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| TARGET GROUPS | Appropriate for all target groups |
| **TITLE** | **USE CULTURE FOR LEARNING MATH AND SCIENCE** |
| RUNNING TIME | The preparation time left to the students’ team should be a mínimum of 2 weeks but preferably more. The students would need time to do the research, translate materials if necessary (if those are available only in their mother tongue and not in the language of the host country for example), discuss the cultural aspects of both the scientific topic and the delivery of the presentation to the rest of the class and practice for this presentation.The time for presentation of the work done by the students should be during one study hour. |
| LEARNING OBJECTIVES | Within the CULPEER context these exercises can be used for attaining the following key competences:*Communicating in a mother tongue*: searching for and reading materials about specific scientific topics/subjects will broaden the active vocabulary. The same is relevant if the research team includes more than one child of the same mother tongue and if parents also contribute to the activities. *Communicating in a foreign language*: reading materials and watching videos in your mother tongue or in a foreign language for example and then developing a presentation on the topic in a foreign language would improve your paraphrasing, interpreting or translating skills.*Mathematical, scientific and technological competence*: the research on the scientific topic and the cultural view point on the subject would achieve a better understanding of the respective scientific topic because of the alternative way of studying about it and the responsibility given to present it and explain it to other students. *Digital competence*: confident and critical usage of information and communications technology in relation with the need to retrieve and exchange various digitalized pieces of information on the scientific topic. *Learning to learn*: ability to pursue and persist in learning, to organize one’s learning, including through effective management of time and information, both individually (for finding relevant information) and in groups (presenting it to the small team and preparing the group presentation to the rest of the class). The cultural information creates motivation to the involved foreign students to learn and to lead teams. The ability to explain a certain piece of information/phenomenon to the others also builds confidence*Cultural awareness and expression*: cultural awareness and expression starts from being aware and able to express your own culture. Researching the cultural background and predispositions, which have influenced a certain discovery, finding, etc. will develop the ability to appreciate the creative importance of ideas, experiences and emotions as well as to practice culture while presenting the scientific information.In addition to the above, the students, which are placed in a team with a common task, will develop team work skills and abilities and will develop appreciation of each other based on their contributions to the implementation of the common task in question. When the task is implemented with the necessary dedication, care, attention, etc. a really important indirect outcome would be the peer-learning/teaching, which is about to take place – a certain scientific concept, accompanied by unorthodox cultural explanations, would become clear for the whole class thanks to the explanations of a small team of students. Now isn’t that motivating?!  |
| MATERIALS | Sheets with assignments to be provided to the research teams – what has to be done, by whom, until when and delivered in what form. This activity requires the materials, which are available in a class room. In addition to those - access to Internet (if something has to be played to the others) & projector (if something is to be projected for the others to observe). The students will be free to use the school library, can gather at places they choose in order to be able to work together – both at school and outside school (in a café, at one of the kids’ homes, etc.) – this should not be a teacher’s concern, as the students carry the responsibility to organize themselves in the process. |
| PREPARATION | The teacher leading a certain scientific class should look at his/her agenda for the school year from the perspective of the possibility to involve students from various nationalities/backgrounds. When a certain study theme approaches (for example electric currents), a teacher with a Croatian student or students in his/her class should give this particular child the task to lead a research team on Nikola Tesla’s life and work. The boy/girl to whom the task is assigned could either be left to pick his/her own research mates (if he or she has a certain social circle in the class) or the teacher could pick those him/herself. The team should have a mínimum of two weeks until the day of presentation of the specific theme. The team of students, led by the one with foreign background, should be given a clear task – research the life of the scientist, discover something personal about him/her, something curious, something memorable, something that was significant and led to a specific discovery and create a short sketch with it – to present it to the other fellow students, together with a clear explanation of the scientific part as well (law, theorem, formula). This activity would require the teacher to check the nationalities/backgrounds of the scientists who are included in the curriculum agenda. Some resources for preparation:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1315909/ - “Science and culture” by Maurizio Iaccarinohttp://www.asa3.org/ASA/education/science/cp.htm - “Culture & Science — Cultural Influences and Effects In what ways are scientists and their theories affected by culture?” by Craig Rusbult, Ph.D. |
| IMPLEMENTATION | Depending on the school curriculum and the advancement in the different scientific subjects, which are directly related to this key competence, the teachers could envisage the formation of small multicultural teams, led by a foreign student, whose background is related to the origin of a certain scientific discovery. It will be the teacher’s task to identify these relations and to appropriately assign team work activities. The respective foreign student leading the team, can be assigned the task to explain to fellow students certain scientific findings or definitions or formula that have been discovered/created/originate from their geographical area. **Example:**Greek student/s could study and explain (even play short etudes from Pythagoras’ life they prepare themselves) the Pythagorean Theorem to the others. The team researching and presenting a certain scientific subject could have children from multiple cultures, including the host culture, but it should be led by a child with the same background as the scientist/s studied. **Other ideas:**Isaac Newton and his laws in physics (English children).Nicolaus Copernicus in astronomy lessons (Polish children).Galileo Galilei in astronomy, physics, math lessons (Italian children).Johannes Kepler in astronomy and mathematics (German children).Archimedes – astronomy and mathematics (Greek and Italian – Sicilian – children – Magna Grecca). Nikola Tesla – physics and engineering (Croatian children).Charles Darwin – biology (English children)Marie Curie – chemistry (Polish and French children).Euclid – mathematics (Greek children).Asian Indians and their introduction of the number 0 and the numerical counting system, following by a spread of the concept by the Arabs, which allowed the effective presentation of infinitely large numbers with a limited numerical alphabet – mathematics (children from India or Arab countries) The Chinese made the first compass (IX & XI century) from magnetite – naturally magnetized ore – physics (children from China). Alexander Fleming and penicillin – biology (British children).  |
| ROLE OF THE TEACHER | The teacher gives the assignment and helps the lead student to pick her/his team of 2-3 more fellow students to do the research with. The teacher checks the outcome of the research done by the children and confirms that what they are about to present is scientifically correct. The research team covers the scientific topic assigned to them without participation of the teacher, during the class devoted to the specific theme.  |
| POSSIBLE RISKS & HOW TO HANDLE THEM | The research team finds it hard to cope with the scientific explanations or with finding sufficient information on the scientist they are researching. The teacher could provide information, books, online sources of information, stories to be investigated. He/she could also postpone the topic with one week, if the curriculum allows that, in order to give the team a bit more time to organize themselves.  |
| FEEDBACK TOOL | Questions to the team leader (for example a Croatian student, leading a Tesla research team):* Was it hard to find information about the scientist you were assigned with?
* Was it hard to translate that information about an interesting sketch, presenting the person, his/her background, life story, etc.?
* How did you feel during the work with your fellow students?
* Did you enjoy working with the others in a team?
* What skills/competence do you consider you improved most during this experiment?
* How did you feel during the presentation your team did to the other students?
* Would you like to have more such opportunities given to you?
* Do you consider that you have more self-esteem and a better standing in the class now?

These questions should be asked in a personal meeting with the student. The same questions could be asked to his/her fellow researchers, with some additions probably, referring to how they see their future collaboration and relations with the foreign student, whether they would like to join such activities in the future, whether they consider to having improved their team working skills, problem solving skills and the key competences already mentioned above.  |