Working Document

OVERVIEW OF THE TASK

Crystals

Target audience:	1st cycle of secondary school (2nd year of cycle)
Team work:	2 people
Class time required:	8 periods of 75 minutes

Educational Aim in the context of the training:

This learning situation brings the student to understand the scientific principles touched by crystallography. This important aspect of geology speaks about the formation and internal structure of crystals. Instinctively, when we hear about crystals, we think of precious stones such as diamonds and rubies. We must nonetheless not forget other types of minerals whose crystals are much smaller, as is the case with intrusive and extrusive igneous rocks, for example.

Culinary arts seem like a particularly concrete approach to get the student to understand crystallography. During the course of this activity, the student must prepare two kinds of candy, very distinctive in terms of their crystallography. Rock candy and fudge are indeed formed from crystals whose dimensions differ greatly.

Each team of two students will have to produce a complete procedure for the preparation of fudge. The objective is to scientifically find a way to succeed at this recipe every time. In addition, the team will have to explain what happens at a microscopic level during the formation of these two candies. The study of crystallography will thus be addressed.

Targeted disciplinary competency:

C1 *Seeks answers or solutions to scientific or technological problems*

a) Choose an investigative scenario (protocol)
b) Actualise the steps (revised protocol)
c) Analyse the results (graphics, taste testing and final report)

Targeted cross-curricular competencies:
C-5 Adopts effective work methods

Broad Area of Learning	Orientation and entrepreneurship Development axis: self-knowledge, of one's potential and of one's methods of actualisation (knowledge of talents, qualities, fields of interest, personal and professional aspirations). Here the student may be touched by two very different fields of interest. Gemology (the whole field of precious stones) and by rebound, culinary arts, with its innumerable possibilities.

Involved worlds and compulsory concept(s)	**Material world:** Properties • Characteristic properties • Mass • Volume • Temperature • States of matter Transformations • Physical changes ▪ Phase changes ▪ Dissolution • Conservation of matter • Mixes • Solutions Organisation • Atom • Element • Periodic Table • Molecule **The Earth and Space :** General characteristics of the Earth • Internal structure of the Earth • Lithosphere • Type of rocks (basic minerals) Geological and geophysical phenomena • Volcanoes • Natural manifestations of energy ***Possibles extensions*** ***Technological world :*** *Engineering* • *Raw material* ***Living world:*** *Maintaining life* • *Inputs (energy, nutrients)* • *Osmosis (shelf life of very sweet foods)*

Cultural references	The first reference that comes to mind is the one related to jewellery and to the wealth they assure those who own them. The second reference is more modest and pertains to the pleasures of the flesh.
Possible evaluation: To be developed…	
Global context: The student is placed in a context where he has worked in the confectionery field for several years. A publishing company approaches him to write the « desserts » section of a new cookbook. This new challenge interests him and he decides to take the plunge. The student is then asked to work at the preparation of rock candy and fudge. He must give a complete and scientific procedure that will allow the reader to succeed with this recipe every time. In addition, since today's public wants to fully understand things, the publisher asks him to explain, scientifically, what is going on at a microscopic level (crystals).	