



Teachers guide to the activity

connect₂

CO₂ on the way to school

A global school campaign on transport and climate change



«The international campaign CO₂nnect: CO₂ on the way to school provides schools with a unique opportunity to provide high quality Education for Sustainable Development.»

Bård Vegar Solhjell, The Norwegian Minister of Education

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Foreword

The United Nation's goal for Education for Sustainable Development (ESD) is to integrate the principles, values and practices of sustainable development into all aspects of education and learning. It is therefore our pleasure to present to you an international school campaign which will suit you whether it is your first time you are acquainted with ESD, or if you are already using this approach in your teaching.

The campaign involves:

- school pupils investigating carbon emissions from travel to school
- learning more about climate change and developing ideas on how to reduce CO₂ emissions from transport
- using this information to cooperate with local decision makers to reduce CO₂ emissions in local communities

The actual activities will take place inside and outside the classrooms, in schools and local communities. Transport emission data and ideas on how to reduce CO₂ emissions are shared on the website, and own results may be compared with those of other schools both nationally and internationally.

The CO₂nnect website address is: **www.co2nnect.org**

This booklet contains the central pages of the CO₂nnect website and gives ideas on how to plan and carry out the teaching and learning in the school. The CO₂nnect activities are carried out according to the 10 steps described on page 8. You find ideas, supporting material, and recommendations for additional activities in the help sheets in section 4. Here you may also read more about the learning goals of co2nnect.org. This booklet is edited by Astrid Sandås, the Norwegian Directorate for Education and Training and Faye Benedict, The Norwegian University of Life Sciences.

The ESD school campaign "CO₂nnect" is organised by the EU Comenius Lifelong Learning project "SUPPORT: Partnership and participation for a sustainable tomorrow".



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1. Objectives of the CO₂nnect campaign

Overall goal of the CO₂nnect campaign

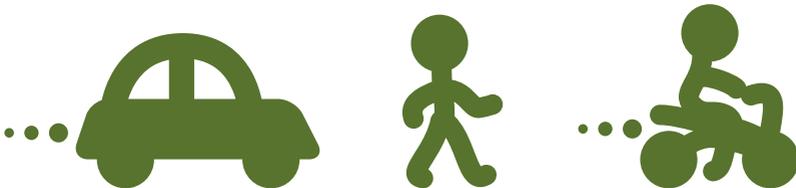
The long-term purpose of the campaign is to improve the understanding and practice of Education for Sustainable Development. An important part of this is to create systems of committed cooperation between schools, decision makers, and researchers.

To achieve this, schools are offered an international, internet-based school activity in which schools, researchers and local decision-makers cooperate. By joining the campaign, your school will be part of a large network of schools.

Objectives of the CO₂nnect campaign

The concrete objectives of the campaign are to:

- Engage a large number of schools, pupils, parents and communities internationally to work with sustainable development in the field of climate and transport
- Increase pupils' competencies in ways described in the learning goals
- Increase schools' competency to deliver high quality ESD
- Provide ICT based tools including guidelines, links, a CO₂ transport emissions calculator and opportunities for partnership
- Generate information useful to research and management about transport- and climate issues (including an international database on CO₂ emissions from school transport)
- Generate innovative ideas for sustainable transport



2. Learning outcomes

Education for sustainable development aims to develop skills and abilities, awareness, attitudes and values as well as a better understanding of sustainability issues.

Intended learning outcomes for the CO₂nnect activities are:

Understanding of the mobility- and climate change issue

- climate change, its causes and consequences
- greenhouse-gas emissions from transport and mobility
- the interlinking of social, environmental, cultural and economic aspects of the local transport system
- how individual choices and participation can contribute to creating a more sustainable development

Skills and abilities

- actively participate in local democratic processes
- interact with local decision-makers
- collaborate with researchers and generate reliable information
- create innovative proposals and suggest alternatives for a more sustainable society
- use ICT and the internet interactively for partnership and data analysis
- act and think autonomously

Awareness

- sensitivity to and awareness of the effect of transport on climate change and the sustainability issues raised by climate change
- awareness that each person has a role in climate change, including CO₂ emissions from transport

Attitudes and values

- develop concern about the climate change issue, its causes and impacts
- develop motivation to participate in decision-making for a more sustainable society
- realize that they have opportunities to help create a more sustainable society, both as individuals and through common actions

3. What to do?

3.1 The 10 steps of the campaign

1. Plan and prepare for the campaign . Get familiar with the website, approach and activities. Make a school/class plan for your work with the campaign. Find local partners or school partners and plan how you will cooperate.
2. Sign up to participate.
3. Introduce topics of climate change, CO₂, and school transport.
4. Collect data on distance to school and means of transportation and enter it into the international database.
5. Complete a short online questionnaire on climate- and transport issues.
6. Analyse and discuss your results; compare your CO₂ emissions from transport with that of other schools and countries.
7. We encourage you to work closely with local authorities, parents, businesses, organisations or other stakeholders during the project. You could present and discuss your findings. Then explore together how the local transportation systems could be made more sustainable. What policies or programmes does your school or community already have for transport and climate gas emissions?
8. Develop ideas for reducing climate emissions from transport. Upload your climate idea and photos from your work.
9. Submit your project work to an international school competition (optional).
10. Evaluate the campaign and become a SUPPORT school (teachers, optional).

3.2 Collect and enter data

After signing up, you print out the data sheet, hand it out to your pupils, and have them complete it. Complete a form yourself, and hand it out to other school staff that want to participate. One form per reporter.

You will find an electronic version under **What to do/Enter data sheet**. There you find a further description how to proceed.

Estimate the distance to school, this can be done in several ways, e.g.:

- Use internet tools like Google Maps
- Trace the school way on a paper map and scale it up
- Use a car or bike odometer
- Use a GPS
- Count your steps or use a pedometer/stepcounter and multiply with length of pace

Data entry sheet

Name: _____

Birth year: _____

Male: Female:

Tick a category: Pupil: School staff:

Which mode(s) of transport did you use to get to school today?	CO ₂ multiplier (kg CO ₂ per km per passenger)	Distance to school? (in km, one direction)
Foot	0	
bicycle	0	
by animal transport	0	
rickshaw/trishaw	0.073	
moped	0.094	
motorcycle	?	
auto rickshaw	0.094	
onemobile	0.043	
car electric	0.11	
car small	0.133	
car medium	0.183	
car large	0.094	
car hybrid	0.17	
taxi	0.069	
bus	0.055	
mini bus	0.06	
diesel train	0.065	
electric train	0.065	
underground/metro	0.042	
electric tram/trrolley bus	0.115	
ferry	0.53	
express boat	-	
other mode(s) (please specify)		

3.3 Results

You will be able to view the calculated CO₂ emissions of the data your class/school has entered as well as that of all others who are participating. Under “Results” in the main menu, you can find the following pages:

CO ₂ emissions	gives the “total” results of all reporters
CO ₂ by transport modes	shows emissions per transport mode
Transport practice	shows the number of reporters that have used the various transport modes
CO ₂ by country	shows a country-wise listing of school-way distance and CO ₂ emission figures
CO ₂ by school	lists school-way distance and CO ₂ emission figures for participant schools
Questionnaire part one	shows the results of the first part of the questionnaire
CO ₂ by questionnaire one	here you can investigate further how the CO ₂ -emission level (CO ₂ /km), modes of transport, gender, and age varies among the various responses to the questionnaire
Questionnaire part two	shows the results of the second part of the questionnaire
CO ₂ by questionnaire two	here you can investigate further how the CO ₂ -emission level (CO ₂ /km), modes of transport, gender, and age varies among the various responses to the questionnaire
Map of contributors	shows schools that have uploaded results
Climate ideas	here you find the suggestions from participating schools for how to reduce CO ₂ emissions from transport in their local community
Photo gallery	here you find images uploaded by participant schools

4. Help sheets

4.1 Introduction

In this section you find a set of help sheets with information that might be helpful when planning and carrying out this project. The aim of these help sheets is to provide ideas.

4.2 CO₂ from transport and other sources

The average amount of CO₂ emitted per person for a typical country in Europe is around 7 tons – or 7000 kilograms. However, the average emission per country varies, and especially developing countries, have much lower carbon emissions per person than an average person in Europe.

CO₂ emissions from the school way is likely to be a small part of a person's total CO₂ emission budget. However, knowing the magnitude of this emission level might help young people to grasp how much 7 tons of CO₂ is, and thus give them a reference point for putting the problem of CO₂ emissions into perspective.

In most European countries transport is somewhere between 20 and 25% of a carbon footprint. Transport to school is part of that 20-25%, and the rest is made up of travel to and from work, shopping and holidays.

Explanations of terms and units, see http://co2nnect.org/help_sheets

4.3 Calculations of emissions

The CO₂nnect CO₂-calculator works by multiplying the distance travelled to school by a "multiplier". The multiplier defines the amount of CO₂ emitted per passenger and per kilometer for a given mode of transport.

Each mode of transport (walking, bicycling, car, train, etc.) will have a different multiplier. The multipliers have been pre-programmed into the CO₂nnect calculator and the calculations are done automatically for you.

The CO₂nnect multipliers:

- include CO₂ only. Some other calculators include other "greenhouse gasses" as well, expressed as "CO₂ equivalents"
- include only the CO₂ generated by the actual travel to and from school. Some calculators include CO₂ produced indirectly, for example during the manufacturing or disposal of a car.

For the list of the CO₂ multipliers used in CO₂nnect, http://co2nnect.org/help_sheets

Most of the multipliers used in CO₂nnect have been taken from the UK Department of Environment (Defra). The source is “2008 Guidelines to Defra’s GHG Conversion Factors: Methodology Paper for Transport Emission Factors.” (see: <http://www.defra.gov.uk/>)

Where this document does not give data on a mode of transport, we have used other sources. CO₂nnect has consulted with experts on carbon calculators while selecting the multipliers.

The multipliers in CO₂nnect are based on 2008 data and have been confirmed by carbon calculator experts.

The amount of CO₂ emitted by a car using petrol will depend on many things:

- engine size and car weight
- the kind of fuel used and the fuel efficiency
- age of the car
- number of passengers (more passengers means lower emissions per person)
- car maintainance (especially the engine, and tire pressure and condition)
- how the car is driven (speed, idling, starting and stopping, acceleration, braking).

The same would be true for other methods of motorized transport.

The multipliers assume a certain average number of passengers in each mode of transport. This is called the “average passenger load.”. This could be quite different than the actual passenger load in your situation. For example, if you ride a big bus that is almost empty, or extremely full, the multipliers might not be very accurate for your trip to school.

You might also ask whether the multipliers would vary from country to country. The answer is yes! One reason is that electricity is produced vary in different ways. The main source of the electricity in a country (hydropower, coal, nuclear, other) would certainly make a big difference in the amount of CO₂ emitted from trains, trams or other transportation running on electricity!



Countries all have their own economies, transport systems and pollution laws, which could also have an effect on passenger loads and carbon emissions – even for the same mode of transport. This would be a relevant topic to discuss this when you compare results from several countries.

Theoretically it would be possible to make a calculator that would take all of these things into account. However, today we don't have all the data needed to find such detailed and accurate multipliers. A calculator like that would be very complicated and it would take a lot of work for pupils to collect the data. We chose to make the CO₂nnect calculator relatively simple so that pupils could spend more time learning about their local transport systems and working with others to find sustainable solutions.

There are a few other sources of inaccuracy to be aware of as well. Pupils will be measuring and entering the distance to school and the mode of transport. There will always be some error in these measurements depending on the method used, and the distances are rounded up or down to the nearest kilometer. Some mistakes might also be made when calculating distance or entering the data.

The information on number and proportion of people using the various modes of transport should be quite accurate. There are no multipliers, so errors would only occur while deciding on the mode of transport and registering the data.

Considering all of these possible sources of error, we are still confident that the results of CO₂nnect will be accurate enough for you to use your school results to discuss CO₂ emissions and work to reduce emissions in your school and local community. They will also be accurate enough for you to compare between schools

4.4 Project work using the campaign – an example

We recommend that you use the "10 steps of the campaign" to set up a plan for your school.

Below is one example of how you could organise the 10 steps and activities of the campaign at your school as a school project.

1. Plan and prepare for the campaign

- Teachers and staff hold a preliminary planning meeting and decide on a time frame
- Teachers meet with pupils in the classes that will participate. Pupils and teachers discuss what they want to do and make a plan for their work from start to finish
- Teachers and pupils get familiar with the website, the approach and activities
- Decide what issues you would like to explore locally
- Find local partners or school partners and plan how you will cooperate

2. Teachers sign up the school and their classes to participate,

- This could be done in the classroom or by the teacher alone

3. Introduce topics of climate change, CO₂, school transport and sustainability

- Many methods can be used to get pupils working actively with the topics, such as group work, excursions, drama, discussion, debates, reading and reporting on internet links of interest, or inviting guests from the transport or energy sector to the school.

4. Collect data on distance to school and means of transportation and enter it into the international database.

- One or more class hours could be used to measure the way to school on maps or using other methods and enter the results into the CO₂nect database.

5. Complete a short online questionnaire on climate- and transport issues

- It should only take a few minutes to complete the questionnaire. Why not also pick one or more question to discuss and debate, after completing the questionnaire?

6. Analyse and discuss your results compare your CO₂ emissions from transport with that of other schools and countries.

- This topic could be done in a few class hours by using the results analysis tools on the website, or it could stretch over some weeks to give pupils more time to work with the material or to make a local project.

7. An important part of CO₂nnect is to think about how systems can be changed to reduce CO₂. We encourage you to work closely with local authorities, parents, businesses, organisations or other stakeholders.

- In this phase of the campaign the pupils will get more involved with the reasons why their transport situation is the way it is, and what can be done to increase sustainability.
- Set up a meeting or visits with local decision-makers. That could mean school or town authorities, parents, businesses, other schools or any other stakeholder interested in cooperation.
- Present the results of the campaign and the pupils' analysis and conclusions.

8. Develop ideas for reducing climate emissions from transport. Upload your climate idea and photos from your work.

- Pupils will need time to work with their ideas on how to reduce climate emissions. Getting together with local authorities, parents or others in the community may be the clue to a successful climate idea or activity!
- Explore alternative ways of getting to and from school and the climate impact.
- Once the class has discussed and decided on a "climate idea," upload it to the website.
- Check out and discuss other schools' ideas by browsing the website
- Document the work with photos, videos, models, etc. as well as in a written report.

9. Submit your project work to an international school competition (optional).

- Chose a format for uploading your project work, then upload it to the website, prepare the report and upload it.
- CO₂nnect will host a school competition - look out for information about this on the web site.

10. Evaluate the campaign and become a SUPPORT school (teachers, optional).

- This is for the teachers to do by themselves. A meeting of the most involved teachers could be a good setting for completing the evaluation.
- We recommend you to take some time to reflect on what happened and give feedback about what the pupils learned and what the school learned. We also would like to hear what worked well and what was difficult.
- Your school is now on the way to developing ESD and will receive a diploma for being a SUPPORT school.
- At the same time, by completing the evaluation module you have made an important contribution to international research on ESD.

4.5 Questions for discussion

4.5.1 How to use the reflections questions

These questions can be used to stimulate the flow of ideas and discussion about climate change and transport. Pick out one or several questions you feel are interesting and at an appropriate level for your pupils. Use them in group discussions, debates, as a basis for a project or investigation, or when meeting with local people and decision-makers!

4.5.2 Questions about participation and partnership

- How do you feel being part of an international campaign with other schools?
- What was it like to discuss issues with local people, politicians or decision-makers?
- Were the people you worked with locally interested in your findings?

4.5.3 Questions about climate and transport

- Why is emission of greenhouse gasses from transportation a problem? Do you have any suggestions about how greenhouse gas emissions can be reduced?
- What bodies or organisations are in a position to take actions that can reduce greenhouse gas emissions?
- Who is responsible for the systems of transport where you live?

4.5.4 Questions about understanding, analysing and comparing the results

- How does your school compare with the average for your country and internationally? What could be reasons why your school is above or below the average?
- Why do you travel to school using the transportation means that you do?
- How did your grandparents travel to school? How do you think your grandchildren will travel to school?
- Which countries emit a high or low amount of CO₂ per student kilometer travelled? What could be reasons for these differences?
- How accurate do you think the figures for your CO₂ emissions are? What are sources of error?

4.5.5 Questions about finding solutions

- Are there other ways the transportation of school pupils could be organised in your community? Would safety be an issue?
- Is there a culture for bike-riding and sharing rides where you live? Why or why not, do you think?
- What alternative sources of fuel or other means of transport are available, that would reduce emissions?
- Does your municipality have a climate policy or a transport policy? If it has one, is it a good one that will reduce greenhouse gas emissions in the future?
- What could the public services in your local community do to reduce transportation emissions?
- What could citizens in your community do to reduce transportation emissions?
- What could politicians in your community do to reduce transportation emissions?
- What could businesses in your community do to reduce transportation emissions?

4.5.6 Questions for further exploration

- How can citizens get involved to make the transportation system in your community more sustainable? What democratic procedures would be involved to make that happen?
- How could communities be organised differently, to reduce the distance we need to travel in our daily lives?
- How much of your CO₂ emissions comes from transportation? (You will need to look for additional information to answer this!)
- How could CO₂ emissions from other activities besides transportation be reduced?

4.5.7 Reflection questions for teachers

The following questions are examples of topics that teachers could discuss together, either before, during or after the campaign.

Questions about your experience with the CO₂nnect campaign

- How is this way of working different than “traditional” teaching methods, like lessons learning and class instruction?
- How does the approach of this campaign affect what the pupils learn

and their motivation? Consider, for example, the effect of using ICT and the database, working with a real issue, contact with scientists, collaboration with other schools or meeting with local people.

- Did you have any particular problem carrying out the campaign? How could you solve them next time you try a project like this?

4.5.8 Questions about ESD at your school

- What does "education for sustainable development" mean to you?
- Would your school be interested in doing more education for sustainable development?
- How can schools contribute to a more sustainable society?
- How could your school continue to work together with local people and decision makers on sustainability issues?
- How can teachers - and the school as a whole - be good role models when it comes to sustainable development?

4.6 School-local community cooperation

One of the main goals of ESD is that pupils become active citizens who care for and are engaged in the community/society they live in, as well as the world beyond. An important part of this learning process is to get some experience of interacting with the local community.

Practical civics

Interacting with local bodies/organizations/groups/networks (such as local authorities, parents associations, local companies and NGOs) is an excellent opportunity to get some practical experience in civics, and to train and develop several skills like communicating verbally and in writing. It is also an opportunity to improve the pupils' understanding of the values in their society.

Interdisciplinary use of knowledge

Depending on the themes you decide to work with, a range of school subjects can be involved. In this case, looking at maps to discuss alternative ways to get to school, calculating distances, perhaps comparing with the situation in other regions or countries – which can involve the interaction with other schools, creating models and posters and skits, making interviews, studying

the environmental effects of traffic, finding out who has the responsibility for the school bus, who are the local traffic planners, why does the traffic situation look the way it does, what has been done in other places to solve similar problems – all these topics and questions can involve basically all subjects depending on how one chooses to work.

When planning ESD activities, consider how an interdisciplinary perspective can provide deeper insights into topics in the subject curriculum.

ESD is truly cross-sectoral and may be just as attractive for someone concerned with sustainable economic growth as for someone whose main entry point is environmental or socio-cultural issues..

Local cooperation needs local design

How one chooses to interact with the local community is of course determined by the society and local customs.

In countries where politicians have a more informal approach, it may be easy to get a member of the local government to come to the school or invite the pupils to the town hall. In a less open society, this might be both difficult to achieve and it may be more rewarding to invite civil society representatives from organizations working with a related topic.

To give some ideas, we imagine that one or more of the following groups might come into question:

- Local politicians – perhaps the chairman of the municipal council, the transportation planner, the urban planner
- Community based organizations working with the local environment or sustainability issues
- Agenda 21 committees
- Village development committees
- Local branches of Non-Government Organisations
- The Police
- Parents associations
- Bus company

Whom you chose to cooperate with or invite depends on the focus you/ your class has chosen and what methods you wish to use. It is up to you to



choose how, and there are endless variations, depending on the age group, setting and your interests. Some ideas:

- Prepare questions in the classroom and let some pupils interview the invited person/send them out to interview people. Other pupils can get the task to write down what is said and some to take photographs.
- Invite stakeholders to the classroom and ask them to explain how transport planning is done, why things are done the way they are and what the plans of improvement are.
- If you prepare a proposal for how the pupils' way to school can be improved, you can invite parents, politicians and others for a meeting or make an exhibition.
- Invite other schools in the region/municipality/town to make their suggestions for an improved transportation plan. Cooperate with the other schools to make a final proposal, and go to the local government to present it.

4.7 School-school cooperation

Your school can cooperate with other schools locally, nationally or internationally when carrying out the climate campaign. This can give the pupils fresh perspectives on their own transportation system and alternatives.

When cooperating, it is important to define the topic for the school-school partnership and how you will work together. Try to clarify what you will each do on your own, what you will work on together underway, and whether you will make a joint product or separate products which you can then share. For example, you can cooperate with another school in the Climate Campaign by:

- Comparing results of the climate campaign and explore the reasons for differences. You could compare climate gas emissions, ways of getting to school, alternative means of transport to school, what your municipality is doing on climate and transport, or other results
- Selecting reflection questions that both you and your partner school will work with, and sharing your discussions and ideas
- Developing an idea for a more sustainable transport system.

The SEED Comenius network publication "Tools for ESD-Schools - Reflective methods for School Partnerships of Education for Sustainable Development"

is a toolbox for cooperation between schools and provides practical tips and advice.

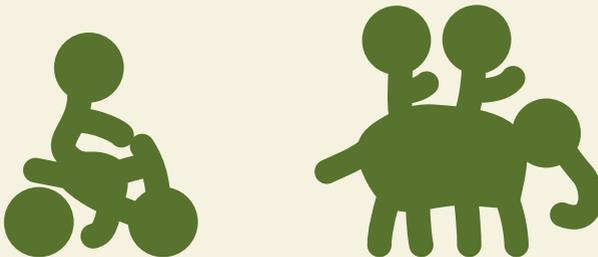
There are several ways to find a partner school:

- Use a partnership you already have
- Contact your local or regional school office to find a school nearby
- Search for a partner school internationally

The e-twinning tool is extremely useful for finding an international partner school. Go to the e-twinning home page (www.etwinning.net), register for free and use the database to find a partner school.

The EU Comenius programme offers many opportunities to create or join school networks and partnerships. Comenius Contact Seminars are a good place to meet possible partners and make an application for a new school network allowing you to visit your partner school and attend events to build competence.

See the Comenius webpages or contact your Comenius National Agency to find out about the various opportunities for partnerships and mobilities.



4.8 School development

On one level, the Climate Campaign is an opportunity for your school to join an innovative international activity. It can also be part of a longer term process of pedagogical renewal and capacity building – school development. Here we want to discuss ideas about how your school's approach to Education for Sustainable Development (ESD) could be linked to a wider agenda of school development and school leadership.

How strongly are sustainability and ESD embedded in the basic values and mission of your school? Some schools have gone very far with this idea and developed a vision and strategy to become an "ESD school" or "sustainable school". We call this a whole-school approach to ESD. In these schools we usually find a strong and engaged school head who is concerned about sustainability and pedagogical development.

For some of these schools, sustainability essentially means environmentally friendly school operations. Others go further and integrate the ideas of sustainability and global responsibility right across the curriculum and teaching.

Most schools don't have a whole-school approach to ESD. Teachers are organised in teams to do this kind of teaching or individual teachers integrate ESD into their classes and subjects.

Whatever your school's particular situation and approach is, the Climate Campaign can be used to learn about ESD and build the competence of the school and its teachers to deliver this kind of education. The campaign can be adapted to your situation and ambitions.

The competence-building benefits of participating in the campaign are actually quite wide in scope. The campaign activities can give your school a platform of practical experience and build an understanding of:

- working with learning outcomes
- constructing education across subjects
- project work
- hands-on learning
- partnering with authorities, parents, companies and others in the local community
- cooperation with research

- using ICT interactively
- international cooperation
- investigation of complex sustainability issues
- pupil participation in democratic processes
- active contribution to sustainable development
- innovation

High quality ESD involves new kinds of relationships between the school and society and focuses on developing the potential of pupils to think and act independently and critically. Organisational learning and school development are processes over time, and they require strong leadership and strategic plans at the school level. The same is true of integration of ESD. There are many common points between ESD and school development and it can be very productive to link them in the school's vision and strategy.

Most countries have programmes or centers of competence where it is possible to get help and information about school development and school leadership. These links can also be a good start.

Recent work in the United Kingdom on linking school leadership, school development and a whole-school approach to ESD:

The National College for School Leadership (www.ncsl.org.uk) works to make a difference to children's lives through excellent school leadership. Under Leading sustainable schools you can read about "What the research says" The NCSL-report «Leading Sustainable Schools» can be downloaded at the NCSL website under Publications

The publication: "Building capacity and empowerment through ESD" from the SEED Comenius network provides an international discussion of the relationship between ESD, school leadership and school development. (see: <http://seed.schule.at>)

4.9 About learning outcomes

Learning outcomes can be described as competencies. A competency is what the pupils will be more capable of doing after completing the learning activity. Competencies are always written as verbs, since they are the ability to do something. Knowledge, for example, would not be a competency, but ability to construct knowledge from information or experience would be. When formulating the suggested learning outcomes for the Climate Campaign, we could not find any standard framework or formula for describing the learning outcomes of Education for Sustainable Development (ESD). UNESCO has provided descriptors for ESD in connection with the United Nations Decade for Education for Sustainable Development but these describe the characteristics of the educational offering (inputs) rather than outcomes for pupils (outputs).

Earlier work under the auspices of UNESCO provided a set of objectives for environmental education which comes closer to a description of learning outcomes, (Intergovernmental Conference on Environmental Education organized by Unesco in co-operation with UNEP Tbilisi, 74 - 26 October 1977). The learning objectives are grouped under the headings awareness, knowledge, attitudes, skills, and participation. We have used this familiar framework as a starting point and adapted it to the broader perspective of ESD and to the contents of the Climate Campaign.

Because achieving the learning outcomes is a long process which can't be achieved after just one activity, our goal is not absolute, but rather to "stimulate" or "contribute to" a learning outcome. We expect the pupils to make positive progress toward the goal, but it would be unrealistic to expect them to fully reach the goal immediately.

There are certainly other ways the learning outcomes could have been described. ESD is supposed to prepare students for their role as citizens creating a more sustainable society. This role of empowered, active citizenry would require, for example:

- the ability to acquire, construct, evaluate and apply knowledge
- the ability to draw connections between isolated events and the broader context of their causes and consequences ("seeing the bigger picture"), and
- the ability to think and act independently and innovatively.

Peter Senge of Massachusetts Institute of Technology has written a book called "The Necessary Revolution: How Individuals and Organizations Are Working Together to Create a Sustainable World". It is about organisational learning for sustainable development. Senge argues that sustainable development hinges on all kinds of organisations undergoing a deep transformation and learning process, to become sustainable. (The Necessary Revolution by Peter Senge et al is published by Doubleday Business in 2008.)

Senge describes 3 key competencies needed for this kind of organisation learning and transformation for sustainability to occur: seeing the wider whole/systems thinking, collaboration, and creating the future.

The challenge is not so much about "finding solutions" or "being critical," Senge argues, but rather about having a full understanding of a situation or issue and possessing the skills, attitudes and organisational dynamics to make change happen. Citing examples of a wide range of organisations where such a deep transformation has occurred, Senge paints an optimistic picture of a world full of opportunities for positive change - if we have the competencies needed.

OECD's DeSeCo project describes 3 groups of key competencies: using tools interactively, interacting in heterogeneous groups and acting autonomously. It is quite interesting that Senge's key competencies bear such a striking resemblance to these!

Both Senge's book and the results of OECD's DeSeCo project are interesting reading, guaranteed to stimulate thoughts about what key competencies young people today will need in their lifetimes to meet the sustainability challenges ahead.



4.10 Other activities

An excellent sourcebook about methods in ESD is "Handbook on methods used in environmental education and education for sustainable development" by M. Scoullos and V. Malotidi (2004). You can get this book online at www.mio-ecsde.org by registering as a user of the Greek Medias website (free). You will be sent a password and can then download the handbook, as well as other materials on ESD.

The book is particularly concerned with how the learning objectives of ESD can be achieved using educational methods such as various methods for discussion, concept mapping, bibliographic research, experiments, models, values-related teaching and field methods as well as problem-solving and project methods.

The work of the climate campaign can be filled out using methods chosen by you and your pupils. The following are some examples:

- Research media coverage of climate and transport issues
- Monitor the weather, biological diversity or other nature phenomena related to climate
- Research the price and emissions of alternative fuels and means of transport
- Explore values and interests using role playing, debates, etc.
- Conduct an opinion poll
- Interview local politicians about their stand on climate and transport
- Research local transportation systems
- Investigate the safety of the way to school
- Try out and evaluate alternative transportation means
- Make a climate plan for your school or community

5. Who is behind CO₂nnect?

This campaign has been developed by partners and members of the EU Comenius Lifelong Learning project Partnership and participation for a sustainable tomorrow, SUPPORT. The goal of SUPPORT is to promote and improve knowledge about Education for Sustainable Development, ESD. The SUPPORT website address is <http://support-edu.org>. SUPPORT comprises a network of about 50 partners and members representing international expertise in the field of education for sustainable development.

The idea for the SUPPORT project was initially developed by the Environment and School Initiatives network, ENSI, an international organisation promoting educational research and policy development in ESD since 1986.

The CO₂nnect website, technical solutions, and database functions were developed by the Norwegian Directorate of Education and the Centre of Schools Science Education, University of Bergen, Norway as part of the educational platform *sustain.no*.

The ICT development team within SUPPORT that has worked with implementing CO₂nnect, consists of Reiner Mathar (Group Leader), Astrid Sandås, Faye Benedict, James Hindson, Karin Ulbrich, Ole Edvard Grov, Åsa Renman, and Gaute Grønstøl.

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6. Endorsements of CO₂nnect

The organisers of the World Conference on Education for Sustainable Development (to be held in Bonn, Germany in spring 2009) have selected CO₂nnect as one of 25 international ESD projects to be showcased at the halfway conference for the United Nations Decade for Education for Sustainable Development.

- *«The international campaign CO₂nnect: CO₂ on the way to school provides schools with a unique opportunity to provide high quality Education for Sustainable Development.»*

Bård Vegar Solhjell, Norwegian Minister of Education.

- *«Our future is threatened by a non-toxic and ubiquitous metabolite of the global human civilization: Carbon Dioxide. Encouraging local action is one of the keys to solve the problem. Therefore, CO₂nnect plays an important role in shifting humankind towards a more sustainable development.»*

Dr. Thomas Schauer, Director, The Club of Rome - European Support Centre.

- *«Climate change as a political challenge cannot be handled by national states on their own. That's why, the European Union plays a key role in coordinating politics to avert the climate changes consequences. Recognizing the need for being engaged internationally in this area, the EU formulated goals for reducing carbondioxid- emissions. But political aims do not work without citizens participation. So I am glad about this platform, which offers opportunities of networking and exchanging experiences in issues of climate change. The CO₂nnect-campaign helps young people to understand how climate change influences their everyday life. I hope that schools from all parts of the world will use this tool for exchange and generate new knowledge and understanding to solve future problems. I wish all users success and - of course a little bit fun too -in communicating all over the world via the CO₂nnect-Network.»*

Dr. Udo Bullmann, Member of the European Parliament.



connect²

CO₂ on the way to school



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