

ROCKS

Rocks are generally classified by their origin (igneous, metamorphic, and sedimentary), texture, and mineral content. Then, the aim is to acquire the basic instruments to sort and to place the samples, by observation and classification, in the right context, but also to help students:

- to understand the great variety and complexity of Earth materials,
- to recognize the properties of rocks to determine how they are used and also understand the use of resources,
- to understand Earth's historical development and its dynamics.

A trolley and some trays have been organized, numbered, and a detailed descriptive card produced on each rock (FIG 4.9).



FIG.4.10 THE TROLLEY

Then a picture is taken and put on the tray, so that it is easy keeping the tray in order (FIG. 4.11). The activity consists of manipulation and recognition of major technical prescriptions, using a toolbox, (TABLE 4.4) and then filling out a card

(TABLE 4.5) in a model proposed here, which can vary depending on the age of the students.



FIG. 4.11 A TRAY

CAMPIONE 0.11 	CAMPIONE 0.58 
NOME: Arenaria ORIGINE: Sedimentaria TIPO: Clastica- Organogena. ASPETTO: Colore giallo/ marrone chiaro. Tessitura clastica, particellare. Struttura omogenea. Granulometria variabile, da argilla a ghiaia. Supporto granulare con contatti tra clasti e blocchi. INCLUSI: Ciottoli e bioclasti. MINERALI: <u>Quarzo SiO_2</u>, di colore grigio-bianco. <u>Muscovite $KAl_3(AlSi_3O_{10})(OH)_2$</u>, si presenta in lamelle sottili e legger colore bianco-argentato. <u>Calcite $CaCO_3$</u>, in questo caso di colore bianco, anche se può av molte colorazioni diverse. AMBIENTE: Deposito marino. INTERESSE PRATICO: L'arenaria è una roccia con frequente impiego in edilizia, an per esterni, ma talora con pessimi risultati perch cemento si degrada facilmente; ruote da mulini e m abrasive di impiego artigianale; brecciamé. * Frammento di parti dure di organismi.	NOME: Calcare. ORIGINE: Sedimentaria. TIPO: Chimica. ASPETTO: Colore arancio-marrone. Tessitura microcristallina. Struttura concrezionale. Cristalli equidi, con dimensioni simili che formano un mosaico equidimensionale. INCLUSI: Non sono presenti clasti. MINERALI: <u>Calcare $CaCO_3$</u>, di colore bianco-nocciola. PARTICOLARITÀ: Roccia con struttura concrezionale che dona alla roccia un aspetto particolare, molto poroso e disomogeneo. Equidimensionale strati deformabili, equidimensionali, subparalleli, interdendati. AMBIENTE: Caratterizzato da alta solubilità, in ambiente carsico. INTERESSE PRATICO: Usato prevalentemente per creare lastre lavorabili e lucidabili. Impiegato anche per creare blocchi grezzi. Alcune varietà presentano belle forme arborescenti e trovano impiego come pietre ornamentali in gioielleria e bigiotteria.

FIG. 4.12 EXAMPLES OF CARDS

ROCCE		SEDIMENTARIE			MAGMATICHE				METAMORFICHE	
		DETRITICHE	ORGANOGENE	CHIMICHE	INTRUSIVE		EFFUSIVE		pressione	temperat una
					acide	basiche	acide	basiche		
Aspetto/ struttura / tessitura	massiccio	x	x		x	x				x
	Granulare *		x							
	Sabbiosa clastico		x							
	Spigoli vivi/ Frattura concoide		x	x	x		x			
	Cristallina **				x	x				x
	Porfirica						x	x		
	Vetrosa scoriacea						x	x		
	Porosa			x			x			
	Scistosa Fogliettata A pieghe								x	
	Occhiadina								x	
	Saccaroide									x
	Fossili		x							
	Ciottoli	x								
	Rami/ foglie			x						
	Trasparente quarzo				x	x			x	
Inclusi*	Neri Biotite				x			x	x	
	Verdi								x	
Cristalli	Bianco/chiaro	x	x	x	x		x			x
	Nero/scuro					x	x	x	x	x
	Rosso						x			x
Colori	nocciola	x	x	x						
	Verde								x	
		ARGILLITE SILTITE ARENARIA CONGLOMERATO CALCARE DOLOMITA SELCE		CALCARE GESSO TRAVERTINO	GRANITO GRANODIORITE	GAIBRO DIOIRITE	OSSIDIANA RIOLITE	TRACHITE BASALTO	SLISTO GNEISS SERPENTINA	MARMO

TABLE 4.4- THE TOOLBOX

RICONOSCERE LE ROCCE

roccia, lente, punta di ferro, HCl,

Aspetto	- Massiccio - Fragile - Omogeneo...
Forma	- Compatta - Allungata - Inneregolare...
Colore	- Uniforme
Cristalli:	- forma - quantità
Proprietà:	- untuosa - pesante - porosa - strutture ...
Legante	cemento
Inclusi:	- fossili - ciottoli
Origine	- Sedimentaria - Clastica/terrigena - Chimica - Organogena
	- Magmatica - Intrusiva - Effusiva - Filoniana
	- Metamorfica - Pressione - Temperatura
NOME	

TABLE. 4.5- EXAMPLE OF PRACTICAL ACTIVITY, SECONDARY LOW SCHOOL
The importance of the activity, from the point of view of teaching, does not

seem to differ much from traditional school collections, when available, however, its peculiarity resides especially in:

- giving the opportunity for all schools to have materials organized and ready to use,
- being easily transportable
- the materials being clearly explained and documented by tabs.

As for all the activities here available, the lesson often sees the intervention of external teachers, more experienced, and periodic meetings of teacher training with the aim of sharing contents and approaches. Moreover and most important, is that the type of information proposed in the cards and in classroom activities, is based on the approach and investigative PBL, reasoning and building of connections, such as shape-pressure-rise, or on the historical and geographical context.

MINERALS

The aim of the work is to identify some minerals by well-defined observable physical and chemical properties, such as cleavage, fracture, colour, density, hardness, streak, luster, crystal shape, and reaction with acid. Only later, it is possible to classify minerals on the basis of their chemical composition or crystal morphology. Other features to take into consideration and important to recognize are the use of minerals in the everyday life and their relevance in the history of humanity, as well as the positive and negative impacts on the environment.

The operating mode is similar to that used for the rocks. Each student examines a sample, trying to recognize the features and the most significant properties. The following figures represent examples of the trays organized in transportable trolleys (FIG. 4.13) usually used for the activities. The minerals are arranged in trays divided in themes (e. g. Pressure – Temperature, FIG. 4.14 and many others) or organized just following the chemical systematics by anions (FIG. 4.15). Of particular interest for the students and the teachers, because it opens the discussion on many different topics, is the tray



FIG. 4.13 – THE TROLLEY



FIG. 4.14. - PRESSURE-TEMPERATURE TRAY



FIG. 4.15 - SYSTEMATIC TRAYS



FIG. 4.16 - TRAY OF THE MINERALS OF THE AOSTA VALLEY
of the Valle d'Aosta minerals which allows to talk about georesources, use of

minerals in industry/technology and everyday life, environmental issues also connected to the presence of ore deposits.

Also in this case, as for rocks, there is an accompany card for each mineral (FIG. 4.17) and the activities are presented in different ways for students' age (FIG. 4.18 and 4.19).

The most interesting aspect, in addition to the intrinsic beauty that characterizes many samples which is certainly the feature more easily attracting the attention and interest of the students, it is the ability to "tell stories" about minerals, some of them briefly but clearly described in the cards. This helps make these samples rich in charm and "life".

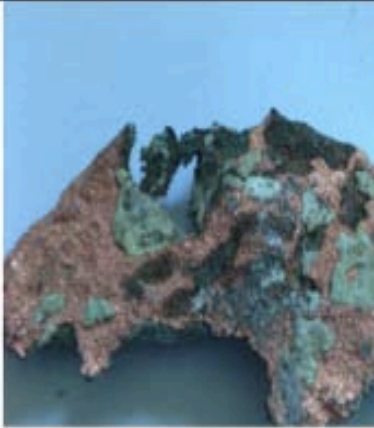
		
16 A RAME - USA Cu. Il nome deriva dal latino <i>aramen</i> un derivato della voce latina <i>aes</i> che significa "rame" o "bronzo", in quanto i non si faceva differenza tra il rame puro e il bronzo, la sua lega più importante ottenuta con l'aggiunta di stagno. PROPRIETA' ASPETTO CROSTOSO e lucentezza metallica	17 A TALCO - ITALIA $Mg_3Si_4O_{10}(OH)_2$ Fillosilicato di magnesio molto diffuso sulla Terra e noto sin dall'antichità. Il nome deriva dall'arabo <i>faïq</i>. PROPRIETA' UNTUOSO AL TATTO, cattivo conduttore di calore.	18 A CIANITE - NORVEGIA Al_2SiO_5 nesosilicato di alluminio, Anticamente era chiamato distene (dal greco <i>dis</i>=due e <i>stenos</i>=forza) PROPRIETA' i suoi cristalli hanno DUREZZA VARIABILE con le direzioni di scalfittura.

FIG. 4.17 EXAMPLE OF MINERAL CARDS