http://www.carboschools.org

Teaching about Sustainable Development

Dr. Phil Smith, MBE

Teacher Scientist Network, Norwich.

Introduction

A great deal of time, energy and resources have been invested in helping teachers and pupils understand more about CO_2 and its role in climate change. In addition to Carboschools, there are a plethora of science education activities associated with climate change, for example globe (www.globe.gov), la main a la Pâte (www.lamap.fr/climat), climate futures (http://www.upd8.org.uk/climate-futures/) and the web-portal http://climatechangeeducation.org/ to name just four that are semi-international. **But what about our (societies) role?**
Learning about the science behind climate change and carrying out projects and investigations should have awakened young people's curiosity, interest and desire to act positively in their own lives to make a difference, locally and globally. However, this is only the start.

This desire to act needs to be fostered and built upon. The young people in education today (12-16 year olds in 2010) have the potential to become the policy makers dealing with consequences of climate change across Europe and beyond in 2050. This is where the Education for Sustainable Development (ESD) agenda becomes so important. Building upon the young people's knowledge in

order to firstly increase their environmental awareness and back this up with actions both singularly and in partnership with others is the key aim of ESD, influencing young people's schools, homes and their wider communities.

"*if the earth's problems are caused by millions of thoughtless or selfish acts … then the big solutions can come from millions of individual efforts*" (St. Martin at Shouldham CEVA Primary School, Norfolk, UK"

Definitions

One of the earliest definitions of Sustainable Development (SD) comes from the Brundtland Commission (1987)

"*Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*"

The Brundtland Commission also suggested that economic, social and environmental considerations had to be integrated to address issues of poverty, equity, quality of life, and global environmental protection. At the 'Earth Summit' in Rio in 1992, these principles were adopted and incorporated into 'Agenda 21', a comprehensive set of principles to assist governments and other institutions to implement sustainable development policies and programmes in the twenty first century. Agenda 21 was agreed by over 170 countries, and many of the principles needed local action. Many local authorities, in the UK and around the world, have produced local action plans for sustainable development - 'Local Agenda 21'.

The UK Sustainable Development Commission extended this definition slightly and added a positive outlook. Rather than just 'meeting the needs' SD is seen as "a way of thinking and acting to organise our lives in order to satisfy our basic needs **and enjoy a better quality of life, without compromising the quality of life of future generations**."

Another commonly used definition comes from the World Conservation Union / United Nations Environment Programme / World Wide Fund for Nature, 1991

"Improving the quality of life while living within the earth's carrying capacities"

This statement recognises that the well-being of people and nature is intimately linked. People can't flourish without a flourishing natural environment - they share the same planet, limited natural resources and future. See the WWF's One Planet Future for more details: http://www.wwf.org.uk/what_we_do/about_us/building_a_one_planet_future.cfm

Living sustainably will help us limit the extent of climate change (mitigation) and to respond to its consequences (adaptation). So our ability to develop more sustainable lives will impact upon the speed and degree of climate change that we experience, while the choices available to us to develop sustainably will change as the climate changes.

ESD, Education for Sustainable Development, is about developing pupil's knowledge, values and skills to enable Sustainable Development to occur. It is also about pupils considering alternative solutions and choosing paths of action.

What is ESD ?

✓ ESD could be lessons that compare fair trade with organic and non-fair trade products; balancing different needs (environment, economy, society). Thus enabling young people to come to personal decisions about whether to buy fairly traded products or not.

× ESD is not lessons on fair-trade that 'lead' pupils to the conclusion that buying fair trade products is the right thing to do

Adapted from Martin & Owens (2008)

Empowering young people and involving them in actions is a key part of ESD. Often the questions and challenges posed do not have right or wrong answers, there is a good deal of individual choice. However, young people need help to develop the skills necessary to unpick the complex arguments. Martin & Owens (2008) describe a spiral ladder of participation in ESD. It begins with awareness raising / gaining knowledge (which might be Carboschools activities), followed by development of skills and understanding and the formation of personal opinions that result in taking action and evaluating the effectiveness of that action.

One of the challenges our present education system is faced with is the dimension of teaching about SD in '*futures education*.' How able do we feel to prepare our young people for (a very different) life in the future. It is only when we can reflect critically and creatively on the future that we can help young people fully understand the importance of global citizenship and education for sustainability (Hicks, 2010).

Whole School approach

At this point we move away from the exclusive arena of the scientist into other school subjects, predominantly geography, citizenship and social studies. Young people's learning about Sustainable Development, and their encouragement to act in a more sustainable way can be developed in every area of the school curriculum. A truly sustainable school will be one in which sustainable living has

been built into every aspect of a school's life – **the curriculum** (the learning in and outside of the classroom), **the campus** (the environment and premises of the school) and **the community** (the inputs to and from the local community, sending out a positive message about what can be achieved and the wider benefits that living more sustainably offers).

Endeavouring to make the learning experiences of all young people an integral part of the curriculum will aid the development of enthusiastic and active learners as will the opportunities to 'live their curriculum' across the school. In schools in which ESD runs right through the curriculum, their teachers can enable thinking for the future with simple actions, such as tree planting that will not appear to benefit the present school generation but their children.

As scientists, we would like to see this cross-curricular approach to ESD underpinned by 'sound' (reliable and accurate) science. Science gives us a greater understanding of the world around us and how it works, but it still leaves us with more questions to answer and our young people can help us answer those questions. This questioning and decision-making by young people, based on knowledge and understanding, allows schools to develop 'active citizens' for the future: young people with a knowledge of how their actions impact on others, not just from theories in books but through having lived a more sustainable lifestyle.

To ensure this 'sound science' underpins all subjects, schools need to work together in their planning, design and implementation of a school curriculum in which science sits at the heart. This allows dramas exploring the consequences of climate change to be developed by students of the performing arts and students of modern foreign languages to enter into communication with young people in other parts of the world to discuss local actions. In both cases these lessons are of real value, can actively involve young people and are of more worth if the science is not compromised.

The language we use.

Before we can motivate our young people to live more sustainably and feel valued within their communities and able to make a positive contribution, we need to address the question of the language we use when speaking about climate change.

So often we talk about 'saving the planet' – as individuals can we really achieve or even aspire to achieving this, or are such phrases the language of comics and super-heroes? By starting at this point our young people will feel over-whelmed as opposed to empowered, the opposite of what we are trying to achieve.

So a motivational and not scare-mongering approach to teaching about climate change and sustainable living is required. "Even the longest journey starts with a single step" (attributed to Lao-tzu, *c* 604-531 bc, founder of Taoism).

This is made all the more challenging by the nature of the world in which we live – a media-dominated one.

Too often the media is dominated with rather sensationalist headlines about climate change or dramatic pictures that shock and create fear, rather than inspiring hope (particularly in younger children). Indeed a survey by the (then) Department for Education and Skills (DfES) in the UK in 2005, found that 1 in 4 of the young people surveyed believed climate change was the greatest threat they would face in their lifetime.

In the UK in February 2007, the day after the release of the fourth IPCC report, all 4 'quality' newspapers lead with front page headlines conveying a message of rising anxiety. Prof. Mike Hulme, from the University of East Anglia, in a short letter to Nature analysed their content. The Headlines were: *"Final warning", "Worse than we thought", "New fears on climate raise heat on leaders"* and *"Only man can stop climate disaster".* And all nine newspapers introduced one or more of the adjectives *"catastrophic", "shocking", "terrifying"* or *"devastating*" in their various qualifications of climate change. Yet none of these words exist in the report, nor were they used in the scientists' presentations in Paris (Hulme, 2007). Interestingly, Hulme also reports that papers in the US gave a more balanced view.

If we were to take this more positive approach then follow-up activities will feel more purposeful and with hope. We should not talk about about "going without" rather a drive towards "sustainable prosperity." We need to change the language and tone in which we speak about sustainability to one in which "rather than stopping we will Start." (HRH Prince of Wales, at the launch of Project START, 05.02.10). Not until large businesses, industrialists and politicians starting acting and speaking in this way will the public's rather negative attitude to 'doing their bit' be changed.

Prof. Mike Hulme writing in his book 'Why we disagree about Climate Change' suggests further that the use of language, across a variety of disciplines (science, economics, politics and journalism) has now led us down the wrong road 'framing climate change as a mega-problem awaiting, demanding, a mega-solution … a political log-jam of gigantic proportions, one that is not only insoluble, but one that is perhaps beyond our comprehension.'

For those who wish to demonstrate real successes to their young people, an article in New Scientist (July, 2009) provided 12 examples from around the world to prove that when communities, city officials and governments put their minds to it, things can be changed for the better from entire towns growing their own food in Yorkshire, UK to a total switch to solar power in a town in China.

Policy and Drivers

It is hoped that *"Improving the quality of life while living within the earth's carrying capacities"* would be motivation enough to adopt widely the principles of sustainable living and ESD. After all, based on current estimates if everyone in the world adopted the current UK rate of using our natural resources, we would need 3 planets to support us, and we have only one! (WWF, One Planet Future).

However, life is never that simple and several key publications and events in the last few years have served to put ESD higher on the political agenda around the world. Certainly, as a means of reducing the impact of climate change in the future, sustainable development has seen a raised profile. Mechanisms to reduce our reliance on fossil fuels and adopt more energy-saving measures and the use of renewable energy sources to help achieve Kyoto targets are regularly cited. So 'going green' is no longer an eco-fad associated with primitive living but a necessary (positive) lifestyle choice making people part of the majority and not the minority, but there are many shades of green.

We are presently mid-term (five years) into the UN Decade of Education for Sustainable Development (DESD), for which UNESCO is the lead agency (2005-2014). This was marked by the UNESCO World Conference on Education for Sustainable Development – Moving into the Second Half of the UN Decade, held in Bonn, Germany, from 31 March to 2 April 2009. The conference aimed to

highlight the relevance of ESD to all of education; promote international exchange on ESD, especially between countries of the North and the South; carry out a stock-taking of the implementation of the UN Decade, and develop strategies for the way ahead. Around 700 participants adopted the so-called Bonn Declaration (2009) at the end of the conference, a declaration that reflected the debates and proposing guidelines for accelerated actions, in the second-half of the decade.

The Bonn declaration can be viewed at *http://www.esd-world-conference-2009.org/en/whats-new/news-detail/item/bonn-declaration-now-available-in-8-languages.html*

It is hoped that the Bonn declaration (2009) will serve as the backbone for the development of the post-Bonn process within the framework of the DESD. It is both a statement and call for action and two items are particularly worth highlighting.

Item 3
All countries will need to work collaboratively to ensure SD now and in the future. Investment in education for sustainable development (ESD) is an investment in the future, and can be a life-saving measure especially in post-conflict and least developed countries.

Item 4
We need a shared commitment to education that empowers people for change. Such education should be of a quality that provides the values, knowledge, skills in competition for sustainable living, participation in society and decent work (this builds upon earlier declarations and promises).

In its call for action, at a practical level, the Bonn Declaration states the need to
Support the incorporation of sustainable development issues using an integrated and systemic approach in formal education as well as in non-formal and informal education, at all levels. In particular through the development of effective pedagogical approaches, teacher education, teaching practice, curricula, learning materials, and education leadership development, and also by recognizing the significant contribution of non-formal education and informal learning as well as vocational and workplace learning.

The key role of schools in the ESD process was also highlighted among 8 key recommendations from the International Alliance of Leading Education Institutes (published in connection with COP15, the Copenhagen Climate Change Summit, December 2009).

Recommendation 3
"*ESD will make demands on all of society but schools will play a critical role, through what the key teach (how they reach it) and how they model sustainable practices. Governments need to ensure that schools are able to play a leading role in ESD through the way education systems are managed, schools are organised and pupils taught*"

With these issues in mind, and CarboSchools commitment "*to take local actions to reduce CO_2 emissions*" we have provided here in the CarboSchools library details of a collection of activities, requiring minimum specialist equipment and adapted to work in any classroom in the developed world. They should enable whole school participation with your young people being active learners in their experiences of school and their curriculum.

We hope such activities can aid the motivation of young people in your classes to start to form opinions and make decisions for themselves, before initiating and taking actions.


What can we do?
Carbon-free days
Litter monitors
Wildlife areas
Transport surveys
Grounds/ garden developments
Energy-saving squads
Power-down days
Fairtrade snack shops
Walk to school weeks
Sustainable Sculptures
Power-rangers
Low C-technologies
Water conservation
Grow your own
Rainwater Harvesting
Reduce, re-use, recycle
Composting
Themed outdoor areas
Wind Turbines
Inter-class competitions
Eco-fashion shows
Solar panels
Rewards schemes

Starting out and working with young people

So just how can we reduce our own Carbon-footprint and our role in depleting all the earth's natural resources (our ecological footprint)? There are so many actions young people may wish to try it can be overwhelming (see "*What can I do*", figure above).

Indeed, finding a ***focus*** to young people's actions can be the challenge. There is a well established and worldwide programme designed to empower young people to take local actions, in specific areas – EcoSchools (http://www.eco-schools.org). It is an international award programme (with bronze, silver and gold awards) supporting schools on their sustainable journey providing a framework to help embed the key principles into the heart of school life. Internationally, the programme involves 44 countries and 25000 schools.

Participating schools focus upon any of 9 specific topics – Healthy Eating, Energy, Water, Transport, Litter, Waste, School Grounds, Biodiversity and the Global Perspective. These themes allow pupils to focus, maybe year-on-year, on different themes helping to maintain interest and allowing young people to work with other environment groups/NGOs with specialisms in particular areas.

What approach to take? If we look towards one of the most sustainable systems we know, our natural earth, we see that waste is food, energy comes from renewable sources (the sun) and toxins are absent or broken down naturally: a so-called 'closed-loop' system. The first steps towards sustainable living, reducing what we consume, will probably not be radical enough. Given a preference for such a circular economy we need to rethink and redesign existing methods of production and consumption and encourage our young people to begin thinking and learning in this way. The many 'linear systems' in which we take, make and dispose are flawed because of limited resources and the effects of these processes on our planet. However, we will still want (and arguably need) these products – sustainable prosperity – and so need to seek insights and learn from living systems. You can read more about these ways of thinking at http://www.ellenmacarthurfoundation.org/education/next-steps-in-esd and may wish to view the 'get loopy' video on the same site.

In reading the account from Max Linder (box below) we clearly see in practice those characteristics of effective teaching about sustainability – hands-on activities, supported across the school, actively involving young people being given a 'voice' to bring about change in their schools and showcasing this to a wider audience. This illustrates the outcomes reported by Gayford (2009) from a 3 year study about learning for sustainability (from the pupils' perspectives), He concluded that the most effective approaches were those with innovative activities, with strong pupil involvement, as opposed to those lessons which involved 'teachers preaching' to their pupils.

The 'most effective lessons' addressed relevant issues to the lives of the young people, both in the school and the home. Achieving whole school involvement required that events and outcomes be shared widely and visibly across the school with strong support from the schools' senior management team. The report stressed the involvement of school councils, ones in which pupils have an active and controlling voice. Passing responsibility for monitoring, recording and reporting upon the effectiveness of measures taken to improve sustainability to pupils was shown to increase pupil motivation and give valuable educational outcomes.

He concludes, "When young people are given knowledge about how to act, and when practical strategies are adopted, pessimism can turn to hope" (Gayford, 2009).

Michael Reiss (2010), writing about a 5 year longitudinal study of science lessons for 11 – 16 year olds concluded "that school science education can only succeed when pupils believe that the science they are being taught is of personal worth to themselves." This lesson is equally valid for cross-curricular teaching about Sustainable Living, something that is intrinsically personal but impacting more widely to involve fellow classmates, their local community and beyond.

Our teaching about sustainability needs to offer very hands-on approaches to learning – 'learning by doing' in order to reinforce the learning spiral/ladder discussed earlier, developing skills and understanding and most importantly making learning fun and memorable. Science is often referred to by young people as their favourite and most memorable lesson at school. This because of its practical hands-on nature (an almost unique quality), and there are ways that other subjects that involve the teaching about Sustainable Living can also be very hands-on.

The article EcoSchools and CarboSchools can be found below.

References

Gayford, C. (2009) Learning for sustainability: from the pupil's perspective. A report of a three-year longitudinal study of 15 schools from June 2005 to June 2008. WWF.

Hicks, D. (2010) The Long transition: educating for optimism and hope in troubled times. 3rd Annual Conference of the UK Teacher Education Network for ESD / Global Citizenship.

Hulme, M. (2007) Newspaper scare headlines can be counter-productive. *Nature* **445**:818

Hulme, M. (2009) Why we disagree about climate change: understanding, controversy, inaction and opportunity. Cambridge University Press, ISBN 978-0-521-72732-7

International Alliance of Leading Education Institutes (IALEI), December 2009, Climate change and sustainable development: the response from education, 8-recommendations. ISDN: 978-87-7430-087-8

Martin, F. and Owens, P. (2008) Caring for our World; a practical guide to ESD for ages 4-8. Geographical Association. ISBN 978-1-84377-211-8

New Scientist, 26th September 2009, "It's a green world after all,". Part of a 4-edition feature on "Blueprint for a Better World" – 12.09.10 – 03.10.10

Reiss, M. (2010) "Science for personal worth" People & Science (March 2010). A publication of the British Science Association

WWF, One Planet Future,
http://www.wwf.org.uk/what_we_do/about_us/building_a_one_planet_future.cfm

EcoSchools and CarboSchools

For one school in CarboSchools they see it as just one simple step to embark upon Eco-Schools, and that school is Lycée Max Linder in Libourne near Bordeaux in France.

The CarboSchools project has raised their awareness of sustainable development. They are able to continue their environmental work thanks to « Eco-Ecole » The approach is very much one of a whole school involvement from senior managers including the head teacher, through teaching staff, support staff and involving parents and the local community. There is a small core group, the Eco Council who decided upon that their focus for the first year would be healthy eating, to improve their daily meal.

The school enters a contract with Eco École that commits them to targets for the year.

- 20% organic food (ex. bread), that is locally sourced.
- meals in school to be well-balanced and offering more choice
- Improvement of the quality and balance of the meals using seasonal produce
- Introduce more fruit and vegetables into the diet of young people

In the following year, the school chose to focus upon reducing waste across the school.

The pupils are proud and positive about their work within Eco-École, finding it interesting and viewing it as

- another way to protect nature
- a different way of working
- the occasion to meet people and to share
- a way to continue the Carboschools project
- a way to take an active part in school life

The schools work is showcased annually to the local community (other pupils, teachers and parents). The pupils recognize the important role that such collective activities play in increasing public awareness about climate change. The event is organised and hosted by Carboschools pupils. In so doing, they themselves become aware that only group activities can change the process of global change.

Written for CarboSchools by Phil Smith, Teacher Scientist Network, Norwich, UK
ts.network@bbsrc.ac.uk (last change: 1st-Dec-10)

This publication has received funding from the European Community's Seventh Framework programme under grant agreement number 217751.