Learning Mineralogy and Geochemistry through research projects for high school students: two examples on mineralogy applied to geo-hazards and cultural heritage

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The presence of Mineralogy and Geochemistry in the high school curricula in Spain is very scarce and mostly focused on descriptive aspects. Efforts to show that these disciplines can contribute to interpret Earth processes, geo-hazards, resources, environmental issues, or cultural heritage studies must be carried out. We present the results of two experiences of how to attract high school students to be researchers on these fields conducting researchs projects and presenting the results of that activity in a report. Groups of four to six students developed the research projects “Land use evaluation based on clay mineralogy of igneous and sedimentary materials from S of Spain” and "Inter-disciplinary approach to the roman pottery from uilla San Antón (Arjonilla, Jaén, Spain)". These projects belong to the initiative Science IES which included the implication of teachers to coordinate the activities in-out schools. In both projects, students planned and executed a scientific research, undertook a literature review, characterized the study materials using XRD and SEM, interpreted and discussed their results, generated conclusions and produced a well organised and written scientific report as well as oral and poster presentations. Both experiences were completely rewarding, given that students understood the significance of the issues: the presence of smectite as factor controlling geohazards and the importance of pottery mineral characterization to know source areas of the raw materials and technology production. Moreover, they recognized the importance of supporting disciplines such as mathematics, physics, and chemistry, made connections between different science disciplines, helped them to learn in a cooperative way, gained confidence in their abilities, and enjoyed their discoveries. The activity concluded with a conference held in Sevilla where students displayed their results through oral and poster communications.