



REGIONE DEL VENETO



PermaNET

Permafrost Long-term Monitoring Network

Educational Toolkit



Educational Toolkit

Introduction: The main aim is to provide simple but scientifically correct information about permafrost and its effects not only on natural but also on human environment. Special emphasis should be given to its relationship with climatic changes in recent decades.

In the superior context of general education dealing with permafrost helps pupils (i) to understand natural processes and achieve environmental competences, (ii) to get an exemplary insight into the world of (applied) natural sciences, and (iii) to learn about the crucial importance of sustainable development for the entire Alps following the “philosophy” of the Alpine Convention.

We should use many images and films in order to make basic concepts as clearer as possible. It is strategic to highlight the evidences that can be perceived in everyday life and easily observed during a walk in the mountains.

We believe that it is of paramount importance to consider permafrost in the context of the entire environmental system, especially by stressing its significance for geomorphological and geoecological processes as well as its interactions with glaciers, giving special emphasis to the deglaciation that has taken place since the LGM and its consequences.

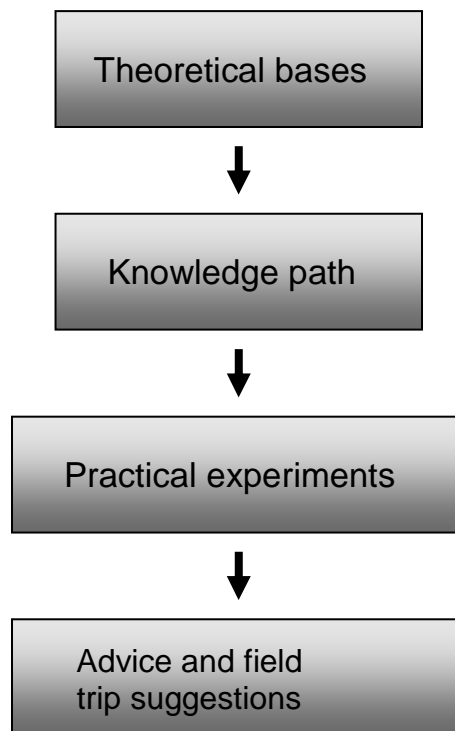
The texts should be characterised by short sentences and the chapters should not have more than 1000-1200 signs, including blancs. All the figures have to be captioned.

The main contents or a low definition version of the toolkit could be included in the Permanet web site.

Target age: 10-18.

Format: The Permafrost Educational Toolkit shall be made available via the www by the institutions which are responsible for distributing didactic material to teachers and students in the majority language of the respective country or region (e.g. in Austria: gw.eduhi.at and gw.didaktik-graz.at). A brochure dealing with the main aims of the initiative and illustrating the contents of the web site and the target it refers to, should be produced.

Contents: The structure of the toolkit should be subdivide into four blocks in order to create a “journey” through the matter starting from the theory and ending with the recommendations and suggestions for those who want to know much more about permafrost. We should provide a useful instrument to gain a better understanding of the nature of the phenomena and on the effects of permafrost melting. A set of simple practical experiments will be included in order to stimulate the curiosity of young students.



Block 1 Theoretical bases. Within this block all the basic information about the phenomenon will be explained. In particular how, where, when and why permafrost occurs and melts. This block will show clear examples of morphological evidences and explain where and when they can be observed and how and why permafrost develops. For these purposes special folders including images related to different case studies on the Alps and provided by each partner, are planned. The folders should contain the national/regional information on where to go for excursions into permafrost areas in the respective country/region.

Basic concepts on climatic changes as possible cause of permafrost melting have to be introduced also by using historical images.

Some information about practical problems related to permafrost will be introduced, in particular we should answer some simple questions such as “what are possible damages for buildings?”, “why can the melting of permafrost be a problem?” and show images of damaged structure (cable car or skilift pylons, alpine refuges, rock fall etc.).

In this block the PermaNet Project (objectives, tools and methods) has to be illustrated in general as well as the results so far achieved and possible future scenarios concerning development of permafrost in relation with climate changes (maps and so on).

Block 2 “Knowledge path”

The aim of this block is to provide learning material for teachers in order to enable students to consolidate their (via block 1) already existing knowledge and to get the opportunity to train their skills in dealing with permafrost by solving tasks on the basis of self-reliance. This learning material is structured by 15-20 “stations” forming a “knowledge path”. Each station consists of (i) a work sheet containing a

short introduction to the relevant question and the tasks students have to fulfil, (ii) the maps, graphs or pictures which the students have to work on, (iii) a solution sheet giving possible solutions of the tasks. All the stations are listed in an overview sheet on which teachers and/or students can check the stations they have already passed.

It is up to the teacher to decide how to use the “knowledge path” in the lessons and to adapt it according to the age of the students. A general recommendation is to encourage students not to solve the tasks alone but in pairs or small groups. Further recommendations could be:

- Learning on stations
- Open education
- Using single stations in active learning during outdoor-lessons
- Using single stations during regular lessons
- Using single stations as home exercises
- Using single stations in assessment/grading
- Altering stations regarding permafrost in the vicinity of the school location
- Altering stations regarding current “events” in permafrost

Block 3 Practical experiments

In addition to the knowledge path (block 2) some experiments are provided in order to visualize selected processes related to permafrost and climate change. This is in accordance to the pedagogical fact that students learn more efficiently and sustainably when acting on a topic using their hands (active learning). As a consequence the experiments are described in a way that students can perform them without the help of the teacher.

Also in this block the teacher can decide how to integrate the experiments into the lessons. Yet it has to be noticed that the material needed for the experiments must be provided in advance because it will probably not be available in the schools. Furthermore most of the experiments cannot be carried out in “normal” class-rooms but need special infrastructure.

Block 4 Advice and field trip suggestions. At the end of this instructive journey the young student should be familiar with the basic concepts of permafrost and related problems. So the purpose of this fourth block is to provide advice on where and when to observe this phenomenon and possibly to design some itineraries in selected regions of the Alps, where people can observe typical morphological features and the most representative periglacial landscapes. Each itinerary has to be characterized by several stops with short descriptions of the key features, visible from significant viewpoints. The information should be provided also by means of simple graphs, schemes and photos. The itineraries have to be thought at 1:25.000 scale and ready to print. If the itinerary is too long or full of information and images or of particular significance from geomorphological point of view it can be possible to split it in some smaller parts in order to facilitate the use in the field. All partners should therefore make an effort to design possible itineraries (at least one permafrost itinerary in each Alpine country) on the base of their knowledge and support them with images, explanatory notes and other illustrative material.

We recommend integrating the elements of the permafrost educational toolkit into an experience-orientated learning project (suggested duration 3-5 days) which consists of teaching the theoretical

bases (block 1), the knowledge path (block 2), practical experiments (block 3), and a field trip (block 4) during which students get the opportunity to work on permafrost in the field (e. g. by doing simple measurements, mapping, photographic documentation). Selected elements of the permafrost educational toolkit can also be used in informal environmental education with the main target group of adult tourists (e. g. educational trails, guided tours, brochures about natural conditions).

Language: English should be the main language but different versions (Italian, German, French etc.) could be delivered by each partner. The toolkit will be prepared in English but all the learning material must be provided in all Alpine majority languages.