

## Title: The minerals and the light: Mineralogy and astronomy in the history of the homo sapiens sapiens

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Since the end of the '90s, when the concept of competence was introduced in the education world, the debate on teaching assessment of competences is going on in the Italian school system. Nonetheless, first cycle and second cycle State Exams and national tests (INVALSI), yet have a focus on knowledge and skills. In the education field competence is defined as the capability to face requests and complex tasks effectively, using knowledge and skills acquired by study, research, observation and experience. The proposal formulated here is directed to turn disciplinary knowledge and skills to personal competences through educational and unitary teaching, in order to overcome the discontinuities between Primary school - Secondary school – Universities - the world of work. The ultimate goal is to preserve throughout the didactic course of teaching the wholeness and unitarily of personal competence of the student, who uses acquired disciplinary knowledge and skills in a personal fashion, neither mnemonic nor mechanical. The course of study may begin in the first class of lower secondary school and go on up to the fifth class of upper secondary school, with didactic laboratorial strategies and teaching strategies for competences, involving multiple disciplines.

The recipients are the classes where a greater difficulty for students to integrate into the life of the School is registered, or the learned input-skills are of low or inadequate level, possibly with the presence of students with Special Educational Needs. In involved classes the collaboration and sharing of all teachers of the Class Council has been requested, in order to build an educational unitary course, centered on the concept of competence.

Contents of the course:

- The materials of the solid earth: minerals (physical and chemical properties, classification)
- Percentages, graphics, angles, geometric solids, symmetry
- Measurement units, speed and acceleration, mass and weight, pressure, energy, heat, temperature, density
- States of matter: solid state and liquid state
- The periodic table of elements, atoms and molecules
- Mixtures

Introduction to the course:

- History informs sciences: newspapers and books dating back to the First World War are read in the classroom, mineral resources used in everyday life and their mining locations, in cooperation with Geohistory and Italian teachers.
- Discussion groups and "questioning" by the test "Is it useful to study the Mineralogy?" and input test with open-ended questions.
- Experiments in the laboratory shared with Physics teacher: we observe a mineral (recognition, classification, chemical composition)
- Theoretical lesson: natural sciences, physics and chemistry, with the support of the textbook and using material found by students in the Internet
- Visit to the local museum with the teacher of Geometric Design or Art History or Technology or Geohistory
- Brainstorming and project with support of LIM to view video-on lab and specific software
- Experiments in the laboratory shared with the teacher of Mathematics: growing crystals (shape and symmetry, recognition and classification, chemical composition and structure of atoms)
- Final report on experiments, possibly with research hypotheses.