: **K** = Knowledge, **S** = Skills
[2]Please indicate with number 1 to 6 depending on the stage of the AC ladder stages: 1– **Living isolated**, 2– **Going Outside**, 3– **Joining in**, 4– **Unpaid work**, 5– **Working on qualifications**, 6– **Active Citizenship**.

UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[1]	AC Ladder Stages:[2]
1.7 The rule of three	Understanding Rule of three.	K	2
	Apply the rule of three in various situations.	S	2
1.8 Ordering Whole numbers	Being able to compare two numbers (Greater/smaller than, equal: <> =).	S	1
	Classify numbers.	S	1
	Recognise equal numbers.	S	1
	Able to sort numbers		
	Arrange natural numbers in increasing or decreasing order.	S	1
	Count forward from a given number.	S	1
	Count forward or backward.	S	1
	Skip counts (e.g. by twos).	S	1
	Count from a given number.	S	1
1.9 Sequences	**Odd and even numbers**		
	Define odd and even numbers.	K	2
	Distinguish between odd and even numbers.	S	2
	Prime numbers		
	Define a prime number.	K	2
	Recognise prime numbers.	K	2
	Factors:		
	Define a factor.	K	3
	Demonstrate that a number is a factor of another by splitting a number into its factors.	S	3
	List the factors of a number.	K	3
	Break a number down to its prime factor (Prime factorization).	S	3
	Find the greatest common factor of a set of number.	S	3
	Multiples:		
	Define a multiple.	K	3
	Generate a list of multiples (multiplication table).	S	3
	Find the least common multiple.	S	3
	Use prime factorization to find the least common multiple.	S	3
	Square		
	Remember square numbers sequence (from 1 to 12).	K	3
1.10 Rules of order in calculations	**Being able to recognise rules of order**		

	1. Parentheses
	  a. Evaluate the multiplication and division from left to right.
	  b. Evaluate the addition and subtraction from left to right.
		K	3

UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[1]	AC Ladder Stages:[2]
	Have the knowledge of the order of operations to solve expressions and equations: 2. Exponents (out of the parentheses).	K	5
	Have the knowledge of the order of operations to solve expressions and equations: 2a. Multiplication and division *(this could be in a different level of difficulty of the AC Scale since it is considered easier than the parentheses).*	K	5
	Have the knowledge of the order of operations to solve expressions and equations: 2b. Addition and subtraction *(This could be in a different level of difficulty of the AC Scale since it is considered easier than the parentheses).*	K	5
	Apply the order of operations when solving an expression or equation.	S	5
1.11 Fractions	**Have knowledge of what a fraction is and its elements (numerator/denominator)**		
	Define what a fraction is.	K	3
	Identify the numerator of a fraction.	S	3
	Identify the denominator of a fraction.	S	3
	Explain the features and the properties of the fractions.	K	3
	Determine the different meanings of fractions (sharing, division, ratio).	K	3
	Define proper fractions (<1).	K	3
	Recognise equivalent fractions.	S	3
	Transform one fraction in another equivalent.	S	3
	Have knowledge of the rules for adding and subtracting fractions		
	Have knowledge of the rules to solve additions and subtractions with fractions.	K	3
	Adding fractions with the same denominators.	S	3
	Summing fractions with different denominators.	S	3
	Subtracting fractions with the same denominators.	S	3
	Subtracting fractions with different denominators.	S	3
	Reduce a fraction to its minimum terms.	S	3
	Have knowledge of the multiplication and division rules of two fractions		
	Being able to multiply two fractions.	S	3
	Multiplies a natural number by a fraction.	S	3
	Being able to divide two fractions.	S	3
	Reduce a fraction to its simplest form (lowest terms).	S	3

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UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[1]	AC Ladder Stages:[2]
	Order and compare fractions		
	Order fractions with the same denominator.	S	3
	Order fractions where one denominator is a multiple of the other(s).	S	3
	Order fractions with the same numerators.	S	3
1.12 Decimals	**Understanding why the use of decimals is needed**		
	Explain the role of the decimal point.	K	3
	Have knowledge of the different meaning of decimals (share, ratio…).	K	3
	Have knowledge of the names of the numbers before and after the decimal		
	Recognise the place value of decimals (Decimal Point, Tenths, Hundredths, Thousandths).	K	3
	Read and write numbers written in decimal notation.	K	3
	Compose and decompose a decimal written in decimal notation.	K	3
	Able to recognise the decimals		
	Be able to add two or more decimals.	S	3
	Be able to subtract two or more decimals.	S	3
	Be able to multiply two decimals.	S	3
	Be able to divide two decimals.	S	3
	Approximates (e.g. estimates, rounds to a given value, truncates decimal places).	S	3
	Moving the decimal point.	S	3
	Order and compare decimal numbers		
	Locate decimals on a number line (between two consecutive natural numbers and between two decimals).	S	3
	Compare two decimals.	S	3
	Arranges decimals in increasing or decreasing order.	S	3
1.13 Percentages	**Being able to calculate percentages**		
	Calculate the percentage of a specific number.	S	3
	Add a percentage to a number.	S	3
	Subtract a percentage from a number.	S	3
1.14 Conversions Percentages/Fractions/ Decimals	**Being able to convert a fraction to a percentage (and vice versa)**		
	Express a fraction as a percentage.	S	3
	Express a percentage as a fraction.	S	3

UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[1]	AC Ladder Stages:[2]
	Being able to convert a decimal to a percentage (and vice versa)		
	Express a decimal as a percentage.	S	3
	Express a percentage as a decimal.	S	3
1.15 Solving Problems with Percentages, Decimals and Fractions	**Being able to compare percentages**		
	Compare two or more percentages (10% of 100 and 30% of 200)	S	4
1.16 Solving simple problems with numbers	Identify fractions related to everyday items (using objects or drawings)	S	3
	Represent a fraction in a variety of ways, based on a whole or a collection of objects	S	3
	Match a fraction to part of a whole (congruent or equivalent parts) or part of a group of objects, and vice versa	S	From 3 to 5
	Counting money	S	From 3 to 5
	Getting the change back	S	From 3 to 5
	Develop processes for mental computation	S	From 3 to 5
	Calculate a raise in salary	S	From 3 to 5
	Calculate the interest rates	S	From 3 to 5
	Calculate discounts	S	From 3 to 5
	Determine the operation(s) to perform in a given situation	S	From 3 to 5
	Translate a situation using a series of operations in accordance with the order of operations	S	From 3 to 5
	Identification and understanding of problems, hypothesis formulation and of solutions and their verification	S	From 3 to 5

4.2 Work Area 2 – MEASUREMENT & CONVERSIONS

Overall description:

Measurements & Conversions are topics with which we are only partially confronted in everyday life. The work area 2 provide the learner with a systematic approach to catch up missed learning opportunities and to transfer the learning into a secured knowledge.
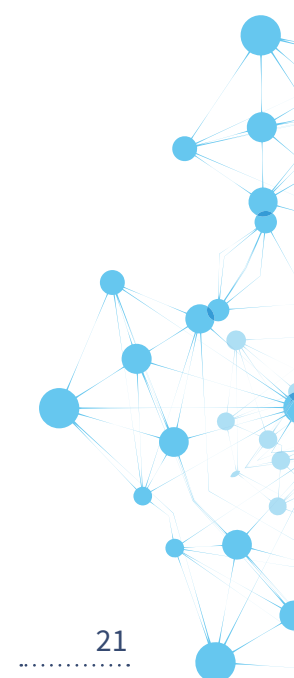
For conversion, a deeper understanding of the measurement is necessary. That is why the WA focuses in a first step on measurement as a basis. It starts with measuring lengths as lengths are most likely to be used in everyday life. In a next step other measuring ranges (masses and volumes) will be transferred. The second part of the work area focuses on the conversion of units. The WA provides the learner with the needed single steps to convert one unit into another.

2. MEASUREMENT & CONVERSIONS			
Competences			
Be able to describe the different forms of measurements; adopt a systematic approach to convert a unit into another; be able to transfer the learning into a secured and retrievable knowledge			
UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[3]	AC Ladder Stages:[4]
2.1 Metric units of Measurement	Understand and List metric units of length and distance (used in the local, national context), (km, m cm, mm & miles).	K	2
	Understand and List the metric units for area. (cm^2, m^2, km^2).	K	2
	Understand and List metric units for volume. (m^3, cm^3, mm^3, L, mL).	K	2
	Understand and List units of weight (used in the local, national context), (t, kg, g).	K	2
	Understand and List units of time (year, month, day) & (hr, m, s).	K	2
	Understand and List units for angle measurement (degrees).	K	2
2.2 Converting numbers from one unit to another	Convert between standard units of length.	S	3
	Convert between standard units of area.	S	3
	Convert between standard units of volume.	S	3
	Convert between standard units of weight.	S	3
	Convert between standard units of time.	S	3
2.3 Converting numbers from one system to another system	Apply the Rule of three for Conversions.	S	4
	Convert between kilometer and miles.	S	4
	Convert between kilograms and pounds.	S	4
	Convert between liter and gallons.	S	4
	Convert between different currencies.	S	4
	Convert from Celsius to Fahrenheit.	S	4
	Expressing time into decimal format.	S	4
2.4 Dates and times	Read dates in various formats (day/month/year) or (month/day/year)	K	2
	Write dates in various formats (day/month/year) or (month/day/year)	S	2
	Organize dates chronologically *e. g. 12/01/2018, 25/01/2018, 03/02/2018, etc.*	K	2
	Demonstrate date calculations (future and past) e.g. *"It is 20th December. So just 4 days until Christmas."* or *"Today is the 1st of May, so I had my birthday one month ago".*	S	2

UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[3]	AC Ladder Stages:[4]
	Demonstrate date calculations (future and past) e.g. *"It is 20th December. So just 4 days until Christmas."* or *"Today is the 1st of May, so I had my birthday one month ago".*	S	2
	Transform clock indications into everyday language e.g. eight fifteen, or fifteen past 8.	S	1
2.5 Solving simple problems with measurements and conversions	Adapt your conversion knowledge to other unknown converting systems, e.g. converting clothing size/shoe size in other size systems.	K	4,5,6
	Explain a watch with watch hand.	K	2,3,4
	Adapt a recipe which is calculated for 4 persons, to 3 (6) persons. (Plus and Minus).	S	3,4,5

[3]Please indicate with: **K** = Knowledge, **S** = Skills
[4]Please indicate with number 1 to 6 depending on the stage of the AC ladder stages: 1– **Living isolated**, 2– **Going Outside**, 3– **Joining in**, 4– **Unpaid work**, 5– **Working on qualifications**, 6– **Active Citizenship**.

4.3 Work Area 3 – SHAPES & SPACE

Overall description:

In everyday life, we are surrounded by space, and the shape of things/objects. The Work Area (WA) 3 - Shapes & Space, provide us with all the relevant information, necessary to be able to understand the areas related to space and the position, size and shape of things in it.

When we know how to apply and understand the relationship between shapes, sizes and shapes, we will be better prepared to use them in our everyday lives and to solve simple problems that might occur. WA "Shapes & space" provides us with the knowledge of how to deal with measurements and relationships of lines, angles, surfaces and shapes.

Last but not least, WA 3 will assist us to learn think logical. By thinking logically, many difficult problems can be solved and simple solutions can be found.

3. SHAPES & SPACE			
Competences			
Exploring Shapes and Space to solve everyday problems			
UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[5]	AC Ladder Stages:[6]
3.1 Basic Geometric Shapes	Identify the points, lines and angles.	K	2
	Illustrate by example parallel and perpendicular lines.	S	2
	Identify the basic 2D geometric shapes - *Square, Rectangle, Triangle, Circle, Rhombus.*	K	2
	Draw basic 2D geometric shapes.	S	2
	Describe the basic characteristics of each one of the basic shapes.	K	2
	Measure *angles, sites, diameter, radius.*	S	2
	Identify the 3D geometric shapes (Sphere, Cone, Cube, Cylinder, Prism, Pyramid).	K	2
	Draw the basic 3D geometric shapes.	S	2
	Solving a basic geometric problem in everyday settings.	S	2
3.2 Basic Geometric Calculations	Identify the appropriate formulas to calculate area, perimeter of 2D Shapes.	K	3
	Calculate the area, perimeter of 2D shapes by using the appropriate formulas.	S	3
	Identify the appropriate formulas to calculate area, perimeter and volume of 3D Shapes.	K	4
	Calculate the area, perimeter and volume of 3D shapes by using the appropriate formulas.	S	4
3.3 Common types of Shape Transformation	Identify a basic geometric problem (*e.g. share a cake into equal pieces*).	K	4
	Interpret a basic geometric problem (*e.g. share a cake into equal pieces*).	S	4
3.4 Space	Define the coordinates on an axis.	K	4
	Explain the coordinates in a space.	S	4
	Illustrate by example how to locate objects from one plane to another.	S	4
	Illustrate by example how to locate objects on an axis.	S	4
	Illustrate by example how to locate objects in a space.	S	4
	Identify the steps for calculating the distance between points.	K	4
	Measure distance between points.	S	4
3.5 Solving Simple Problems with Shapes and Space	Identify a basic geometric problem (*e.g. share a cake into equal pieces*).	K	4
	Interpret a basic geometric problem (*e.g. share a cake into equal pieces*).	S	4

4.4 Work Area 4 – HANDLING INFORMATION

Overall description:

The Work Area Handling Information focuses on the processes of data visualisation, interpretation and processing. In doing so, the learner will first learn how to organise and present the data using the most common graphs and how to extract data from already given graphs and interpret the information they provide.

The learner will also have a basic understanding of probability concepts. In this Work Area, probability is handled in a very practical way in order for the learner to have a basic knowledge of the basic calculations behind and a pragmatic and day to day approach.

The final part is dedicated to solving daily problems and issues related to the units of the Work Area, aimed at stimulating the learner capacity to put into practice the skills and knowledge acquired.

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4. HANDLING INFORMATION			
Competences			
Handling Information			
UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[7]	AC Ladder Stages:[8]
4.1 Visualizing Data	Identify the common types of charts: – Column/Bar graphs. – Pie charts. – Line graphs.	K	3
	Have knowledge of the main charts and graphs commonly used to visualize data.	K	3
	Interpret charts to draw conclusions: – Explain the information and data illustrated in a chart. – Analyze the data. – Deduce the core information.	S	4
	Create charts/graphs when appropriate: – Select the most relevant data. – Organize data. – Show data in a chart/graph. – Highlight the most relevant data.	S	4
4.2 Probabilities & interpretation	Have knowledge of the basic statistical concepts: – Probability: Reading probabilities, using fractions, decimals and percentages: a) Classify probabilities as fractions or decimals from 0 to 1, b) express into %, c) interpret outcomes which are 0 or 1. – Frequency. – Mean/average in a set of numbers. – Median in a list of numbers.	K	4
	Be able to calculate: – Probability: Reading probabilities, using fractions, decimals and percentages: a) Classify probabilities as fractions or decimals from 0 to 1, b) express into %, c) interpret outcomes which are 0 or 1. – Frequency. – Mean/average in a set of numbers. – Median in a list of numbers.	S	4
	Understanding Population and Sampling.	K	4
	Differentiate between quantitative and qualitative data http://www.analyzemath.com/statistics/introduction_statistics.html	K	4
	Interpret a given probability:		
	Probability.	S	4
	Frequency.	K	4

UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"[7]	AC Ladder Stages:[8]
	Mean/average in a set of numbers.	K	4
	Median in a list of numbers.	K	4
4.3 Data processing	Have knowledge of the basic six stages in data processing: – Data collection. – Storage of data. – Sorting of data. – Processing of data. – Data analysis. – Data presentation & conclusions.	K	5
	Utilize the data processing cycle: – Organize the collection of data. – Choose which method to use to process data. – Sort data out to start processing them. – Process data. – Draw conclusions after having processes selected data.	S	5
	Present data using graphs, tables or charts.	U	5
4.4 Solving Simple Problems with information handling	In simple situations, identify the events that are most likely to happen.	S	3
	Identify the certain, possible or probable elements when making choices.	S	4
	Discuss the criteria and motivations after taking decisions, highlighting facts, risks, opportunities.	S	4
	Being able to understand the probabilities using everyday examples (e.g. Tossing a coin, throwing dice etc.).	S	4
	Detecting meaningful data, analyzing it, interpreting it, developing reasoning about it, consciously using graphic representations and calculation tools.	S	4
	Describe and compare facts and events.	S	3
	Identify the existence of problems and the possibility of dealing with them and resolving them.	S	2
	Develop forecasts and hypotheses.	S	3
	Knowing the different probabilities behind real life situations.	S	3

[7]Please indicate with: K = Knowledge, S = Skills
[8]Please indicate with number 1 to 6 depending on the stage of the AC ladder stages:
1– Living isolated, 2– Going Outside, 3– Joining in, 4– Unpaid work, 5– Working on qualifications, 6– Active Citizenship.

4.5 Work Area 5 – REASONING & PROBLEM SOLVING

O verall description:

Everybody can benefit from having good problem solving skills as we all encounter problems on a daily basis; some of these problems are obviously more severe or complex than others. It would be important to have the ability to solve all problems efficiently and in a timely fashion without difficulty, unfortunately there is no one way in which all problems can be solved. There are however methods that can help us to define, analyse and structure a problem, use techniques to find possible solutions, and implement the best possible solution and at the same time taking responsibility for the chosen solution.

Having high reasoning and critical thinking skills can help in work, school, and interpersonal relationships. There are a variety of ways to change reasoning skills for the better. Although a lot of people have the ability to perform critical thinking, surveys suggest that reasoning and critical thinking can be explicitly taught. Great critical thinkers have the ability to analyze analogies, create categories and classify, test hypotheses and more. The Critical Thinking and Reasoning Unit aims to deliver the knowledge and skills that will encourage the learners to reason by using simple proven techniques that can help to reach logical and rational decisions.

5. REASONING & PROBLEM SOLVING			
Competences			
Adopt proven techniques for problem solving and reasoning. Be able to tackle everyday problems and perform decision making autonomously with confidence, taking the responsibility of the solutions adopted or decisions made.			
UNIT	Learning Outcomes (LOs) in terms of Knowledge, Skills and Competences	"K" or "S"⁹	AC Ladder Stages:¹⁰
5.1 Problem Solving	Provide a definition to a problem.	K	5
	Describe goals and barriers in problem solving.	K	5
	List the steps in problem solving.	S	5
	Describe the steps in problem solving.	K	5
	Apply the steps in problem solving.	K	5
	Identify the problem, goals and barriers.	S	5
	Have knowledge of the methods to Structure the Problem.	K	5
	Enlist possible visual ways to present a problem (i.e. Chain diagrams, Flow charts, Tree diagrams).	K	5
	Structure the Problem.	S	5
	Use the possible visual ways to present a problem (i.e. Chain diagrams, Flow charts, Tree diagrams).	K	5
	Outline methods to search for possible solutions such as brainstorming, divergent and convergent thinking, questioning assumptions.	K	5
	Apply these methods (brainstorming, divergent and convergent thinking, questioning assumptions) to generate possible solutions.	S	5
	Make rational decision based on risk assessment and evaluation of pros and cons.	S	5
	Take responsibility.	S	5
	Apply the steps for Implementing the decisions.	S	5
	Monitoring/Seeking Feedback for improving the problem solving techniques.	S	5
5.2 Critical Thinking & Reasoning	Identify analogies.	K	5
	Analyze analogies.	S	5
	Create categories and classify items appropriately.	S	5
	Identify relevant information.	S	5
	Recognize valid deductive arguments, test hypotheses and recognize common reasoning fallacies.	K	5
	Construct valid deductive arguments, test hypotheses and recognize common reasoning fallacies.	S	5
	Distinguish between evidence and interpretations of evidence.	S	5