This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 640190

EURO-CARES
A PLAN FOR EUROPEAN CURATION OF RETURNED EXTRATERRESTRIAL SAMPLES

Work Package 8

Deliverable 8.6: EDUCATIONAL MATERIALS (pre 16 years of age)

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Educational Materials (Pre 16 Years of Age)

Change to Deliverables content: Following analysis of the national curricula and education guidelines of several U nations, the Work Package 8 (WP8) team decided that it was more appropriate to include educational materials for students aged over 16 in the 'Universities' deliverable (D8.7) rather than the 'Schools' deliverable (D8.6). The change has been reflected in a change to the titles of the deliverables, from 'Schools' to 'Pre 16 years of Age' and 'Universities' to 'Post 16 years of Age'. This report covers material for the pre 16 years of age students.

Background: Prior to preparing any educational materials, the Work Package (WP) team had to decide on a strategy for producing materials that would be (a) relevant for a range of ages across the different curricula pertaining in the European nations and (b) useful for teachers. To tackle these criteria (relevance and usefulness), the team first examined the national schools' curricula of the UK, France, Germany and Italy, and then convened a focus group of teachers from different school levels to discuss what sort of materials would be most appropriate to produce.

National Curricula: the UK has a very detailed (some would say quite prescriptive) national curriculum for schools (https://www.gov.uk/national-curriculum/overview). France also has a national curriculum (http://www.education.gouv.fr/pid24/les-niveaux-et-les-etablissements-d-enseignement.html), but it is more general in terms of its content than in the UK. In contrast, Germany and Italy have teaching guidelines to ensure appropriate levels of literacy and numeracy, whilst leaving content to individual states/regions. **Conclusion**: The WP team preparing the materials decided, therefore, that the UK curriculum would be used as a basis for the resource, on the grounds that if the material spoke to the UK curriculum, it would also meet the more flexible requirements of the other consortium nations.

Focus Group: because of time constraints, the focus group convened was only of UK teachers; however, since we had already made the decision to base the materials on the requirements of the UK national curriculum, we felt that this was not a problem. Membership of the focus group (which met once, following exchanges of e-mails) included an Early Years (EY) teacher and a Special Needs specialist, as well as teachers at primary and secondary levels. **Conclusion**: the unanimous conclusion of the focus group was that there were abundant written materials already freely available, but that teachers did not have time to search them out. At all Key Stages (from Early Years to GCSE, ages 3 to 16) what was required were practical activities that would enrich lessons already designed to deliver the national curriculum. For ages over 16 (in the UK, sixth formers taking A-Levels in preparation for university entrance), enhancement activities were deemed to be more appropriate if they were in the form of material that was complementary to the syllabus, designed to stretch the capabilities of the more able students.

Outcome: Following the consultation exercise, the following decisions were taken regarding the materials to be delivered to schools:

(i) The subject of the materials would be 'Living and Working on the Moon';
(ii) There would be, in the first instance, a single practical project forming the core of an activity, around which information of increasing levels of complexity and depth would be

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built. At all stages, there would be adaptations of the material to enable children with special needs (physical and developmental) to take part;

(iii) There would be three levels, suitable for Early Years children (ages 3 to 4), primary school children at Key Stages 1 and 2 (ages 5 to 7 and 8 to 10, respectively) and secondary school students at Key Stages 3 and 4 (ages 11 to 13 and 14 to 16, respectively);

(iv) Sixth form students would have a separate set of materials, based around use of a Virtual Microscope. These materials would now be included in deliverable D8.7.

Format of the Resource: It was stressed by the focus group that teachers were more likely to use the material if they had something that they could physically handle and work with, rather than a list of web-sites pointing to external resources. It was decided that the project would be presented as a series of cards in a wallet/envelope, with teaching notes that tied directly to specific sections of the national curriculum. This would be delivered to the schools using various networks. The resource will also be available through the EURO-CARES website (http://www.euro-cares.eu/).

Subject Area: analysis of the UK National Curriculum by the WP8 team was confirmed by the focus group: 'Space' does not appear as a stand-alone subject within EY and KS 1 and 2 of the curriculum, but rather is used as a basis in which to develop numeracy and literacy, as well as ideas of communication, collaboration and responsibility. Within KS 3 and 4, a more specialised study of 'Space' includes knowledge of the Sun and planets in the Solar System, orbits, satellites, etc. It was decided that the Moon will be the core of the resource, and that the main activity will be design of a lunar lander. Material included in the resource will be as follows:

A wallet containing the following cards (the wallet and cards would be laminated for durability):

1. A plan for an afternoon classroom practical session on 'Living and Working on the Moon'
2. Build a lander: Materials required
3. Build a lander: Practical notes, including link to video/podcast showing what to do
4. Five separate sets of teaching notes, covering specific sections of the National Curriculum for EY and the 4 Key Stages, for use in lessons both leading up to and following on from the practical session
5. Suggested enrichment and consolidation activities following on from the afternoon session (poems, stories, drama, etc.)

Additional Resource: Also available as an enrichment activity for younger students is a virtual Field Expedition (vFE), with accompanying teaching notes. It is an adaptation of a 3D field trip to Skiddaw in the Lake District (https://vimeo.com/78057630), which is part of one of the Open University's Level 2 Natural Science modules. New landscapes will be created to simulate a hot desert (probably the Nullarbor Plain in Australia). Where the avatar in the Skiddaw simulation collects a rock in the quarry (about 3 min and 20 sec into the video), our field scientist will discover a rock on the desert plain. She will examine the rock with a hand lens, looking for textural indications that the specimen is a meteorite (fusion crust, 'thumbprint' depressions, etc.), and test whether or not the rock is magnetic. Part of her essential equipment will have been a hand lens and magnet. She will also assess its composition through estimation of the rock's mass and density. The meteorite will be collected and returned for curation, and the field trip will end with sight of the curation facility.

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Development of the vFE has been made possible through support from the OpenScience Laboratory of the Open University (http://www.open.ac.uk/researchprojects/open-science/) and an award from the Science and Technology Facilities Council Public Engagement Programme. It will also be available for Deliverables D8.7 (Educational Materials: Post 16 Years of Age) and D8.8 (MOOC: Space on Earth)

Next Steps:

(i) 'Road Test' the resource by deploying it in a primary school (EY and KS 1-2) and a secondary school (KS 3-4), gaining feedback from the teachers using the resource;

(ii) Upload the finalised project and associated teaching notes to a dedicated section of the EURO-CARES website;

(iii) Print the materials in English, and distribute to primary and secondary schools *via* the Association of Science Educators;

(iv) Translate the materials into French, German, Italian and Spanish;

(v) Determine the best national networks in the other European countries that can be used to distribute copies of the materials.