Activity Title: Use culture for learning math and science

Description of the activity: (Please include details on the following areas: target age group, preferred group size, ideal setting to carry out the activity)

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 students 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.

More possibilities:

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).
Nicola Tesla – physics and engineering (Serbian 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).

Learning objectives - key competences, which are influenced via this activity: (What learning outcomes does this activity cover as far as attainment of certain key competences is concerned?)

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.

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.

Expected Outcomes:

Improved key competences (see list above).
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, supported by unorthodox cultural explanations, would become clear for the whole class.

Activity Structure: (What are the components of the activity? What resources or staffing will be required)

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.

Activity duration:

Try to assign the task of a certain research and presentation at least a couple of weeks before the time when the certain topic is about to be discussed and explained by the students' team. 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.

Resources:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1315909/ - "Science and culture" by Maurizio Iaccarino
http://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.