Key-Co System

Co-funded by the
Erasmus+ Programme
of the European Union

GUIDELINES FOR TEACHERS

K.C.3 Math, Nature, Technology

VHS im Lkrs. Cham

TITLE OF THE UNIT	**Getting fit with math**[1]
INTERCULTURALITY ELEMENTS OF THE UNIT	**Realising fitness norms within the target country**
TARGET GROUP	**ADULT MIGRANT LEARNERS with low mathematic skills**
LEVEL	**A2 learners**
TEACHER/S	**Language teachers, teachers teaching basic skills, working in literacy courses**
TIME	9 hours (405 minutes) – 3 lessons including some at home and outside activities so the time is relative. Teachers who have a limited amount of time can shorten the brainstorming sessions and other teachers who have don't have time constraints can make longer use of the materials.
KEY COMPETENCES INVOLVED	**Mathematical competence and competence in science, technology and engineering**
PRE-REQUISITES	*Basic literacy skills* *Basic numeracy skills* *Basic ability to use internet and PC*

[1] The materials are developed on the basis of previous project Golden Goal Plus LdV Transfer of Innovation coordinated by the VHS im Lkrs Cham.

	Being able to do basic physical activities (Jogging, throwing etc.)		
LEARNING OBJECTIVES	**KNOWLEDGE**	**SKILLS**	**COMPETENCES**
	– Knowledge of numbers, measures and structures, basic operations and basic mathematical presentations, understanding of mathematical terms and concept – Awareness of the questions to which mathematics can offer answers – Knowledge of the basic principles of the natural world, fundamental scientific concepts, theories, principles and methods, technology and tehnological products and processes – Understanding of the impact of science, technology, engineering and human activity in general on the natural world – Interpreting information – Read and understand tables, charts, diagrams and line graphs; – Numbers used in different ways: for example, large numbers in figures or words), simple fractions, decimals, percentages; write down spoken numbers, e.g. “one thousand and fifty”, or “three fifths”; recognise decimal	– Apply basic mathematical principles and processes in everyday contexts at home and work (e.g. financial skills). – Follow and assess chains of arguments; reason mathematically, understand mathematical proof and communicate in mathermatical language – Use appropriate aids including statistical data and graphs; understand the mathematical aspects of digitalisation – Critical appreciation and curiosity, concern for ethical issues and support for both safety and environmental sustainability – Handle technological tools, machines and scientific data to achieve a goal or to reach an evidence based decision or conclusion. Recognize the essential features of scientific inquiry and have the ability to communicate the conclusions and reasoning that led to them. – Show clearly methods of carrying out calculations and give the level of accuracy of their results	– Carrying out calculations – Add, subtract, multiply and divide with whole numbers and simple decimals (e.g., to two decimal places) – Find simple fractions and percentages (e.g., 2/3 of €15 is €10, 75% of 400 is 300) – Use straightforward scales on diagrams (e.g., 10mm to 1m) – Use ratios and proportion (e.g., three parts to one part) – Find the average (mean) of up to 10 items e.g., temperatures, scores, time) – Check calculations using different methods (e.g., estimate to reject impossible answers, check a subtraction by “adding back”) – Carry out calculations involving two or more steps, with numbers of any size – Convert between fractions, decimals and percentages – Use proportion and calculate using ratios where appropriate; – Compare sets of data with a minimum of 20 items (e.g., using

	fractions and know that one third is a bit more than 30% or 0.3; – Understand negative numbers used in practical contexts, such as appreciating that –2.3° is less than -2° when measuring temperature – read and understand measurements in everyday units (e.g., minutes, millimetres, litres, grams, degrees) by reading scales on familiar measuring equipment (e.g., stop watch, tape measure, measuring cup, weighing scales, thermometer) – Make accurate observations – Identify suitable calculations to get the results they need for their task. (e.g., "I must multiply these numbers" or "I must divide by 100") – understanding some aspects of physics	– Check methods in ways that pick up faults and make sure results make sense – Present the main results of their findings and calculations, rather than give a narrative account of everything they did, and be able to explain how their results relate to the original purpose of the activity. – Able to explain some aspects of physics on examples of some sport activities	percentages, using mean, median, mode) – Use range to describe the spread within sets of data – Understand and use given formulae (e.g., for calculating volumes, areas such as circles, insurance premiums, V=IR for electricity) – Ability to create a personal fitness and nutrition program
LEARNING ENVIRONMENT	The field of sports and physical movement serves to create impulses for a motivation to learn since this area of life has not usually been experienced negatively. Furthermore, it provides a multifaceted field for basic social skills education such as team building, conflict management, strategy development, complying with rules etc. Sporting activities also provide an opportunity for relaxation and recreation. The integration of appropriate content into basic skills courses therefore encourages their motivation to improve their ability to use mathematics at a level necessary to understand and function in these fields. of interest.		
METHODOLOGIES	Outdoor activities		

	Problem solving Group work Exercises related to the daily activities	
DIDACTIC TOOLS	Didactic materials and digital resources supporting the planned activities. Description of exercises Access to the internet if possible, PC Tools for 2nd lesson: if possible javelin, Frisbee, boomerang etc	
	TIME	**ACTIVITY PLAN LESSON 1 (130 minutes)**
SITUATION ANALYSIS	20 min	Introduction - Physical activity plays a significant role in achieving and maintaining good health. What you eat and drink (energy in) is an important factor in determining the amount, type and frequency of physical activity required to get or stay well. Being more active can have many health benefits and make you feel better. Finding and creating opportunities to move more and to sit less every day - at home, at work, when travelling or for recreation - can have many benefits. Exercise 1 look at the pictures of different activities. (Online version: Sort the activities – are they activities of leisure or physical activities). As a class which of the exercises are more for leisure and which may be considered physical activities. Divide the class in half. Ask one half of the students to work with a partner and try to brainstorm different physical activities from their home country. The other half then create a list for the host country. As a class create a list in front of the classroom and they should see which activities are more common in host country or in the home country. Students should be encouraged to expand on the list if they feel some kind of common activity from their home country hasn't been included in the list.
MOTIVATIONAL PHASE/STEP	30 min	Many of us could be more active in our daily lives, even without devoting extra time to planned physical activity. Exercise 2) The teacher can presents country specific information and/or recommendations from the World Health Organisation as true and false questions and ask the students to take a few minutes to answer the true or false questions. Now ask the students – how often are they active per day / per week? They may write this down on a piece of paper.

		The teacher should then collect the pieces of paper and tally the results on the board. As a group they should figure out which percentage of learners is more active than the average European. According to EUROSTAT less then 1/5 of Europeans get the recommended physical activity per week (2 ½ Hours total). Partners should use data for their country if appropriate - Germans or less active.	
ACTIVITIES FOSTERING SKILLS DEVELOPMENT	65	**Step 1 Introductory phase** **20 minutes**	Next the learners should work in groups and prepare a mind map on reasons why people are not as active as they could be. For example, do they work long hours, are the weather conditions not good, do they have small children at home, do they have pre-existing medical conditions etc…? The teacher should collect the ideas on the board. Exercise 3After collecting an array of problems, each group should come up with three solutions for each of the problems. Think about various possibilities to move more and to sit less every day – at home, at work, when travelling or for recreation.
		Step 2 Intermediate phase **30 minutes**	Exercise has a positive affect on all systems of the body. Look at Exercise 4 and ask the learners to match the names of systems of body with the description. After the learners are familiar with the various systems of the body. Read the text on the affects exercise has on the various systems Exercise 5. Following the exercise discuss as a class if any of the information is new to them or is something they already knew. Do they have a similar mindset in their home country? How is exercised viewed there?
		Step 3 conclusive phase **15 minutes**	The final activity Working in pairs interview, following questions can be used: • What are your favorite sports? • Which kinds of sports do you take part in? • When did you start? • What kind of sports were common for your home country or while you were growing up? • What is the sports success you are most proud of? • Can you tell me a bit about your experience of...?

			• What do you think about…? • Do you like… ?
META-COGNITIVE PHASE	15	The teacher should start a discussion with the learners on the different ways people may hold themselves accountable when exercising. This may be using an App on a mobilie device, a notebook or maybe a workout partner.	
AUTHENTIC TASK	30	Ask students to think about their exercise levels is there something they could do to do more exercise. Have each student create their own exercise plan for a week. What activities will they do each day, how long, where etc. For inspiration they can use the form in Exercise 6	
TIPS & SUGGESTIONS		Depending on how the teacher may want to implement the activities the length specific activities can be adapted to the teacher's needs / course planning.	
	TIME	**ACTIVITY PLAN LESSON 2 (125 mins)**	
SITUATION ANALYSIS	10	The Teacher introduces and sequences theory and practice components about the pulse and heart rate, to help students learn the techniques and knowledge and see the relevance of what they are learning through practical experience. The teacher should begin by talking about how pulse differs depending on what we do and don't do. She may want to startle the students or see if she could excite them in order to increase their pulse. Ask the students how do they feel before a big exam? Or what is there heart doing when they are relaxing in a sauna? The heart is the most important muscle in the human body. This is why "the heart" is very often used in various phrases and proverbs. Look at Exercise 7 and match the proverbs with the meaning. What proverbs do the learners know? What do the following phrases mean, such as taking something to heart or having the heart in the right place? Are there such phrases in other languages? Compare them. Do the Exercise 8 and learn about the heart.	

		*Note - This lesson should be introduced to the learners a couple days or even better a week before	
MOTIVATIONAL PHASE/STEP	10	The teacher should tell the learners now imagine you are standing on the rooftop of the highest building in world located in Dubai Burj Khalifa and looking over the edge. The teacher may like to ask the students what are some of the highest landmarks in their home countries? Can people visit them and look over the edge? Or walk out onto a glass platform like at the Grand Canyon in the USA? What do you think your body is doing? Teachers should start with this brainstorming session and list the reactions on the board. This should lead the learners to idea of the heart rate. The rate is probably must higher than that when we are sitting in the classroom or going to bed at night.	
ACTIVITIES FOSTERING SKILLS DEVELOPMENT	65	**Step 1 Introductory phase** **20 minutes**	Exercise 9 – answer questions about the pulse and heart rate The teacher should discuss the article with the learners and see if they have any additional information to add about checking their pulse. The teacher should then ask the students to check for their pulse as instructed in the article. Then they should check each others. To save on time, have the students try and count the beats for twenty seconds and then multiply by three. This will also give them an average beats per minute. Does everyones heart beat fall into 70 to 100 beats per minute? The final task to give the students: Before you get up in the morning, while you are still lying in bed, count your pulse for 60 seconds. Using the template for Exercise 9 Record the pulse rate and the date. Record also your pulse rate in the evening before you go to bed. Try to do this every day for x weeks. Record the information on the chart (template for the learners).
		Step 2 Intermediate phase **30 minutes**	The second part of this activity should be revisited after x days / weeks. First part: Exercise 9) Using the information that is provided in the example chart, calculate the average morning and evening pulse rates for the days. Check the answer that you get is correct by first estimating your answers.

			– Is there any difference between the average pulse rates for the morning and the evening? Extra: Draw a bar chart to show the results. – What does your bar chart show? – Is the pulse rate always the same in the morning and in the evening? – Are there any factors that would affect pulse rate? – Try to interpret your results and draw some conclusions about the data that you have presented.
		Step 3 conclusive phase **15 minutes**	Now learners should think about how our heart beat affects our health. Our pulse tells us if we are in shape and also tell us how much activity we should be taking on and the ideal heart rate for when we work out. If we want to be fitter and increase our endurance then we must increase our pulse rate, but it shouldn't get too high. There are various heart rate training zones and formula that one can use to work out the value of a particular heartbeat zone for any individual. Complete Exercise 10 and match the names to the training zones. A MHR (Maximum heart rate) is calculated using the formula: 220 – your age = MHR. Determining a resting heart rate (RHR) is very easy. Find somewhere nice and quiet, lie down and relax. Position a watch or clock where the second hand can be seen. After 20 minutes, do not sit up and determine the pulse rate (beats/min). This is the RHR. If someone has a heart rate monitor, then put it on before they lie down. After the 20 minutes, they should check the recordings and identify the lowest value achieved. This will be the RHR. The learners shall calculate their MHR and RHR.
META-COGNITIVE PHASE	20	For the next exercise the students should calculate their MHR and based on their morning heart rate value and they should estimate their RHR.	

		Now they should calculate their Training zone values in Exercise 11 and in Exercise 12 they should look at their data and find their optimum heart rate.	
AUTHENTIC TASK	20	Finally, explain how the calculations work to a friend who is new to this area. For the calculations of the recorded heart rate for each of the training zones and draw a simple, colourful and 'easy-to-understand' diagram to show the mid point values for each zone. Finally the students should think about what will happen to their values in 10, 20 or even 30 year. Why do they think these changes will occur. They should think about different ways people workout – which activities are more likely to increase the heart rate, i.e. yoga, football, golf, skiing, swimming and so on.	
TIPS & SUGGESTIONS		This is an activity which should be done over a longer period of time or learners should be given the task a couple weeks prior to this lesson in order to bring their date with them.	
	TIME	**ACTIVITY PLAN LESSON 3 (140 mins)**	
SITUATION ANALYSIS	20	The students are going to brainstorm different sports and the equipment need to play those sports. These items will be addressed in the main part and discussed on how they travel and how physics plays are a part.	
MOTIVATIONAL PHASE/STEP	15	Looking at the mind map. Which sports are common to their home country and which sports are common to host country. Once the students have listed several sports (and the teacher has initiated or prompted the sports listed in the main exercise) the group should start to think about what kind of equipment do you need, e.g. a ball, discus, Frisbee etc.	
ACTIVITIES FOSTERING SKILLS DEVELOPMENT	60	**Step 1 Introductory phase**	Although the students probably came up with array of equipment, the teacher should draw their focus here to the items affected most by aerodynamics – the ball, discus, Frisbee etc. Ask the students if anyone knows anything about aerodynamics – how air moves around a solid object, i.e. the discus or Frisbee. If so they should share what they know before moving to Exercise 13. In this exercise the learners should read a short text about aerodynamics and try to fill in the missing words from the word bank.

		Step 2 Intermediate phase	Take a closer look at the four forces. The teaceher should provide the students with the short text about each of the forces. They should then fill in the blanks surrounding the airplane in Exercise 14.
		Step 3 conclusive phase	In the previous exercises and texts weight has been mentioned. Although there is a correlation between weight and mass they are two very different things. Read the text about the differences between weight and mass and have the students answer the questions Exercise 15. The teacher should prepare a bucket or fish tank with water. The teacher should bring with several objects or ask the students to see what kind of items they have with them which may be submerged in the water Then one by one the students should try to submerge the different objects, but before placing the objects in the water they should try to guess if the objects will sink or swim. After trying out the different objects the students should complete the final exercise to find out why some objects sink and others float. Exercise 16
META-COGNITIVE PHASE	15	This additional task is most appropriate for advanced learners to work on their own or the teacher may decide to select one or two of these story problems to work on as a class. The students can now work in pairs. They should look at the Exercise 17 and try to answer the multiple choice questions together. The story problems talk about how physics affect different objects.	
AUTHENTIC TASK	30	Teacher together with learners can select some of the sport activities and carry out some competition, during the activity the learners can try e.g. techniques of throwing (base, frisbee or discus) and then measuring the distance. This can also be done outside of classroom learning time. For example, the class could take a trip to a mini-golf course and play a couple rounds while measuring their shots.	
TIPS & SUGGESTIONS		Depending on how the teacher may want to implement the activities the length specific activities can be adapted to the teacher's needs / course planning.	

TITLE OF THE UNIT	**Basic Arithmetic Operations of Whole Numbers**
INTERCULTURALITY ELEMENTS OF THE UNIT	**Realising local prices and eventually taxes when budgeting a meal** **Realising a household plan** **Converting measurements or temperatures according to the target country's norms**
TARGET GROUP	**ADULT MIGRANT LEARNERS**
LEVEL	**A2 level learners**
TEACHER/S	**Teaching basic skills, Language instructor working in literacy courses for migrant learners.**
TIME	Ca. 9 Hours (405 Minutes) – 3 Lessons *Each hour is about 45 minutes. This is an estimated time. The teachers may choose to spend less or more time on specific activities.
KEY COMPETENCES INVOLVED	**MATHEMATICAL COMPETENCE AND BASIC COMPETENCES IN SCIENCE AND TECHNOLOGY** LEARNING TO LEARN COMMUNICATION IN FOREIGN LANGUAGE CULTURAL AWARENESS AND EXPRESSION SENSE OF INITIATIVE AND ENTREPREUNERSHIP
PRE-REQUISITES	*Basic literacy skills* *Basic numeracy skills*

	Knowledge of vocabulary related to food *Knowledge of vocabulary related to cooking methods*		
LEARNING OBJECTIVES	**KNOWLEDGE**	**SKILLS**	**COMPETENCES**
	– Knowledge of numbers, measures and structures, basic operations and basic mathematical presentations, understanding of mathematical terms and concept – Awareness of the questions to which mathematics can offer answers – Knowledge of the basic principles of the natural world, fundamental scientific concepts, theories, principles and methods, technology and tehnological products and processes – Know the vocabulary related to food items – Know the vocabulary related to cooking and baking – Know basic arithmetic operations – Know to compare and bring in relation costs - recipes	– Use logical and rational thought to verify a hypothesis; readiness to discard one's own convictions when they contradict new experimental findings; – Understanding of science as a process for investigation through specific methodologies; – Apply basic mathematical principles and processes in everyday contexts at home and work (e.g. financial skills). – Respect for truth, willingness to look for reasons and assess their validity – Bead and understand recipes – Be able to calculate the budget for ingredients needed for a recipe – Be able to add, subtract, multiply and divide when cooking / using money – Be able to apply math when doubling, tripling etc. the recipes – Be able to multiply the recipe measurements – Calculate the total price of a product cooked/baked – Be able to apply this activity to other everyday situations	– Be aware of cultural aspects when cooking / using money – Be aware of creativity required in case expensive products could be replaced by cheaper ones; – Be aware at the same time of limits of creativity when baking/cooking – Estimate the costs of a certain dish when comparing the recipes – Respect the contributions and opinions of the others – Understand the importance of calculating for daily life – Understand how math affects the quality of culinary – Learn how to incorporate simple math concepts into everyday routines – Gain autonomy and confidence for themselves in matters of improving their daily lives and survival

		– Be able to complete math worksheet – Be able to work in groups – Develop fluency in adding, subtracting, multiplying and dividing	
LEARNING ENVIRONMENT	– Traditional classroom – Learner-centered environment – Real learning-environment (e.g. kitchen) – Learning connected with real-world situations necessary for daily life		
METHODOLOGIES	Problem solving Cooperative learning Peer tutoring Real-world connections Group and pair work Learning by doing		
DIDACTIC TOOLS	PC, projector, IWB, visualizer, worksheets, pictures, if possible kitchen, food items, utensils, mearurement cups		
	TIME	**ACTIVITY PLAN LESSON 1**	
SITUATION ANALYSIS	5	At the beginning the teacher asks learners how they pay for items when they go to the store? What are the most common methods of payment? How do they prefer to pay? How did the learners pay for items at the stores in their host country? What similarities and differences does the host and home country have?	
MOTIVATIONAL PHASE/STEP	15	How many learners like to pay with cash? Do they encounter any difficulties? Do they have troubles adding up the change and bills they have in their wallet? Do they have problems understanding the amounts?	

		Are the numbers pronounced differently than in their mother tongue - for example when comparing German to Spanish. In German language you say four and twenty (24) whereas in Spanish you would say twenty and four.	
ACTIVITIES FOSTERING SKILLS DEVELOPMENT	50	**Step 1 Introductory phase**	Think about what are the different types of coins and bills most commonly found in the target country. Look at Exercise 1 – match the amounts to the coins and bills. Teachers can do this as a classroom activity by printing out the bills and coins and handout random pieces of Exercise 2 - Look at the following numbers how would you say them? Write out the number as it is spoken. *Note: This is country specific in some cases it may be better to ask the learners to look at shapes of coins and bills and ask them to guess the amount on each.*
		Step 2 Intermediate phase	The learners should now test their skills and look at Exercise 3 - which includes an array of coins. They should add or subtract the amounts of the coins. If the learners are more advance they may be asked to perform more difficult equations such as multiplication or division. *Note: If time allows you can have students play around with the paper money and coins and have them solve their own problems.*
		Step 3 conclusive phase	The learners should now read several mathematical stories and decide which is the correct answer – here the learners have the option of multiple choice. Exercise 4
META-COGNITIVE PHASE	15	Discuss shortly with the class other options of payments that are common in the target country. For which scenarios would you most likely pay cash, complete a bank transfer, pay with credit card or use an online form of payment like PayPal or Apple Pay?	

		What are common forms of payment in their home country?	
AUTHENTIC TASK	20	Discuss with the class exchange rates. When do they need to consider exchange rates? Do they send money to their family? Do they need to pay invoices in a different currency? How do they convert money? Do they use a computer? Calculator? Do they do the math in their head? The teacher should use the exchange rate for the Britisch Pound and Euro to do a couple exchange rates. Once the learners understand how to use an exchange rate, they should try out Exercise 5 on their own.	
TIPS & SUGGESTIONS			
	TIME	**ACTIVITY PLAN LESSON 2**	
SITUATION ANALYSIS	5	At the beginning of the lesson the teacher asks who likes baking and maybe who would like to work in the catering/restaurant sector/ bakery. Next, the teacher asks if the learners know some traditional desserts. The teacher should write these desserts on the board.	
MOTIVATIONAL PHASE/STEP	10	A famous cake originally from Munich, the capital of Bavaria is “Prinzregententorte” - the Bavarian Layered Chocolate Cake – is a very traditional cake with some history. The cake consists of eight thin layers made out of a biscuit and chocolate butter crème all surrounded by a chocolate glaze.[2] The teacher tells the history of the cake and the name “Prinzregententorte’’ or the students should read Exercise 6 and fill out the questions.	
	90	**Step 1 Introductory phase**	The teacher distributes the worksheet with the recipe for “Prinzregententorte” - the Bavarian Layered Chocolate Cake. The learners read the recipe.

[2] http://www.mybestgermanrecipes.com/prinzregententorte-bavarian-layered-chocolate-cake/

ACTIVITIES FOSTERING SKILLS DEVELOPMENT			Exercise 7 - The should take the recipe and sort the numbers which they see into the chart. Are they referencing – liquid amounts, solid amounts, temperatures or other. The teacher points out the common units used to measure in this context: 1t = 1000 kg 1kg = 1000 g 1 g = 1000 mg 1 l = 1000 ml 1 Pfund = ½ kg = 500 g (often used in Germany) 1 h = 60 min 1 min = 60 sec Now the learners should complete Exercise 8 - either alone or together usinig a whiteboard. The learners should try to calculate the measurements using the common units list from above. In addition to converting measurements some learners may also need to convert temperatures when baking their favorite pastry or even talking about the temperature outside. What kinds of measurements do they use in the home country? Kelvin? Celsius? Fahrenheit? The teacher should go through the steps on how to convert Fahrenheit – Celsius – Kelvin. https://www.wikihow.com/Convert-Between-Fahrenheit,-Celsius,-and-Kelvin To check for understanding ask the learners to complete a few conversions in Exercise 9.

			Note: Teachers should make a decision if the learners should be also converting to Kelvin or Rankine. It may be enough for the target group to just convert between Fahrenheit and Celsius.
		Step 2 Intermediate phase	The teacher introduces the activity: *Your school will have the annual "Meet and greet" event for future students next week. Your group will run the café and sell some food and beverages. Now you are planning the event and how to finance it. There will be no funding so the revenues from selling food and beverages have to cover the costs. The event usually attracts approximately 120 people.* Work in pairs and think up a response to the following questions: – How many cakes will you prepare for 120 people? – How much time will be required to prepare this number of cakes? – Who will do what? What facilities are available? <u>Next:</u> Prepare a shopping list for buying the ingredients that are required for the specific number of cakes you have decided for in the initial brainstorming session. Check also for the quantities that are available in grocery (e.g. you find out that 1,2 kg of flour will be required / flour is sold only in packages / 1 package of flour = 1 kg / that would mean that you will have to buy 2 packages = 2 units). *Optional: The learners will check for the quantities that are available in grocery, if required research on the internet. Additionally, the learners explain which arithmetic operations were applied, how they got the results*. Check the prices for the ingredients required and calculate the budget required. Use the worksheet prepared - write the results in the table. Check the prices if needed on the internet.

			Work individually– compare the results in the group and explain which arithmetic operations were applied.
		Step 3 conclusive phase	What will be the sales price for one piece of the cake? We assume that the cake will be cut in 12 equal pieces. (*The teacher can explain how to cut the cake according to the clock*) The learners will write give an answer to following questions: – How many pieces do you cut per cake? – Do you take some pieces for yourself? – Will the whole cake be sold, what about the rest? – Do you want/have to earn some money for your class? – Do you have other costs to pay except from the ingredients (e.g. for the room, for the kitchen, for electricity, etc.) Compare the results in the group and explain which arithmetic operations were applied.
META-COGNITIVE PHASE	15	If the lesson takes place in a classic classroom, the teacher asks whether such kind of activity would be interesting to do in a real kitchen. How could that be done? For which event would be appropriate? The learners are asked to do a plan. Working in group.	
AUTHENTIC TASK	25	Exercise 10 - Now the learners should either work alone or with a partner. They should imagine that they are having a dinner party. They have recipes but the recipes are calculated for just one person. Since there will be a total of four people, they need to calculate how much of each ingredient they will need. The teacher should discuss with the students what kind of meals would be typical for a dinner party in the home country. What kind of appetizers? Main courses? Desserts? Etc... If time allows ask the students to come up with some traditional recipes from their home county. How many ingredients are needed and how much of each ingredient. The teacher could ask what are the typical spices and herbs used in their home country.	
TIPS & SUGGESTIONS		*Please note the tip for a Prinzregententorte is country specific to Germany. Partners are encouraged find a regional sweet for this learning activity. Teachers may also prefer to choose a local dish or a holiday specific dish to discuss for this lesson. Thus it is an idea which can easily be recipriocated depending on time of year and location.*	

	TIME	ACTIVITY PLAN LESSON 3
SITUATION ANALYSIS	5	Budgeting – This lesson will have the learners take a look at a household budget. As a class brainstrorm some ideas for monthly expenses. What did they spend their money on in their home country and what do they spend their money on in Germany?
MOTIVATIONAL PHASE/STEP	20	Move on ask if anyone completes a household spending plan. Now ask the learners to complete Exercise 11 – Match the expenses with the appropriate pictures. Brainstorm other categories which you may find included in such a document. This may be done first in pairs or immediately as a group. Start the class by asking how much money they spend in a year on food, clothing, vacation or insurance. For the majority of the class this may be just an estimate or they may have an exact number which they should round. When you round a number, you replace it with a different number that has approximately the same value, but is a simpler, shorter or more specific portrayal of the number. For example, you might replace: $2.679 wth $2.68 3.141592653… with 3.14 When you round a number, you do it to have a number that is easier to write or to work with. Occasionally you do it to express the correctness of a calculated or estimated number. For example, consider a number that was calculated as 2,468, but it might better use 'about 2,500.' In addition to rounding to a particular unit, sometimes you 'round to the greatest place.' This means to round a number based on the number next to it. Here are some examples: 16 becomes 20, but 14 becomes 10 378 becomes 400, but 339 becomes 300 1432 becomes 1000, but 1532 becomes 2000 In order to check for understanding the learners can complete Exercise 12.

		The learners should consider their expenses while they lived in their home country. Is the monthly budget higher or lower? What may affect these outcomes?	
ACTIVITIES FOSTERING SKILLS DEVELOPMENT	80	**Step 1 Introductory phase**	Present to the class the template for a household spending plan. Go through the template with learners to see if they are familiar with all the categories. Are there some new categories which they did not mention during the brainstorming session? Exercise 13 Ask the learners to fill out the document with the amounts they think they give out currently in the target country. They should add each of the sections and decide how much they give out for each category. For which category do they give out the most money? Or the least amount of money?
		Step 2 Intermediate phase	Now they have the amounts Exercise 14 The learners should try to answer the following multiple choice questions about the average amount the Germans give out per month for various categories. Going back to the chart the learners should select another time of year and go back to the amounts to see if the give out a different amount of money. For example compare winter and summer months. For which catergories would they give out more money and which categories less. Furthermore, it should be discussed which of the items on the list are paid monthly, quarterly or monthly basis.
		Step 3 conclusive phase	Finally the learners should take the different monthly amounts and average them out to see how much they give out per month. For learner groups with lower skills the instructor may have to do an example with the class together. Exercise 15 They should calculate their averages.

META-COGNITIVE PHASE	20	The learners should reflect back to the task in Exercise 15. For this task the learners should try to think about the amounts which they use to give out in the target country for each of the items. Are the amounts similar or did they not have to pay some of the items listed?
AUTHENTIC TASK	30	The final tasks is asking the learning to calculate percentages. First they should look at the their total expenses which category has the highest percentage, which category is the least. Calculating percentages may be tricky, so the teacher should take time to show how this may be calculated. An additional task would be to ask the learners to present their finding in percentages or in fractions – the may practice using the terminology: one-half, one- third, seven-tenths etc.
TIPS & SUGGESTIONS		

TITLE OF THE UNIT	**Let's practice maths in the supermarket**
INTERCULTURALITY ELEMENTS OF THE UNIT	**Adult migrants learners with low mathematic skills** **Cultural pattern of shopping in a hosting country**
TARGET GROUP	**ADULT MIGRANT LEARNERS**
LEVEL	**A2 Level Learners**
TEACHER/S	**Teachers teaching basic skills, language instructors working in literacy courses for migrant learners, language teachers**
TIME	9 Hours (405 Minutes)* – 3 lessons *Each hour equates to 45 minutes. The number of sessions can be adapted depending on how much time may be spent visiting a supermarket etc. It is notable to mention that the activities can be adapted to the teachers need and the course plan. Therefore, the length of the learning unit can be shortened or longer if needed.
KEY COMPETENCES INVOLVED	**Mathematical competence and basic competences in science and technology** **Learning to learn** **Communication in foreign language** **Cultural awareness and expression** **Sense of initiative and entrepreunership**

PRE-REQUISITES	*Basic literacy skills* *Basic numeracy skills* *Knowledge of vocabulary related to food / shopping*		
LEARNING OBJECTIVES	**KNOWLEDGE**	**SKILLS**	**COMPETENCES**
	– Knowledge of numbers, measures and structures, basic operations and basic mathematical presentations, understanding of mathematical terms and concept – Awareness of the questions to which mathematics can offer answers – Knowledge of the basic principles of the natural world, fundamental scientific concepts, theories, principles and methods, technology and tehnological products and processes – Understanding of the impact of science, technology, engineering and human activity in general on the natural world – Know the vocabulary related to food items – Know the vocabulary required to do shopping – Know basic arithmetic operations of whole numbers and point numbers; (addition, subtraction, multiplication, division)	– Apply basic mathematical principles and processes in everyday contexts at home and work (e.g. financial skills). – Follow and assess chains of arguments; reason mathematically, understand mathematical proof and communicate in mathermatical language – Use appropriate aids including statistical data and graphs; understand the mathematical aspects of digitalisation – Critical appreciation and curiosity, concern for ethical issues and support for both safety and environmental sustainability – Be able to calculate in your head (add subtract, multiply and divide) – Be able to develop fluency in written adding, subtracting, multiplying and dividing – Be able to understand advertisements – Be able to make a budget	– Be aware of the important role mathematics plays in everyday life – Learn how to incorporate simple math concepts into everyday routines – Be aware of creativity required in case expensive products could be replaced by cheaper ones – Be aware of the price differences between branded and no-name products – Be aware of the benefits of regional and seasonal products – Respect the contributions and opinions of the others – Develop self sustaining techniques

	– Know where to check the quantities of the food items – Know to compare and bring in relation costs/quantities; price per unit; – Know how to recognize real offers and discounts – Know about regional and seasonal products	– be able to apply math when doubling, tripling etc. – Be able to recognize the price per kilo/litre/item – Be able to calculate the total bill – Be able to convert litres/millilitres and kilos/grams – Be able to situation to daily scenarios – Be able to complete math worksheet – Be able to work in groups	
LEARNING ENVIRONMENT	– Traditional classroom – Learner-centered environment – Learning connected with real-world situations necessary for daily life – Local supermarket		
METHODOLOGIES	Problem solving; Cooperative learning; Real-world connections; Group and pair work; Learning by doing; problem-solving		
DIDACTIC TOOLS	PC, projector, visualizer, worksheets, pictures of food items, utensils, nearby supermarket, local supermarket advertisements		
	TIME	**ACTIVITY PLAN LESSON 1**	
SITUATION ANALYSIS	20 mins	At the beginning of the lesson, the teacher asks the learners where do the learners buy groceries. He/she writes down the responses on the whiteboard. (Super market, corner shop, farmer's market, bakery, butcher's shop, greengrocer's shop, etc.) The teacher then asks the group where would they buy their groceries in the home country? Is it different of the same as the host country? Next, the teacher asks how often the learners go grocery shopping in the supermarket. (Daily, once/twice a week, on the weekend, …) This question can be expanded on in order to ask about how often they would go grocery shopping in their home country. The learners give some examples for products they buy there.	

MOTIVATIONAL PHASE/STEP	5 mins	Transition to the topic of the lesson: The teacher shows some advertisements from various supermarkets by using a projecter and asks the learners what these texts are called and there purpose is. He/she writes the answers on the whiteboard.	
ACTIVITIES FOSTERING SKILLS DEVELOPMENT	90 mins	**Step 1 Introductory phase**	The teacher asks the learners to build groups of four/five persons. Warm-up Activity : (This phase serves for better orientation within the advertisements.) The teacher distributes *one* advertisement for each group, e.g. *Tesco*. He/she asks which kind of food and drinks the learners can recognize and write some words on the whiteboard. The learners are asked to put the items to the groups, e.g. dairy products, pastries, vegetables, fruits, etc.) Exercise 1 Read the text below out loud to the class. “Dear customers! For fresh bread from our master baker, 1 loaf for only 3 Euros! Or would you rather have rolls? Today only - 5 rolls for 1.89 Euro. Also, fresh organic milk, the litre for a staggering 1.29 euros! Fancy vitamins? Today fresh from our fruit and vegetable department: German apples from Lake Constance, one kilo for only 1.99 euros! And for the barbecue: Fresh beef steaks, portioned by our butcher master, 100g for an unbeatable 2.49 Euros! Get them now!” ASk the students then to write down how much the various items cost – one loaf of bread, rolls, milk, apples and steaks. Exercise 2 The teacher should ask the learners to worj with addition, substraction, multiplication and/or division and calculate the price based on the answers from the first exercise. Here the teacher should ask for amounts which cannot be found in announcement, i.e. they must use addition, subtraction, multiplication and/or division. The learners are

			allowed to use different ways for solving these tasks; depending on their own preferences and their mathematical skills. Follow this exercise the teacher should how to estimate prices, e.g.: 1l of milk costs 0.95 € → 1l of milk costs *about* 1 € 1kg of apples costs 2.45 € → 2 kilo of apples cost *a little less than* 5 € It may also be appropriate to re-address the act of rounding up or rounding down. Quite often when you visit the local butcher your total on the screen may be 4,42 Euro, but the employee asks for 4,40 Euro. On the other hand supermarkets may have a *round-up action.* If this is the case, then when your total is shown on the screen and it is 5,57 Euro and you tell the cashier round up you may pay 5,60 Euro. The three cents is then donated to a certain charity organisation.
		Step 2 Intermediate phase	The teacher introduces the most important units of measurements needed for shopping: 1kg = 1000g 1lb. = ½ kg = 500g 1l = 1000ml and: 1 € = 100 ct The learners are asked to research the prices of different types of food and drinks per kilo/litre. They should then complete the Exercise 3 worksheet. Each group receives an additional advertisement from a *different* supermarkets, e.g. *Marks & Spencer, Aldi, Carrefour, Sainsbury´s*, etc. First, each group gets 5-10 minutes time to browse through the ad in order to get familiar with the new text.

			Afterwards, the learners should complete the Exercise 4 and fill in the information. teacher asks about the prices of certain foods and drinks in the new ads. The learners should determinate the prices of, e.g.: – apples – bread – milk – water – butter – meat and compare them with the prices of the “old” ad. “Where are the items cheaper?” “Where are they more expensive?” “How much cheaper are they?” “How much more expensive are they?”
		Step 3 conclusive phase	The final step each group receives an identical shopping list from the teacher, e.g.: **1.5kg apples** **2kg bananas** **500g beef** **2 kg pasta** **500g yogurt** **2l milk** The teacher distributes Exercise 5 worksheets (one for each group) and asks the learners to “buy” all products from the list in “their” supermarket.

			They fill in the name of the supermarket and start to search the required items of the shopping list. Reflection and discussion: Once the learners finished the task in their groups, the teacher asks them for the results. “Which supermarket has the highest prices?” “Which purchase was the cheapest one?” “Are there some items that cost the same?” “What do bananas cost in ...?” After that, the learners are asked to make a ranking of all the supermarkets and calculate the difference among the prices. “Compare the cheapest and the most expensive purchase – how much money can you save?” “Would 15€ be enough for the purchase?” “In which supermarket would you need more than 15€?” etc.
META-COGNITIVE PHASE	20	In order to further understand what the groups had been discussing and the choices they have made. Ask the students to create a column chart of their results or perhaps a line chart. One axis of the chart should amounts in Euros and the other access should be various grocery items. The students should create a chart with the results of 3 or 4 supermarkets and around 6 items from the stores. Then they should present the chart to the group. What kind of trends are to be seen? NOTE: if this task may be too ambitious for learners then either it can be done as a class or it may be helpful to present a chart as an example prior to letting students on their own to do this work.	

AUTHENTIC TASK (It is required at the end of the Learning Unit.)	20	The learners should now take time and write down their shopping list. They should also ask about what kind of items they would have on their grocery list if they were in their home country. Are they the same or different? If they have recently gone shopping then they should think about what items are on their weekly shopping list. After they write down all the items on the list they should scan the ads which were handed out in class to see how much the items will cost them. Discuss with the class what they are going to purchase, how much it may cost are any of the items on sale?
TIPS & SUGGESTIONS		Flipped classroom methodology may also be appropriate for some of the learning activities. The teacher may decide to alternatively implement the activities based on their and the students availability.
	TIME	**ACTIVITY PLAN LESSON 2**
SITUATION ANALYSIS (It is essential for the first lesson but not required for the following ones)	10	This lesson is linked to the information and knowledge gained during Lesson 1. The teacher summarizes the results from the previous lesson, which found that it is often cheaper and beneficial to shop in one supermarket and not in different ones. The teacher mentions also the aspect of saving money and time and environmental protection.
MOTIVATIONAL PHASE/STEP	15	Transition to the topic of the lesson: The teacher shows some pictures of brand products and no-name products by using a document or projector etc.:   *"What do you see?"* *"Do you know these products?"*

		"What is difference between these items?" (Quality? Price?) Exercise 7 Sort the products. Which do you think are generic and which are the brand name products.	
ACTIVITIES FOSTERING SKILLS DEVELOPMENT	75	**Step 1 Introductory phase**	The teacher asks the learners to build groups of four/five persons. Each group receives a big sheet of paper and markers. <u>Warm-up Activity :</u> The learners are invited to names of well-known brands they know of. After some brainstorming provide the following list to the learners. They should then try to answer the following questions. **Coco Cola Vittel** **Milka Sprite** **Iglo Cadbury Ferrero** **Nutella Mars** **Kellogg's Pringles** **Danone Barilla** Exercise 8 "What type of food/drinks do these brands produce?" The teacher should then collect the answers and further discuss with the students which of the brands they like and which ones do they not care for. This should continue on the discussion which of the brands do they buy. Do they prefer the brand name items or are the generic brands okay too? What kind of brands are popular in their home country? Are all the brands available in the host country? Which ones etc…

			The teacher distributes one shopping list with some items to each group. **1l Coke** **1l Water** **100g chocolate** **500g cornflakes** **250g yogurt** **450g hazelnut chocolate spread** **0,5kg spaghetti** **250g butter** **1 bag of potato chips** **1kg flour** **1kg sugar** **1l oil** The teacher asks the learners about the approximate prices of these items. It is not necessary to know exactly the price. The learners work in groups and try to complete the Exercise 9 – with the words for “more than” and “less than” either using brochures which the teacher provides or from the brochures in Exercise 4. They should discuss the prices and write down the estimated price for each item. At the end, the total price will be written down. The results of all groups will be compared.

		Step 2 Intermediate phase	This activity is being carried out in the real environment, in the supermarket. The whole class, divided into groups, walk to the supermarket. The learners receive some tasks that should be done during the visit there. This activity is dedicated to getting to know the supermarket, so that the participants can orientate themselves better in the next activities. They should walk around the supermarket and fill out the list of prices for the various food items. Exercise 10 After that, the learners receive some tasks that should be done while they are in the super market. The teacher distributes worksheets to the groups; some of them get worksheet 1, the others worksheet 2. All groups should "buy" all items from the shopping list considering the brand products and the no-name products.
		Step 3 conclusive phase	After finishing the task, the groups meet in the classroom and compare their results. *"How much does the "no-name" purchase cost?"* *"How much does the "brand products" purchase cost?"* *"What is the difference between the prices?"* Afterwards, ALL groups should fill in the chart in order to complete the missing information:

			Worksheet 3 Shopping list / Price of the brand product / Price of the no-name product 1l Coke 1l Water 100g chocolate 500g cornflakes 250g yogurt The teacher asks following questions, e.g.: *"What is the difference between the items from the left and right column?"* *"How much money you can save?"* *"Are there any brand products they are cheaper?"* *"If yes – what could be the reason for that?"* *"Do any items have the same price?"* etc. The final exercise task here is to ask learners to calculate how much cheaper the generic items is from the brand item. First the teacher should teach the learners how can you find out the percentage. The last part of the lesson could be spent in the classroom, reflecting on the results of the day. The learners are invited to do some research on the internet regarding the topic "branded" and "no-name" products in order to compare their quality. Often, branded products are rated much better than they actually are, the no-name products are rated less positive.
META-COGNITIVE PHASE	10	Based on the prices which they have found. They should write out a list of complete Exercise 11 with the differences in prices.	

AUTHENTIC TASK (It is required at the end of the Learning Unit.)	20	The learners should write a list of brand name food products they often purchase. They should use the internet to find out how much these items costs. Then they should try to find the generic brand and compare the price. An additional activity may be an interview with the management of a local supermarket. The students should prepare questions to find out which items are most commonly purchased in the supermarket, which items are popular seasonal items. Based on the report the learners should create a consumer statistics.	
TIPS & SUGGESTIONS		Prior to visiting the local supermarket it is important to contact management before hand in order to avoid any problems.	
	TIME	**ACTIVITY PLAN LESSON 3**	
SITUATION ANALYSIS (It is essential for the first lesson but not required for the following ones)	10	This lesson aims to address topics which include environmental sustainability and the impact of choices we make on the natural world. We have looked at prices in the previous lessons to see which are cheapest, but when we factor in the distance we need to travel, are the prices still cheaper than if we went on foot to the local corner shop?	
MOTIVATIONAL PHASE/STEP	10	Start off by asking the learners what are their means of transportation. Complete Exercise 12 and the learners should match pictures of different means of transportation with the associating term? Is this the same as in the country where they are from? How often do they travel by car, bus, train, bike or even plane? How do they travel to their language lessons? Is it different from when they need to get groceries?	
ACTIVITIES FOSTERING SKILLS DEVELOPMENT	70	**Step 1 Introductory phase**	In the previous lessons we looked at various supermarket advertisement and which offers may be cheapest. The teacher asks the learners to go back to the advertisements from Lesson 1 or they can refer back to the diagramm they had created. The should look at the cheapest items from all advertisements, e.g. the kilo of bananas in Tesco, the kilo of apples in Aldi, the litre of milk in Sainsbury´s, etc.

			Next step the learners should consider how far away the grocery store is from the language course or their home. In some cases it may be helpful to let the learners use computers or their smart phones for an exact way of travel for their shopping trip. Exercise 13 They should look at a map and check to see where the supermarkets are located. Then they should complete the exercise. *"How long does it take if you walk?"* *"How many kilometres/miles do you have to drive if you want to shop in all supermarkets?"* Considering the (probably high) amount of kilometres, the teacher can ask: Exercise 14 *"How much does it cost if I go by car?"* (Gasoline price per kilometre) *"How much time does it take?"* This example should make it clear that you do not always save money when you buy the cheapest items in many different supermarkets. If one adds the gas mileage to the total price of the purchase the result could be much higher than in an average supermarket. In this context, the teacher can also mention the negative impact on the environment and the importance of its protection.
		Step 2 Intermediate phase	The section the teacher should ask the learners if they prefer to buy local produce or do they look for the best bargain. If there were interested in buying only local produce where would they most likely find these products? If they are interested in buying produce from Europe only where would they most likely find this information. The students should further argue the answers from the true false quiz.

		Step 3 conclusive phase	The students should look at the chart and try to answer the questions in Exercise 15. After answering the questions, the learners should try to come up with their own statements which compare each of the graphs or exports and imports. The teacher may ask the learners to also share about what kind of the fruits and vegetables is there country known for exporting or importing? Are any of the items available in the supermarkets in Germany? Did they perhaps eat any produce from the target country?
META-COGNITIVE PHASE	20	The lesson has taken a look at a lot of where our produce comes from. What if they would buy only local produce? What may be advantages or disadvantages? They should read the article and tick the questions which are correct in Exercise 17.	
AUTHENTIC TASK (It is required at the end of the Learning Unit.)	20	Finally the learners should brainstorm a list of fruits and vegetables they like to buy. Which kinds of fruit or vegetables are produced in Germany. In the last task the article mentioned eating seasonally i.e. eating only those produce items which are in season and readily available from local producers. What kind of fruits or vegetables do they think are currently in season? Exercise 18 They should look at the seasonal vegetable chart and try to answer the questions.	
TIPS & SUGGESTIONS			

Co-funded by the
Erasmus+ Programme
of the European Union

Project Number 2018-1-IT02-KA204-048147