

GUIDELINE for the Green Cool Schools material

Green Cool Schools: Guideline for Integrating the Website Content into Teaching Practice at Secondary School Level 1

The title is to be taken literally: more plants, less heat and an attractive place to study and work – this is how schools should be designed! This is the guiding principle of the Erasmus+ project “Learning4Greens@Schools. Learning and Teaching Materials for Greenings at Schools” – which provides teachers at secondary school level 1 with well-founded, self-service teaching and learning materials creating a sound knowledge base for school greening. All this is found on the website “Green Cool Schools” (<https://greencoolschools.eu/>).

This is a contribution to climate protection, adaptation to climate change and sustainable development. Habitats for plants and animals are desirable – also in built-up areas. The content - the education, and the framework – as well as the place of learning should fit together. Pupils in Europe shall acquire the ability to act and experience self-efficacy when greening their own school.

Purpose and target groups of this guideline

This guideline shall contribute to the content of the website “Green Cool Schools” (<https://greencoolschools.eu/>) being integrated into the teaching practice of secondary school level 1. To do this, this guideline primarily addresses teachers, but also decision-makers in the education system or those who help shape education such as school authorities, multipliers or those within the framework of a wide variety of organisations.

The “Green Cool Schools” teaching and learning materials can only be successfully implemented in schools if they are linked to the existing curricula and take into account the actual school environment as well as the conditions in different countries. This guideline aims to support teachers by showing how the materials can be used and how they can be integrated into various school subjects within secondary school level 1 for each represented country (Austria, Germany, Spain). This also creates a basis for interdisciplinary teaching – and thus also for teachers from different subjects to work together at the same school.

Each country involved in the project has its own version of this guideline, which is aimed directly at teachers and other people active in the field of school education – and for this purpose also deals with national peculiarities in the education system. Since no English-speaking country was represented in the project, the present English version of the guideline does not have this national focus – it rather summarises the national documents and offers an overview for interested people from all over Europe.



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Background of this guideline: The Green Cool Schools project

The overall aim of the project and website Green Cool Schools (<https://greencoolschools.eu/>) is to support the greening of schools and respective education to further sustainable development throughout Europe. It is not about greening as a mere hobby, but about greening as a professional contribution to climate protection, adaptation to climate change and active civic engagement. The Green Cool Schools project shows that change to and for our planet is possible locally and now – and not just elsewhere and in the distant future.

For this purpose, didactic teaching and learning materials including practical experiments, addressing lower secondary school (aged 10 to 14), have been developed and published digitally on the project website in German "Austrian German", English, Spanish and the Basque language. Through the cooperation of Germany, Austria, and Spain, three different climate and soil zones – which are representative for Europe – are addressed in the project.

The "Green Cool Schools" website (<https://greencoolschools.eu/>) provides teachers with well-founded "self-service" hands-on teaching and learning materials which create a knowledge base for school greening. The self-service materials are prepared to be used quickly and are self-explanatory. To help avoid long preparation times instructions are provided that serve as a framework for teaching in class. The hands-on teaching and learning materials for the secondary school level 1 serve as an introduction to sustainable, climate- and soil zone-adequate greening of schools. The materials convey awareness and knowledge about the preconditions of long-lasting, sustainable school greening. They also show the potential implementation of greening in schools based on experimental instructions on how to best get started.

- The material shows implementation potential in schools with experimental instructions on how to best get started when greening schools.
- What is promoted in terms of green practice at school can be taken home where further attention is drawn to the subject.

The teaching materials are based on the concept of "education for sustainable development". More information can be found on the website <https://greencoolschools.eu/about-this-website/sdg/>

Overview of the teaching materials and their topics

Eight different topics are included in the pool for the teaching and learning materials:

- Soil
- Soil types
- Soil functions
- Heat islands
- Plant care
- Positive effect of plants
- Vertical greening
- Indoor greenery

This is not a complete course that teachers would have to complete with their classes, but rather a treasure trove from which they can take out what is right for them, their classes, and their schools.

Information on how to use the website "Green Cool Schools" and how to access the didactic materials can be found under <https://greencoolschools.eu/about-this-website/how-to-use-the-green-cool-schools-website/>.

Grids for integration into the curriculum

With the proposed steps towards a green, cool school, teachers shall not be burdened with any additional work. It is rather about the real-life context of acquiring green knowledge and skills which are connected to the respective school subjects! Therefore, the materials are designed to be quickly applied in terms of content, timing etc. and can be flexibly integrated into different subjects so that green skills can be easily taught.

In order to support the integration of the "Green Cool Schools" teaching and learning materials into the curricula, grids are provided, connecting the eight topics and the eight experiments with the relevant school subjects for secondary school level 1, school types and grade/age levels.

These grids shall help teachers to plan their lessons according to the subject-specific national curriculum and by that enhance the self-service experience (usability). They are to be seen as a basis for the course implementation in different settings, suggesting which topics fit into which school subjects and grade/age levels.

In **Germany**, with its federal structure and its 16 different education systems, the grid refers to the states of North Rhine-Westphalia and Mecklenburg-Western Pomerania as an example.

In **Austria**, the grid refers to the basic curricula of two school types at the secondary level 1 in Austria: AHS, that is the secondary level 1 of the academic secondary school, and MS, which is the new middle school. (https://www.bmbwf.gv.at/en/Topics/school/school_syst/st.html)

In **Spain**, the grid refers to the basic curriculum of Secondary Education (ESO - Educación Secundaria Obligatoria) of the Spanish Education System according to the LOMLOE (Ley Orgánica de Modificación de la Ley Orgánica de Educación) (<https://educagob.educacionyfp.gob.es/va/inicio.html>).

Grid for Austria

Topic (and related experiment)	School type	Grade level	Subjects									
			BU ¹	GW ²	TW ³	BE ⁴	PH ⁵	CH ⁶	M ⁷	GSPB ⁸	E/SPA ⁹	
Soil, Soil types, Soil functions	AHS-Unterstufe, Mittelschule (MS)	5	+++	+++	++	++						+
		6	+++	+++	++	++					+	+
		7	+++	+++	++	++	++				+	+
		8	+++	+++	++	++		++			+	+
Heat Islands	AHS-Unterstufe, Mittelschule (MS)	5	+++	+++		++				+		+
		6	+++	+++		++				+	+	+
		7	+++	+++		++	++			+	+	+
		8	+++	+++		++			+	+	+	+
Plant Care, Positive Effects of Plants	AHS-Unterstufe, Mittelschule (MS)	5	+++	++	++					+		+
		6	+++	++	++		++			+	+	+
		7	+++	++	++		++			+	+	+
		8	+++	++	++		++	+		+	+	+
Vertical Greening, Indoor Greening	AHS-Unterstufe, Mittelschule (MS)	5	+++	+	+++	++				+		+
		6	+++	+	+++	++	+			+	+	+
		7	+++	++	+++	++	+			+	+	+
		8	+++	++	+++	++	+	+		+	+	+

School types: AHS = Allgemein höherbildende Schule (EN: General secondary school); MS = Mittelschule (EN: Middle school)

¹ BU = biology

² GW = geography and economics

³ TW = design & technology, handicrafts

⁴ BE = art

⁵ PH = physics, natural science

⁶ Ch = chemistry

⁷ M = mathematics

⁸ GSPB = history and political education

⁹ E/SPA = Foreign languages: English, Spanish (and Basque)

Grid for Germany

Grid for integration of the topics and experiments into the curriculum			
Topic	School type	lead subject / grade level	other subjects
Soil, Soil types, Soil functions	IGS, RegS	Natural Sciences / 5-6	
	GS, SekS	Natural Sciences (elective subject) / 6-7	Natural Sciences / 5-7
	OS	Geography / 5-6	
	Gym, IGS	Interdisciplinary project Geography, Chemistry, Biology 7-8	Biology 7-8 /
	RegS, VHR, HS, RS, IGS		Social Studies / 8
Heat Islands	GS, SekS	Social Science / 7-8	Natural Sciences 5-7, 8
	HS	Social Science / 7-8	Economy and Working World 7-8
	OS	Geography / 5-6	
Plant Care, Positive Effects of Plants	OS	Geography / 5-6	Biology 7-8 /
	Gym, IGS		interdisciplinary project Geography, Chemistry, Biology 7-8
	HS	Natural Sciences / 7-8	
	IGS, RegS	Natural Sciences / 5-6	
	GS		Natural Sciences 5-7, 8
Vertical Greening, Indoor Greening	IGS, RegS, Gym, GesS	Natural Sciences / 5-6	Biology / 5-6
	GS		Natural Sciences 5-7, 8
	OS	Handicraft / 5-6	Biology / 6 Art and Design / 5-6
	RegS, SekS,		Art and Design / 7-8
	RegS, VHR, HS, RS, IGS, Gym		Social Studies 8
	HS	Natural Sciences / 7-8	Economy and Working World / 7-8
<p>Types of school in Mecklenburg-Western Pomerania: GesS = comprehensive school / HS = secondary school / IGS = integrated comprehensive school / OS = (across all school types) orientation level / RegS = regional school / RS = junior high school / VHR = combined secondary and regional school</p> <p>Types of school in North Rhine-Westphalia: GS = Comprehensive School / HS = Hauptschule / SekS = Secondary School</p>			



Grid for Spain

Grid for integration of the topics into the curriculum		
Topic	subject / grade level	Basic knowledge
Soil (Soil, Soil types, Soil functions)	Knowledge of the Natural, Social and Cultural Environment / 5Primaria, 6Primaria	<ul style="list-style-type: none"> • Answer simple scientific questions, to interpret and explain facts and phenomena that occur in the natural environment.
	Natural Sciences / 1ESO, 2ESO	<ul style="list-style-type: none"> • Basic methodologies of scientific research • Geology • Interaction • Ecology and sustainability
	Geography and History / 1ESO, 2ESO,	<ul style="list-style-type: none"> • Natural landscapes • Natural characteristics of the Basque Country
	Biology and geology / 3ESO, 4ESO	<ul style="list-style-type: none"> • Basic methodologies of scientific research • Geology • Earth in the universe
Heat islands	Natural Sciences / 1ESO, 2ESO	<ul style="list-style-type: none"> • Basic methodologies of scientific research • Interaction • Ecology and sustainability
	Geography and History / 1ESO, 2ESO,	<ul style="list-style-type: none"> • Natural landscapes • Natural characteristics of the Basque Country • Climate risks and catastrophes • Environmental awareness
	Scientific Culture / 3ESO	<ul style="list-style-type: none"> • Climate change
School Greening (Vertical and indoor)	Knowledge of the Natural, Social and Cultural Environment / 5Primaria, 6Primaria	<ul style="list-style-type: none"> • Answer simple scientific questions, to interpret and explain facts and phenomena that occur in the natural environment.
	Natural Sciences / 1ESO, 2ESO	<ul style="list-style-type: none"> • Basic methodologies of scientific research • Interaction • Ecology and sustainability

	Geography and History / 1ESO, 2ESO,	<ul style="list-style-type: none"> • Natural landscapes • Natural characteristics of the Basque Country • Climate risks and catastrophes • Environmental awareness
	Biology and geology / 3ESO, 4ESO	<ul style="list-style-type: none"> • Basic methodologies of scientific research
Plants (positive effects and care)	Knowledge of the Natural, Social and Cultural Environment / 5Primaria, 6Primaria	<ul style="list-style-type: none"> • Answer simple scientific questions, to interpret and explain facts and phenomena that occur in the natural environment.
	Natural Sciences / 1ESO, 2ESO	<ul style="list-style-type: none"> • Basic methodologies of scientific research • Interaction • Ecology and sustainability
	Biology and geology / 3ESO, 4ESO	<ul style="list-style-type: none"> • Basic methodologies of scientific research

Explanation of different subjects – a European overview

Each of the three countries involved has its own types of schools, subjects, learning objectives and curricula - and thus also different connecting points in the pursuit of green cool schools. Nevertheless, a general overview of starting points is given below.

The subject of **biology** (and **environmental studies** / and **geology**) explores, among other things, animals and plants in their environment, biological diversity, ecological relationships, natural material and energy cycles, the historical development of the earth and its physical properties.

In **geography** (and **economics** / and **history**), the students explore the geological processes involved in the formation of landscapes and the processes of soil formation. They get to know climate and vegetation zones, but also climate change or environmental problems in urban areas. They become familiar with cartographic representations and deal with the design of living space and sustainable development.

Chemistry examines substances and their reactions - including rocks and minerals (the starting point for soil formation) as well as air, water and soil (the basis of life on earth).

In **physics**, the parameters temperature, heat and cold are examined.

The integrative subjects called **natural sciences** or **scientific culture** or **applied sciences** enable an even more comprehensive view of the soil as well as problems of or solutions to environmental pollution.

In general, scientific working techniques are also taught in these **natural science** subjects – e.g., observation, experimentation, logging.

The subject of **social studies** focuses on the global challenges related to weather, climate and climate change - but also specifically on the immediate environment and on the question of how people can shape their living space.

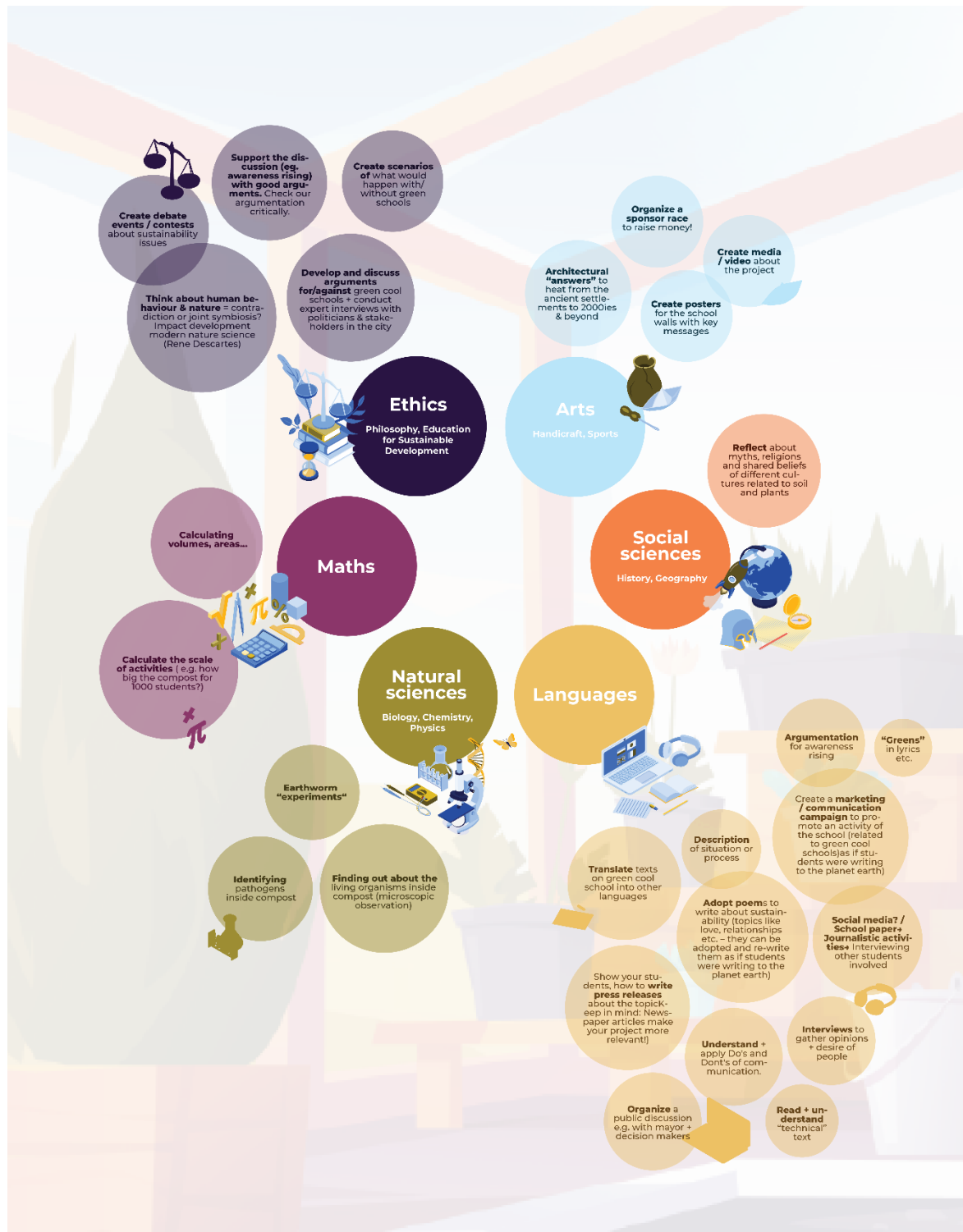
The subject **art / fine art, visual and audio-visual education** promotes creativity and deals with the design of architecture, among other things.

In the subjects (**technical and textile**) **handicrafts, technology, design, work theory and art education**, the pupils learn to plan and implement work processes and to design and produce simple everyday objects; they deal with environmental design and everyday aesthetics.

Inclusion of topics in other subjects

The explanation of subjects, as described above, refers to the eight topics presented so far and the associated teaching materials. In addition, Green Cool Schools can also form the framework for a variety of further teaching projects, in which other subjects are then also integrated. Some examples of this are outlined below:

Implementation of the Green Cool Schools materials



Regardless of the specific topic, the teaching and learning materials can be implemented as follows:

1. **Question / outline of the problem:** There is an initial situation or initial questions. Depending on the topic and situation, the teacher can ask the class about their previous experiences or assumptions (hypotheses). The teacher then specifies the procedure for developing it – then defines or expands it together with the class.
2. **Development phase:** Prepared in this way as proposed in phase 1, the students work on the topic. They carry out an experiment, for example on composting plant waste or filtering rainwater. They collect information about the school grounds and enter it on a map. They propagate plants and observe and document their growth. The teacher can add further steps to the development, e.g., research. In some cases, material from the website can also be used for this purpose.
3. **Backup phase:** What has been learned is saved. The students present their findings - e.g., orally or by presenting their notes. The teacher guides the class back to the original questions. Ideally, this question should now be answered in a way that everyone can understand. Perhaps new questions will arise that will lead to new insights. Or there are further concrete steps that promote and increase green knowledge in school, so that learning and design go hand in hand.

The eight teaching units are not formally structured according to this three-step process, but they do follow this logic.

We wish you all the best when implementing Green Cool Schools.

We would be happy to receive your feedback.

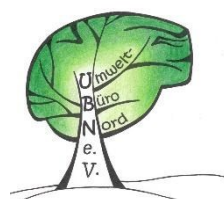


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