EDUCATION FOR CHANGE: A HANDBOOK FOR TEACHING AND LEARNING SUSTAINABLE DEVELOPMENT

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This handbook was developed by the group of authors and represents experience accumulated during the "Education for Change" project in various countries around the Baltic Sea.

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FOREWORD

This is a handbook for educators by educators and is intended as a practical handbook for teaching sustainable development. It's intended for teachers and student teachers as well as capacity building for experienced educators. The examples and methods described in the handbook have been tested, evaluated and developed to make sustainable development both visible and achievable.

As our overall aim is to encourage, support and contribute to an ongoing dialogue about how skills, commitment and action competence on sustainable development among children and youth can be developed, we see this handbook as providing practical support rather than as a textbook.

The Education for Change team represents organisations and universities in the Baltic Sea region. Many of us have been cooperating for more than ten years in the education project *Naturewatch Baltic* – a project designed to help and encourage teachers and students to actively participate in sustainable development. *Naturewatch Baltic* also arranges workshops for educators and people involved with nature conservation. The experiences gained and the needs expressed in this context have inspired us to create this Education for Change handbook. It is our sincere hope that you will find it useful.

Gitte Jutvik
Editor
WWF Sweden

INTRODUCTION: NO-ONE WANTS AN UN-SUSTAINABLE DEVELOPMENT!

"Earth provides enough to satisfy every man's need, but not every man's greed"
Mahatma Gandhi

At the time of writing more than 6 billion people live on planet Earth. If every single human being in the world was to enjoy the same lifestyle and the same pattern of consumption that we have in the Baltic Sea region we would need the equivalent of two extra planets. Continuing to exploit the Earth at the present rate does not bode well for the future. But many of us believe that we have a choice and can make a difference. One of the ways of getting the message across is to help our children to understand that there are limits to this exploitation, and that if we act now there is hope. Not only do we need to act for our common future, but also for our physical health. Social researchers have shown that when children acquire knowledge and guidance about the problems and possibilities they are much better equipped to see the future much more optimistically than children with little idea about these things. Education for sustainable development is therefore closely connected to young people's lives and futures and must be given the highest priority. Teachers and school personnel need to be trained in such matters and acquire the necessary skills and competence, while governments need to provide resources for research into suitable teaching methods and content. Above all, education for sustainable development must be regarded as a serious pedagogical challenge.

The long-term aim of this journey is to have as good a life as possible without hurting or harming other fellow humans or living beings.

Although environmental subjects and courses have been an integral part of formal education since the 1960s, this has not been sufficient. A greater need for new perspectives has led to the United Nations (UN) proclaiming a ten-year plan, from 2005 to 2015, for education for a sustainable development. The aim of Education for Change is to help to make this UN decade a practical reality.

But what is Education for Change and what are the aims?
Education for Change, also known as EduC, is a project designed to help teachers and educators to include and work with the concept of sustainable development in their education. The aim of education for sustainable development is to provide learners with a holistic approach so that they are equipped with the necessary tools and thinking and can thereby make a difference. Such an approach does not only call for the efforts of individual teachers but for the efforts of all teachers. Teamwork is called for! For development and training among colleagues our recommendation is to use the EduC Study Circle method. Details about this method – together with other resources, information about courses and activities and how to get involved – can be found on the Education for Change website **www.balticuniv.uu.se/educ/**

The Education for Change Handbook for Teaching and Learning Sustainable Development handbook is available in Estonian, Finnish, Latvian, Lithuanian, Polish, Russian, Swedish and English and consists of four separate chapters, outlined in brief below. Throughout the text you will find Reflection Boxes. These are intended for teacher discussions and to stimulate a better understanding of the various topics. Exercises and activities are also provided in the handbook as resources and inspiration.

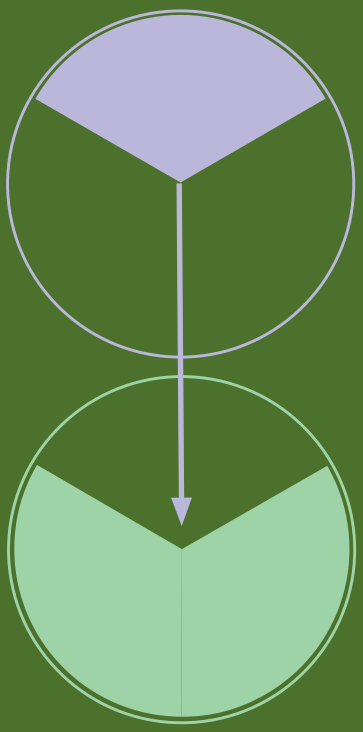
Chapter 1: Sustainable Development looks at why we need to consider sustainable develop¬ment, what sustainable development is and entails and how we might best explore and – if possible – measure it. In this chapter you will find descriptions and definitions, a brief history and relevant viewpoints about issues related to sustainable development.

Chapter 2: Education for Sustainable Development ESD discusses the basis of knowledge and attempts to explain and clarify our view of education for sustainable development. Here we also look at the knowledge and skills that are needed and why, and possibilities for progress.

Chapter 3: Methods investigates the ESD methods that are available and the circumstances in which they might be used. Here we present methods for pedagogical work with values, critical thinking, problem-solving and action competences.

Chapter 4: Practical Examples provides a number of teaching and learning resources on sustainability issues. These are intended as inspiration. You can also add your own ideas and create your own "pedagogical tool box"!

CHAPTER 1. SUSTAINABLE DEVELOPMENT THE CONCEPT OF SUSTAINABLE DEVELOPMENT



Melting glaciers, toxins in blood and breast milk, 50 percent fewer species of butterflies, rising temperatures, a Baltic Sea with a reduced cod population, dying sea bottoms … the list is endless. How is it that we in the rich western world over-consume while poverty prevails in other parts of the world? How can we possibly solve all the problems relating to inequality and a reduced biological diversity? The questions are many and, despite the fact that we are well educated and informed, the answers are far from obvious.

Figure 1. Approximately 1/3 of the Earth's population consumes 2/3 of the Earth's resources

We all know that human beings have basic needs, such as food, shelter, clothing, health, education, etc. But the life support systems have to operate without being over-burdened either by our withdrawal of resources or our discharges of waste and pollution. Neither should we forget the cultural and emotional aspects of human life. Sustainability requires that society and nature are viewed holistically.

Different examples, events and reports convince us that the Earth is over-burdened. Almost everyone agrees that something has to be done. But not everybody agrees on what changes need to be made, how these changes ought to take place and which areas need to be immediately addressed.

It is increasingly clear that drastic changes are necessary; changes that also include economic and social reform. But rather than single-mindedly concentrating on waste and pollution, we also need to focus on adopting new principles for consumption, production and distribution. A holistic approach that includes all these things reflects a real sustainable development.

Sustainability requires that all angles are considered. Typically, the overuse of a resource is first experienced as a burden on the environment in terms of its waste products, such as an excess of CO_2 or eutrophication due to an overuse of phosphates. Answers to the question about how we ought to deal with environmental problems seldom get to the root of the problem, that is, the way our societies work.

Sustainable development can be understood from different points of view. Some people see it as a journey or an ongoing process within the limits of ecological frameworks. The long-term aim of this journey is to have as good a life as possible without hurting or harming other fellow humans or living beings.

In the same spirit democracy is very much a part of sustainable development. Agenda 21 (UN, 1992) emphasises participatory democracy, which means that decisions are made and implemented in cooperation with ordinary citizens like you and me. This is another aspect of the ethics of justice. So, to summarise, sustainable development can be considered as a sort of journey or direction and needs to be thought about or reflected upon. In Chapter 2 we look at some of the ways in which the concept of sustainable development can be developed in an educational context.

The aim of the UN decade is to ensure that "education for sustainable development is practiced in schools and other educational establishments in order to highlight the central role that education and l earning play in the common pursuit of sustainable development and that quality education is a prerequisite for education for sustainable development at all levels and in all aspects of education".

Reflection Box 1 – Sustainable Development

1. What are people's basic needs? Do they also include the desire to travel, equip our homes with beautiful furniture and flat screen TV's? Who decides and makes priorities when resources are limited?

2. How would you describe and explain the concepts of sustainable development and sustainability? Write down your own understanding and discuss them with your colleagues.

3. Why is sustainable development so important right now?

A brief historical background to sustainable development

At the beginning of the 1960s the time was ripe for a wide social debate relating to the environment. Rachael Carson's book "Silent Spring" (1962) was a wake-up call. The connection between the death of the species of birds known as Yellowhammers and an increased use of mercury-enriched seeds formed the basis of her book.

During the 1960s society felt the need to do something about the existing environmental problems. Technology was introduced to clean chimneys and sewage pipes, for example.

The first international environmental conference was organised by the UN and held in Stockholm in 1972, during which the western world's environmental problems were discussed. The conclusion was that scientists, experts and technology would solve these problems. It was not something that ordinary people needed to worry about. But people didn't accept this and in the 1970s they started to get more and more involved in environmental organisations and pressure groups. People became very concerned and active and put pressure on the politicians to do something. Germany also started to press for the wide use of the precautionary principle[1] and initiated a discussion about the connection between social, economic and environmental problems. The economical aspect is introduced nowadays.

The actual concept of sustainable development emerged in the 1980s in response to a growing realisation about the need to balance economic and social progress with a concern for the environment and stewardship of the Earth's natural resources. The concept became more widespread with the publication of "Our Common Future" by the World Commission on Environment and Development in 1987. In this publication the Commission defined sustainable development as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". In other words, although development may be necessary to satisfy human needs and improve the quality of life, it should occur in such a way that the capacity of the natural environment to meet present and future needs is not compromised. This understanding of sustainable development has, however, been translated and interpreted differently in different contexts.

Twenty years after the Stockholm conference the UN again raised the environmental question, this time on a global stage and with a focus on the 21st century. The UN conference on Environment and Development held in 1992 in Rio de Janeiro resulted in Agenda 21, with guidelines as to how the world's governments, councils and important social groups should introduce development in the 21st century without damaging the environment. The message from the Rio Conference was that both rich and poor countries have their different environmental problems and that in many cases unsustainable development is a result of people's ideas about lifestyles. Problems and conflicts are not always locally visible but are often based on a combination of local and global agreements and requirements.

Chapter 36 of Agenda 21 (UN, 1992) directly addresses education. These initiatives need to be developed. In many countries schools and universities now have to include education for sustainable development in their educational curricula. Baltic 21's Education Sector is actively working to support the implementation of education for sustainable development in all the Baltic Sea region countries.

The importance of education for sustainable development was already emphasised in 1977. In this year the first international initiative was taken in Georgia, at that time part of the Soviet Union, when The Tbilisi Declaration was unanimously adopted at the end of a conference on EE in that city. The declaration noted the unanimous support for environmental education that would help to preserve and improve the world's environment and encourage a sound and balanced development of the world's communities.

The role of the 2002 Johannesburg World Summit on Sustainable Development to promote ESD is important here in that it promoted Education for Sustainable Development (ESD) as a key concept in its plan of implementation. The UN Decade of Education for Sustainable Development (2005-1014) was decided on later that same year by the UN General Assembly. The decade is monitored by UNESCO, has a global vision and aims towards a world in which everybody will have the opportunity to benefit from quality education and learn the values, behaviour and lifestyles required for a sustainable future and for positive societal transformation. The aim of the decade is to ensure that "education for sustainable development is practiced in schools and other educational establishments in order to highlight the central

[1] The **precautionary principle** (Leal Filho, 2000) is a moral and political principle which states that if an action or policy might cause severe or irreversible harm to the public, in the absence of a scientific consensus that harm would not ensue, the burden of proof falls on those who would advocate taking the action.

role that education and learning play in the common pursuit of sustainable development and that quality education is a prerequisite for education for sustainable development at all levels and in all aspects of education".

Reflection Box 2. Sustainable Development

1. 1. Does your country have a different historical background to the sustainable development described here? What is similar and what is different according to your experience?

2. . It is said that in most cases unsustainable development is the result of the way people live their lives and that problems and conflicts are not always noticed or locally visible, but are usually based on a combination of local and global agreements. Do you agree with this? Think of some practical examples as proof of this. How can we get people to change their lifestyles and live more sustainably?

3. Changes need to be made visible. Who initiates change, takes the lead and implements change? Is it the consumers, organisations, companies, politicians or other stakeholders? Compare events like the Rio Conference with national and local changes taking place today.

The most common definition comes from "Our Common Future" (1987), also called the Bruntland Report after the, the former Prime Minister of Norway, Gro Harlem Bruntland, who was the Commission's Chairperson.

"Sustainable development seeks to meet the needs of the present without compromising the ability to meet those of the future".

Different ways of explaining sustainable development

We have already indicated that sustainable development is interpreted in different ways. Let's take a look at some of these interpretations in more detail.

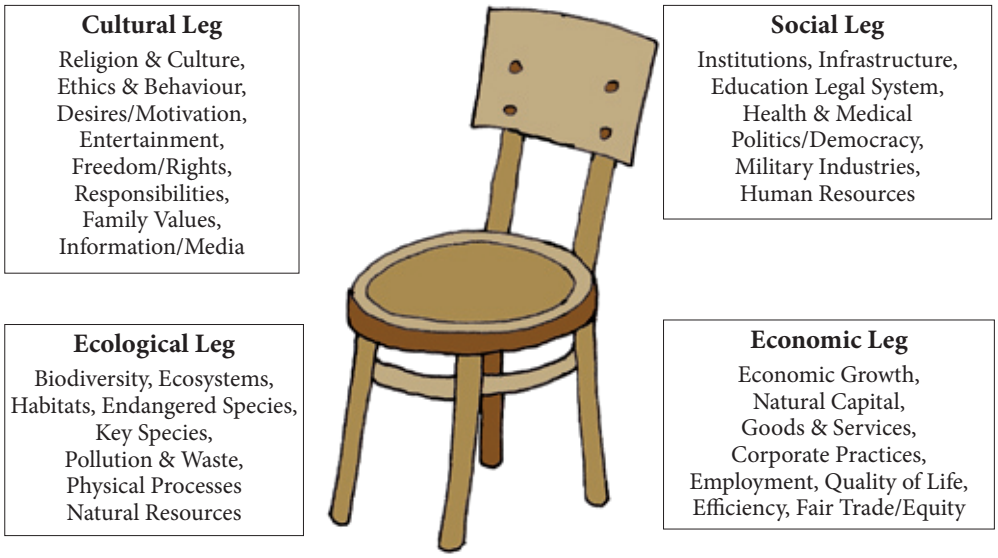
The goal of sustainable development has proved to be relevant, comprehensive and meaningful. It may continue to serve as a guideline or compass needle to indicate development options open to the society in question. But in reality the concept has proved difficult to understand and put into practice. How can we help ourselves, as well as students of all ages, to understand and practice sustainable development? A crucial step in this direction is to discuss what we mean by our needs and also what is required in order to meet the needs of future generations.

Damaging environmental impact, the depletion of natural resources and a decreased biodiversity are all incompatible with sustainability. These trends have to be reversed in order to reach the goal of sustainability. But there are other aspects to sustainable development, too. It is obvious that protection of the environment will not happen until people have achieved the necessary – and acceptable – social and economic standards and circumstances.

There are different interpretations of what is most important in order for development to be sustainable. Some emphasise the importance of a functioning nature and environment, while others emphasise democracy and equality or the stable economic growth of society. The social aspects refer mainly to political institutions, where democracy is particularly crucial to sustainability. The main thing here is that development does not cause social conflict. In practice this means that development should increase people's control over their lives and that all social groups should have the opportunity to participate in decision-making. From a social point of view one may stress the importance of cultural sustainability. Cultural sustainability requires that development takes the values of the people affected by it into account. In addition, a wide range of cultural groups should be maintained and encouraged, and the value of their heritage and traditions recognised.

"The Chair of Sustainable Development"

Sustainability has to be integrated, which means that it should be broad and all-inclusive. "The Chair of Sustainable Development" (Macer, 2004), is a handy comparison that aids both memory and understanding. This chair of sustainable development has four connected 'legs' of sustainability and all four legs have to be included in policy and management for sustainable development. If one leg is over-emphasised, such as the 'economic leg', the chair will be unstable and uncomfortable. The figure below indicates what the cultural, social, ecological and economic "legs" of the chair represent:



The chair illustrates the need to create a proper balance between economic, social, cultural and ecological development and needs.

Figure 2. The Chair of Sustainable Development.

Economic sustainability – means that all the processes and projects undertaken must give the greatest output possible and that the benefits of such a development are distributed between the generations. Economic efficiency means the well-being of the present and possibilities for the future. The understanding is that development determines the quality of economic achievements, the conservation of resources and participation in economic development, and the consumption of goods and services. One of the characteristic tendencies is *resource economy* in production, or the choosing and usage of renewable resources and technologies. The degradation of natural resources is thereby prevented, despite the fact that the national income is increasing. This means a change in national development, an improvement in the quality of human life and changes in behaviour. In other words, the well-being of human beings determines changes in behaviour and values.

Sustainable economic management depends on present-day policies or actions that do not compromise future development. Economic sustainability includes an economic benefit for the generations to come. The cultural heritage and the environment should be included in the economic development model. The use of ecologically and resource-saving technologies, investments in and subsidy of ecologically clean products, and environmentally-friendly national and taxation policies, are all parts of economic sustainability.

Social sustainability – means that development should increase people's control over their lives and that all social groups should have the opportunity to participate in decision-making. This implies development of society as a whole, the involvement of all social groups in decision-making and everybody's participation in a development that is sustainable. The social perspective includes ecological ethics, life quality, well-being and care for future generations and other cultures. Social development, or a social perspective of sustainable development, seeks answers to questions relating to the human role in the universe, and includes moral and ethical aspects. The aim is not to destroy the balance but to contribute to the harmony of the ecosystem and its relationships with our societies.

Cultural sustainability – means that the diversity of cultural groups should be maintained and encouraged and the value of their heritage and traditions recognised. This requires that any development takes the values of the people affected by it into account, that the range and variety of cultural groups is maintained and encouraged, and that the value of their heritage and traditions is fully recognised. Culture relates to ways of being, relating, behaving, believing and acting that differ according to context, history and tradition, and within which human beings live their lives. The recognition of practices, identity and values – the software of human development – plays a considerable role in setting directions and building common commitments.

Human life is also determined by cultural heritage and attitudes towards the environment. In contrast to other living beings, human nature expresses itself in culture. Cultural sustainability includes the exploration, preservation and development of heritage and traditions related to the history of civilisation. Cultural identity is much more sustainable than the identity of the market. You can ruin the market and change the government, but cultural identity remains constant and guarantees the survival of people, the state and the economy.

Ecological sustainability – means that society needs to recognise that the survival and well-being of other species and natural processes are fundamental. The ecological point of view widens concepts of moral action and emphasises a responsibility to care for living organisms.

The basis of ecological sustainability is the understanding of a common ecosystem model: all systems on earth are interlinked and have to be preserved and maintained, and that the Earth can be seen as a self-regulating system where all components are valuable.

Putting the principles of sustainable development into practice involves promoting, fostering and developing our society's environmental consciousness, public participation and environmentally-friendly lifestyles.

Sustainable Development is to create a proper balance between economic, social, cultural and ecological development and needs.

The three circles

For those who want to visualize the different aspects of sustainable development as an hierarchy of interdependency, the circle approach provides an alternative model. The green ecological circle is concerned with protecting a well functioning ecosystem with a large biological diversity – the life-support system that forms the basis of everything.

Figure 3. Three aspects of sustainable development

Preserving nature's long-term processes is extremely important and serves as a life insurance for nature with all forms of life including human life.

Preserved ecosystem processes supply us with a number of free services, such as natural water purification, the filtering of UV radiation and insect pollination. The ecological aspect forms the outer frame for all human activities. Many educators prefer to present the ecological dimension as a base while keeping in mind that sustainability is also about co-existence with other humans. Sustainable development therefore needs to incorporate the human, social and economic dimensions.

The red circle is about how to create well-being in a local and global society and a mutually interdependent relationship with other people. The social circle reminds us of the necessity to fairly and equally shares the Earth's resources in a democratic manner. In short, this is a society in which our basic needs are fulfilled and human rights are respected. The social aspect is about maintaining the good parts of life. But which human needs should we emphasise? How can we create a society of happy and satisfied people based on key concepts like security, participation, integration and culture?

The yellow circle describes the economic or house-keeping aspect. This is about being economical with human and material resources. A sustainable economy utilises the interest of global productivity rather than the capital. It is an economic development that gives economic benefits to society as a whole and does not threaten either the man-made or natural capital. An economy that is socially unfair or that does not stay within ecological limits is not sustainable. In other words, acting sustainably is good economy.

In this handbook we maintain that in spite of the many different interpretations and understandings of sustainable development, developing sustainability and sustainable development as an integral part of the curriculum is essential.

Sustainable Development is a development which, based on preserved and healthy ecosystems, facilitates human well-being and safety and can therefore create a sound economy.

Reflection Box 3. Sustainable development

1. Why do we need sustainable development? Why do we talk about it so much today?

2. What makes development sustainable? Which keywords are the most important for you? Will your keywords keep the chair stable and comfortable? Will all the circles be the same size?

3. What does sustainable development mean for you, your school, your town and your community?

Measuring and comparing

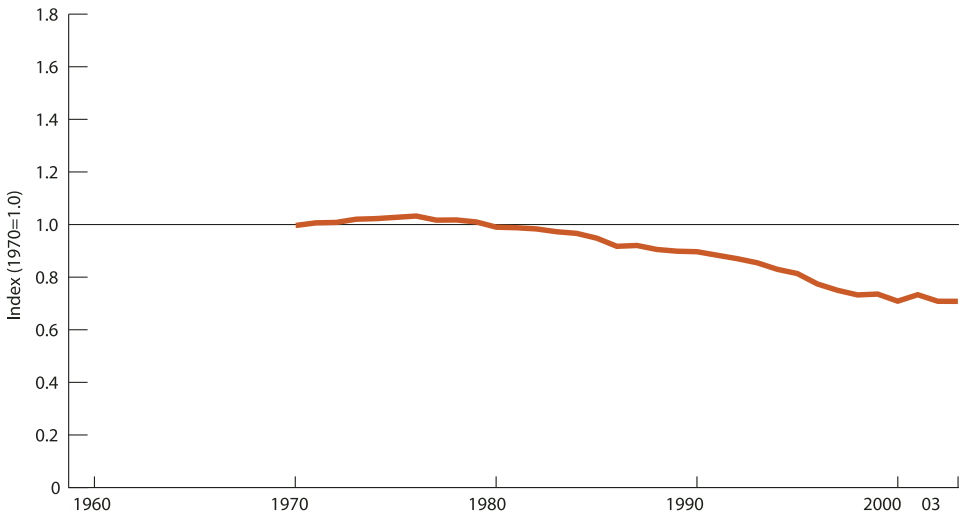


Figure 4. Living Planet Index, 1970-2000 (Global Footprint Network, 2006:2)

The Living Planet Index relates to the number of species of birds, mammals, reptiles and fish on the planet and can measure changes in the population size of 1,300 species of wild animals. Between 1970 and 2003 the Living Planet Index went down by 30 percent.

In the light of what we have talked about above it might seem difficult to imagine that sustainable development can be measured. But it is possible to measure the state of the Earth by means of the Living Planet Index, the Ecological Footprint and the Human Development Index. The first two are the ecological indicators of the successes and failures of sustainable development.

Ecological Footprint

One way of measuring the status of the Earth is the Ecological Footprint. The Ecological Footprint indicates the areas required to provide us with the amount of resources we use and to absorb the waste we produce. In 2003 humanity's Ecological Footprint was three times that of 1961. Our consumption of natural resources now occurs at a rate that is 25 percent faster than nature's ability to create new ones. For Estonians the Ecological Footprint is 6.5 global hectares per person, as compared with the available area of 1.8 hectares per person. If everybody on Earth lived like an average European we would need three globes!

There's no doubt that we are facing enormous challenges: the number of animal species is decreasing, the amount of chemical substances alien to nature are increasing, the climate is changing, the equivalent of 37 football fields of tropical rain forest disappear every minute, more than one billion people have no access to clean water, the number of fish and whales is decreasing rapidly, etc. The list is depressingly long. On top of that we in Europe live as though we had three globes at our disposal – certainly an unsustainable development!

But, on the plus side, we also see a world united around the Kyoto Protocol and seas and forests being protected. In addition,the number of children in the world with access to primary education has increased by 80 percent in the last thirty years.

How is the Ecological Footprint calculated?

The Ecological Footprint measures the amount of biologically productive land and water areas required to produce the resources that an individual, a population, or an activity consumes and absorb the waste generated. This area is expressed in global hectares (gha); hectares with a world-average biological productivity. The Footprint and bio-capacity results for the various countries are calculated on an annual basis.

What is included in the Ecological Footprint and what is excluded?

The Ecological Footprint only includes those aspects of resource consumption and waste production for which the Earth has regenerative capacity and where data exists that allows this demand to be expressed in terms of productive area. For example, freshwater withdrawals are not included in the Footprint, although the energy used to pump or treat them is. The Ecological Footprint accounts for and visualises previous or present resource demand and availability, but does not predict the future.

How does the Ecological Footprint account for the use of fossil fuels?

Fossil fuels – coal, oil and natural gas – are extracted from the Earth's crust rather than being produced by ecosystems. Carbon dioxide (CO_2) is produced when this fuel is burned, and can be measured by the Footprint. Ecological Footprint calculations are based on an estimate of how much carbon the world's forests remove from the atmosphere and how much they retain. For example, one global hectare can absorb the amount of CO_2 released from burning approximately 1,450 litres of petrol per year. The CO_2 Footprint does not suggest that carbon sequestration is the key to resolving global warming, however. On the contrary, it shows that the biosphere does not have sufficient capacity to cope with current levels of CO_2 emissions.

What is not included in Ecological Footprint calculations?

The demand on bio-capacity associated with the use of nuclear power is difficult to quantify, partly because much of its impact is not addressed by the research questions

on which the Footprint is based. Toxins, erosion, desertification and other negative impacts are not included either. On the other hand, ecological farming may result in a larger Footprint in comparison with that of traditional agriculture.

How is international trade taken into account?

The National Footprint Accounts calculate each country's net consumption by adding its imports to its production and subtracting its exports. This means that the resources used for producing a T-shirt that is manufactured in China, but sold and used in Sweden, will contribute to the Swedish, rather than the Chinese consumption Footprint.

Does the Ecological Footprint ignore the role of population growth as the driving force of humanity's increasing consumption?

The total Ecological Footprint of a nation or of humanity as a whole depends on the number of people consuming, the average amount of goods and services an average person consumes and the resource intensity of these goods and services. The equation is simple. The more people there are the less there is to share.

Living Planet Report 2006

The Footprint and the Human Development Index

The following table shows the Ecological Footprint and the Human Development Index of countries included in the Baltic Sea region. You find updated figures on **www.gapminder.org**

Country	Ecological Footprint		Human Development Index (HDI)	
	Global hectares/ person	World Ranking	HDI/ person	World Ranking
Denmark	5.8	11	0.949	14
Estonia	6.5	7	0.860	44
Finland	7.6	3	0.952	11
Germany	4.5	23	0.935	22
Latvia	2.6	45	0.855	45
Lithuania	4.4	24	0.862	43
Poland	3.3	37	0.870	37
Russia	4.4	25	0.802	67
Sweden	6.1	8	0.956	6

Table 1. Use of resources and human development.

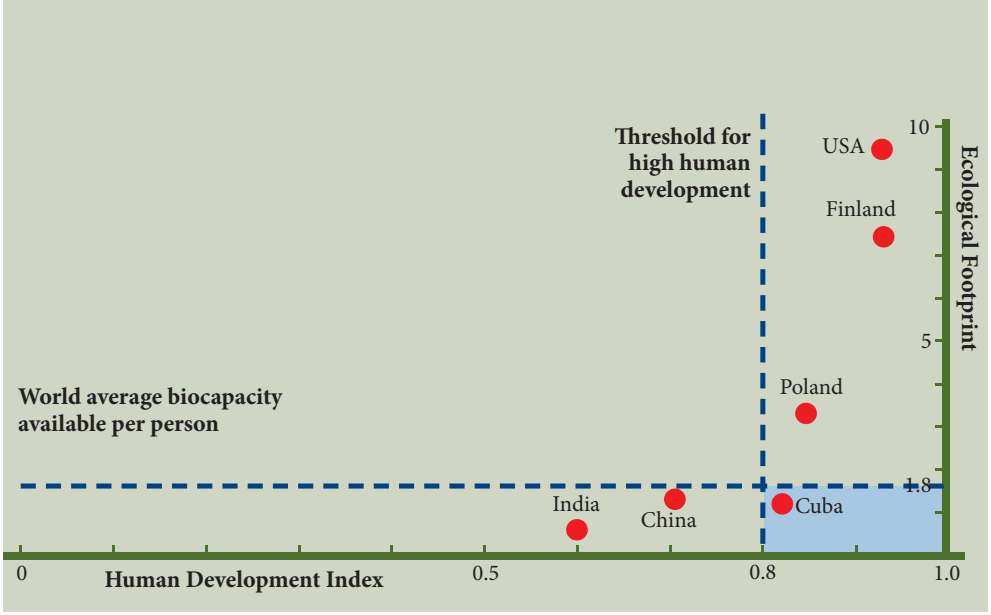


Figure 5. The Footprint and Human Development.

The Human Development Index (HDI) is an indicator of people's well-being, while the Footprint is a measure of the demand on the biosphere. The HDI is calculated on the basis of three parameters: life expectancy, literacy and education, and per capita GDP (or rather purchasing power). United Nations Development Programme UNDP considers a value of more than 0.8 to be "high human development". On the other hand, a Footprint that is lower than 1.8 global hectares per person, the average bio-capacity available per person on the planet, could indicate sustainability at the global level. Successful sustainable development requires that as a minimum (and on average) the world meets these two criteria, with countries moving into the blue quadrant shown in figure 5 (*the full graph you could find at* **www.footprintnetwork.org**, *Living Planet report 2006, p.19*). As the world population grows, less bio-capacity per person becomes available and the quadrant shrinks. In 2003, Asia-Pacific and Africa used less than the world average of bio-capacity per person, while the EU and North America crossed the threshold for high human development. At that time only Cuba met the criteria for sustainable development – based on the data reported to the United Nations. Changes in the Footprint and HDI from 1975 to 2003 as illustrated in the figure

for some nations. During this period, wealthy nations like the United States of America significantly increased their resource use and at the same time increased their quality of life. This was not the case for poorer nations, notably China and India, where significant increases in HDI were achieved while per-person Footprints remained below the global average of per-person bio-capacity. Comparing a country's average per-person Footprint with the global average bio-capacity does not pre-suppose an equal sharing of resources. On the contrary, it indicates which nations' consumption patterns, if extended worldwide, would continue to exceeds the global threshold and which would not. Both the Footprint and the HDI need supplementing with other ecological and socio-economic measurements, such as freshwater scarcity and civic engagement, in order to fully define sustainable development.

Sustainable Development is to create welfare (HDI) within the available ecological footprint area.

Sustainable Development is to create welfare (HDI) within the available Ecological Footprint area.

Reflection Box 4. Sustainable Development

1. In the Living Planet Index biodiversity is about the average use of resources. Do you think the Human Development Index is a good indicator of the social sphere? Is something missing, and if so, what?

2. What is needed to achieve the lower ranking of a country's (or person's) Ecological Footprint?

3. In Bhutan, the small Buddhist country between China and India, the king introduced a way of measuring happiness (Gross National Happiness). Reflect on the data provided in Figure 5, above, in terms of happiness and sustainable development. What are your conclusions?

Overshoot Day

Another way in which the Global Footprint Network can help us to understand the unsustainable situation is through Overshoot Day. In 2007 this event took place on 6th October.

Today, humanity uses about 25 percent more resources in one year than nature can regenerate in the same amount of time. This is called "overshoot". An ecological overshoot of 25 percent means that it takes more than one year and three months for the Earth to regenerate what people have used in one year. This overshoot then accumulates over a period of time and creates a global ecological debt.

We contribute to this overshoot by using more of the planet's natural resources than is necessary. For example, we cut down trees at a much faster rate than they re-grow and catch fish at a faster rate than they reproduce. While this can be done on a short-term basis, in the long-term overshoot leads to a reduction of those very resources on which our economy depends. In other words, overshoot is like ecological over-spending. Just like a business that does not keep its financial books in order it will eventually go bankrupt, which means that we have to document whether we're living within our ecological budget or running up an ecological debt that will eventually deplete our renewable assets.

Human beings do not only commit the crime, they are also the victims. A sustainable development pre-requires everybody's participation and commitment. In our different roles as consumers and producers, politicians and voters, we can all make a difference. Democracy is something we have to learn early in life and build up step by step. In order to be part of the social construction we have to be involved, committed and motivated. For young people this may consist of being trained as social beings to take notice, express their own thoughts and ideas, listen to others, respect others as fellow human beings, respect other people's opinions, cooperate, take responsibility and reflect and participate. Schools have an important part to play here in that their mission is to develop knowledge, values and skills so that young people become responsible and active citizens. Further information about overshoot and Overshoot Day can be accessed on **www.footprintnetwork.org/overshoot/**.

Sustainable Development is a development, which stays within the limits of the ecosystem, that is, respect the "limits to growth".

Reflection Box 5. Sustainable Development

1. The social aspect of sustainability points to the involvement of people. Do you agree with the following statements? "Development should increase people's control over their lives - and all social groups should have the opportunity to participate in decision-making." "Fairly and equally share the earth's resources in a democratic manner." According to the Ecological Footprint and Human Development Index, Cuba is the world's number one (*see the graph on page 16 from the Living Planet Report of 2006*).

2. How important is freedom and democracy for sustainable development? What about countries without a democratic tradition? What will happen if we involve future generations in the democratic process? Which country do you think is the most sustainable today?

3. Imagine your usual lunch in terms of an Ecological Footprint. How does it score on the Ecological Footprint scale? What would a big Footprint lunch look like? What does a small Footprint lunch look like? How would you use the content of the lunch plate for teaching and learning purposes?

4. China has a large population and is becoming a factory for producing goods for the western world. This means that China needs access to more natural resources and more energy. Metal and many other resources come from Africa, are manufactured in China and consumed in Europe. What should we do to stop this imbalance? Choose the best option from the following list:

- Do not buy Chinese products.
- Continue to buy but request a clean and ecological production.

→

- Break off all contact with China until it has a democratic government.

What is your advice as a global citizen? In comparison with China, in what way are our Baltic Sea region countries less sustainable and how are they more sustainable?

5. What are the driving forces behind population growth and increase in consumption? How should we control, change and direct these driving forces so they become more sustainable?

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CHAPTER 2. EDUCATION FOR SUSTAINABLE DEVELOPMENT

In its broadest sense, educating for a sustainable future includes improving the quality of basic education, re-orienting education to address sustainability, improving public awareness and providing training to various sectors of society. Education is often described as the great hope for creating a more sustainable future, and teacher-training institutions are regarded as key change-agents in transforming education and society so that such a future will be possible.

It is important to note that there is no single definition of sustainable development and no common agreement about the concept of education for sustainable development. It is therefore not the sustainable development content that is in focus here but the way in which sustainable development is included and promoted in a culture and societies by means of education.

In this chapter we will take a closer look at some of the differences between Ecology, Environmental Education (EE) and Education for Sustainable Development (ESD). We also consider teaching for sustainable development, the construction of knowledge and values, ESD progress to date, attitude filters, the ESD Roadmap and planning and assessment methods and give hints on how to avoid some of the obstacles and pitfalls.

Ecology, Environmental Education and Education for Sustainable Development

Education for sustainable development has different backgrounds in different countries. Some people regard ESD as following on from EE and including additional issues of ethics, equity and new ways of thinking and learning. Others say that ESD should be a part of a good EE and that there is no need to do away with EE as an umbrella. Another view is that EE is part of ESD, because ESD includes development, cultural diversity, social and environmental equity. In this section we try to clarify the differences between Ecology, Environmental Education (EE) and Education for Sustainable Development (ESD), particularly as they are often mixed up and misunderstood. Many teachers have followed the various stages carefully and are able to recognise the differences, whereas some have begun to work with ESD directly, without having first worked with the more science-oriented EE.

Ecology is a natural science and includes knowledge about the interrelation between species and ecosystems, such as trees, soil, freshwater, etc. Both EE and ESD, on the other hand, involve values. EE encompasses raising awareness, acquiring new perspectives, values, knowledge and skills, and formal and informal processes believed to lead to changed behaviour in support of an ecologically sustainable environment. In terms of teaching about environmental problems in science subjects Environmental Education is not sufficient to meet the needs envisaged for a sustainable development. In other words, ESD is not intended to replace EE but to enrich it. ESD also involves topics outside the common EE subject matter and is often problem-based. According to this understanding, Education for Sustainable Development promotes the development of critical thinking, the creation of protective attitudes and an active participation in decision-making. It is not only stimulated and inspired from the ecological sphere, but also from the social and economic spheres. The following comparative table outlines some of the main differences between EE and ESD.

Environmental Education EE	Education for Sustainable Development ESD
Deals with environmental problems	Deals in an integrated way with the protection of the environment, an effective use of natural resources, maintenance of the ecosystem, a well-functioning society and a good economy
Environmental problems are based on human activities and their effect on the environment	The problem is based on a conflict between different human goals: environmental, social, cultural and economical
Emphasises biodiversity	Emphasises cultural, social, economic and biological diversity
The goal for action: A good environment for future generations	A good quality of life for present and future generations
Actions for the environment	Motivation to change to a more sustainable lifestyle
Responsibility for the environment	Responsibility for the human condition and the condition of the ecosystem
Deals with individual behaviour (environmental ethics)	Increases action competences, including competence to develop moral criteria and stimulate public participation in decision-making
Environmental education has a local and global context	ESD should be applied and based on the local economic, social, cultural and ecological context and community followed by regional, national and global contexts
Taught in some subjects	Integrated in all teaching and learning and in all aspects of school life

Table 2. (From Baltic 21, Series No 02/2002, annex 6).

As has already been mentioned, different countries define EE and ESD differently. In Education for Change we stress an education that strengthens people's ability to think critically and take responsibility. It is also worth noting here that in the final chapter of this handbook we provide examples that deal specifically with ecological problems. However, in order to solve these problems in the best possible way we also need to include and work with cultural, social and economical aspects.

Reflection Box 1. Education for Sustainable Development

This handbook is ESD-oriented, although most of the examples we have included originate from ecology. Select some of the activities from Chapter 4 and analyse in what way they are EE and in what way ESD.

Teaching for sustainable development

Education increases human welfare and is a decisive factor in enabling people to become productive and responsible members of society. A fundamental prerequisite for sustainable development is an adequately financed and effective educational system at all levels, particularly the primary and secondary levels, that is accessible to all and that augments both human capacity and well-being. The core themes of education for sustainability include lifelong learning, interdisciplinary education, partnerships, multicultural education and empowerment. […] Even in countries with strong education systems, there is a need to re-orientate education, awareness and training so as to promote widespread public understanding, critical analysis and support for sustainable development. (*Earth Summit + 5, 1997, p.74*)[1]

[1] Earth Summit + 5 is the UN conference held in New York in 1997 to assess the implementation of Agenda 21, the global plan for sustainable development signed in Rio in 1992.

Exactly how the educational system should include sustainable development is a complex and multifaceted question. The task is made a little easier if we split the topic into separate parts. We will begin by looking at the overall objective and including knowledge and motivation as driving forces. We will also examine knowledge in a little more detail in order to identify action competences and skills, and conclude by identifying the best places for teaching and learning.

Overall objective

The main objective of education for sustainable development is that everybody should acquire the relevant knowledge and be motivated to work for and practice sustainable development. Education for sustainable development can be seen as an overall perspective and an ongoing process in a changable world. The long-range goal is that we live as good a life as possible without harming others or the surrounding nature and society in both time and space. For the individual person this demands a developed capability to act for a sustainable society, that is to say having the relevant knowledge, the right opportunities and sufficient motivation.

Knowledge and motivation as driving forces

At present we regard the planet's development as being unsustainable. If this is correct, how can we make positive sustainable progress visible? Part of this means trusting in our ability to change for a better future. In order to meet the new world's problems and possibilities we need to be equipped to act for a more sustainable future. Many of our educational policy documents include the concept of sustainable development. For example, in almost all the Baltic Sea region countries these documents emphasise the importance of environmental knowledge and education for sustainable development.

Sustainable development demands constant learning, and in this change is a driving force. Schools are also constantly directed and influenced by society. The question is, should schools copy the existing development or be open to the possibility of thinking again and thinking anew? Nobody can describe with any certainty what the future will be like, particularly as change is ongoing and often very rapid. Future generations will have to be able to live and work with change.

Education for sustainable development is about learning to live in accordance with what we need and value most. Once you are clear about what you are going to teach and how you are going to teach it, it is a good idea to share this with colleagues and check that the content and perspectives match the values of staff and students. Each discipline has its own particular pedagogical techniques. The combined pedagogical methods and strategies of each discipline contribute to an expanded vision of how to teach creatively, encourage critical thinking and how to support sustainable societies.

ESD addresses the learning skills, perspectives and values that guide and motivate people to participate in society. In a formal curriculum that has been changed to address sustainability, life practices demonstrate an understanding of and belief in a sustainable society.

We also need to develop personal sustainable development skills. These include our willingness and ability to influence lifestyles and living conditions, assume a global responsibility and have respect for and confidence in future generations. Three factors affect our ability to act: increased knowledge, a choice of possibilities, and a personal driving force; or, to phrase it differently, an outer and inner motivation.

Teaching and learning encompass processes that promote knowledge and also include skills, values and attitudes that affect the individual's, the school's and the community's ambitions to create a fair society, economic security, ecological sustainability and democracy.

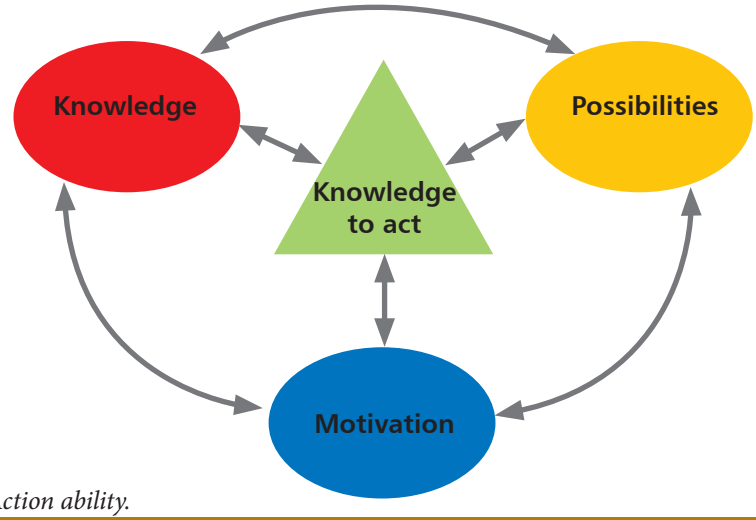


Figure 6. Action ability.

Knowledge includes facts, practical skills, deep understanding, broad awareness and wisdom.

Possibilities include the existence of different alternatives and opportunities. Examples of this are:

- I can because practical and organisational possibilities exist.
- There are safe paths so it is possible for me to cycle to school.
- I can buy fish knowing that this does not harm the fish stock.
- I can vote for good leaders who work for international agreements that are important for climate change.
- As a consumer I have access to information and can use this information and my money to choose products that have been produced in a sustainable way.
- As teacher I have curricula, a head teacher and colleagues that support and cooperate to improve education for sustainable development.

Motivation grows within us as a personal conviction and from surrounding influences such as social norms and economic stimulation. By offering students practice in identifying problems and finding solutions you empower them and support and strengthen their motivation.

Knowledge to act

How would you respond to the question "What is knowledge"? Your answers are likely to be many and varied and include the following: something you get by going to school, reading, writing, mathematics, knowing the capital of Kenya, how you hammer a nail into a piece of wood, the ability to find your way through a forest, etc. To put it another way: we summarise knowledge as facts, skills, understanding and familiarity.

A holistic view of knowledge is one in which knowledge is regarded as a process rather than a product, as quality rather than quantity, as something that is value-dependent instead of neutral, where theory and practice go hand in hand, something that has consequences for the learning process, where the superficial becomes concentrated, the memorising of texts is replaced by understanding and where motivation comes from within. Here the emphasis is on previous knowledge and experiences, active studying in cooperation with others, as well as knowledge of action through reflection. Such a view means that the role of the teacher changes from someone who knows best and feeds this knowledge to students to a guide who offers different and variable ways of working and encourages the learners to find things out for themselves and develop a questioning attitude.

Knowledge is very much about the handling of problems in a changing situation and how to get the best out of life and progress. Despite living in a so-called enlightened and educated society we are witnessing the results of an increased environmental pressure on Earth. New ways of thinking therefore need to be reflected in educational policy documents.

Where should teaching and learning take place?

The answer to the question about "where" learning and teaching should take place is simple: where knowledge is best cultivated. The school tradition is strong and teaching is usually carried out inside a classroom. When the education is being planned, however, it is important to ask yourself where the teaching might best take place. It might be the case, for example, that the planned teaching would be better suited to an outdoor environment. This can be enriching for several reasons. One is that students are exposed to their own unique experiences – something that is direct, personal and cannot be replaced by anything else. This is why we emphasise the importance and value of close contact with the natural surroundings and local community in environmental or sustainable education. Such outdoor education can mean, for example, highlighting the ecological aspects of the school grounds, the riverbank or nearby forest area. It is also worthwhile developing close contacts with the local community, such as encouraging dialogues and cooperation with parents, politicians, companies and other interested parties. A school where education for sustainable development is well developed is also seen as an important stakeholder in establishing a practical and local sustainable development. A well-planned cooperation like that suggested above creates a win-win situation both for teaching and learning and society's democratic processes.

Reflection Box 2. Education for Sustainable Development

1. How do the different aspects of knowledge affect teaching and the role of the teacher?
2. Analyse the complexity of knowledge and name the different "phases" of knowledge. How can knowledge best be used?
3. What possibilities do you have at your disposal? What is needed in order to teach sustainable development? Who is responsible for developing these possibilities?
4. Analyse motivation and what affects it. What kinds of things limit or encourage motivation?
5. What are the obstacles to change and action – in your own case, consumers in general, teachers and politicians?
6. In what way do national policy documents promote ESD?
7. How might you make ESD a reality in your school?

The construction of knowledge and values

It is important to delve a little deeper and become more aware of the actual learning process. Here questions like how teachers can help students learn, assimilate, adapt and use new information and add to their existing knowledge, as well as help to explain misunderstandings and develop values, become essential.

Some of the answers to these questions can be found in educational theories and approaches, like constructivism for example, that focus on the competence of the individual. Constructivism is based on an understanding about what is going on inside the brain of the student. Many of these educational theories are based on the work of highly respected scholars like John Dewey, Lev Vygotsky, Jean Piaget and Jerome Bruner, who argue that children actively construct knowledge and that this construction of knowledge occurs in a social context. Vygotsky was convinced that all learning takes place in the 'zone of proximal development'. This 'zone' is the difference between what a child can do alone and what he/she is able to do with assistance. By building on the child's experiences and providing moderately challenging tasks, teachers can help to provide the necessary 'intellectual scaffolding' so that children can learn and progress through the different stages of development. In simple terms the constructivist theory means that the learner constructs and develops knowledge, bit by bit and by building on their existing knowledge. Constructivism emphasises the students' ability to solve real-life,

practical problems. Students typically work in cooperative groups rather than individually, and tend to focus on projects that require solutions to problems rather than instructional sequences that require particular skills. In constructivist models the role of the teacher is to provide the required resources and help and guide the students to set their own goals and 'teach themselves' (*Roblyer, Edwards, and Havriluk, 1997, p. 70*).

In short, constructivism describes how learning should occur, irrespective of whether learners are trying to understand a lecture or attempting to design a model aeroplane. In both cases the theory of constructivism suggests that learners construct, or build, knowledge. As a description of human cognition constructivism is often associated with pedagogic approaches that promote a practical learning by doing.

Teachers guiding learners

There is also a social constructivist approach, which implies that teachers are facilitators – a role that can be likened to a midwife helping a mother to give birth – rather than instructors (Bauersfeld, 1995). For example, whereas a teacher might stand at the front of the class and give a formal lecture (which the students listen to) about a particular subject matter, a facilitator encourages free thinking and helps the learner to reach his or her own understanding of the content. In the former lecture-based scenario the learner is passive, while in the latter guide-based scenario the learner plays an active role in the learning process. This dramatic change of role implies that a facilitator needs to develop a completely different set of skills, as indicated below (*Brownstein 2001, Rhodes and Bellamy, 1999*):

Teacher	Facilitator
tells	asks
lectures from the front	supports from the rear
gives answers according to a set curriculum	provides guidelines and creates an environment in which the learner arrives at his or her own conclusions
mostly gives a monologue	is in continuous dialogue with the learners

Table 3. Change of role of teachers.

A facilitator should also be able to adapt the learning experience 'in mid-air' by taking the initiative and helping to match the learning experience to the learners' needs and values.

Being aware of your role as a teacher (or facilitator) goes hand in hand with how you view knowledge and the learners in your care. While teachers can support the learning process, the student is to all intents and purposes the main actor in the lifelong process of education. New information is continually being processed and learners are constantly being challenged to review their understanding and their views. The learner is therefore not just a passive receiver. Ideally the teacher should guide learners and provide a positive and challenging environment for learning.

ESD has an important societal dimension in that it attempts to turn the students into active citizens and encourages them to contribute towards a more just and better world. Stephen Sterling (2001) characterises education for sustainable development as grounded in the local economic, social and ecological context. ESD more than traditional education aims to involve the whole personality of the student. Sterling (2001) addresses this perspective when he distinguishes between the socialization function of learning, the vocational function and the transformative function. ESD asks for transformative education. A survey of experts from nine countries (Cogan and Derricot, 2000), both East and West, agreed on eight characteristics that citizens of the 21st century will need in order to cope with and constructively engage in major global trends. They were ranked as follows: 1. Looking at problems in a global context; 2. Working cooperatively and responsibly; 3. Accepting cultural differences; 4. Thinking in a critical and systematic way; 5. Solving conflicts non-violently; 6. Changing lifestyles to protect the environment; 7. Defending human rights; 8. Participating in politics.

Change is never easy, however, and can lead to emotional and psychological difficulties. While knowledge and values are usually best developed in a group, it is important to treat people's firmly held values and opinions carefully. For example, people who state their opinions in a public space are less likely to change their opinions later. It is difficult to go back on what you have already stated in public. As a teacher you create situations that support learning by the way you ask questions, organise activities, support discussions and so on. Every teacher thus has to find his or her own way of helping the learners they are responsible for. In Chapters 3 and 4 you will find methods and activities that are suitable for a variety of pupils in that the way of learning outlined is individually based. In short, there are lots of different ways of learning and lots of different ways of teaching!

Education for Sustainable Development – perspectives and progress

In this section we focus on how to teach education for sustainable development and how to assist learners achieve specific or set goals. We also expand education somewhat and identify support systems within the school environment. What kinds of pedagogical and didactical approaches are suitable for ESD? How can ESD be adapted by different educators working in the different pedagogical settings?

The educational perspectives outlined below are included in almost all teaching and learning. We have described these perspectives in more detail, below, with a view to making the concept of education for sustainable development much clearer. The "ESD Roadmap", detailed on page 27, serves a similar function.

A variety of educational perspectives

Learner-oriented – where learners are responsible for their own learning and where learning emanates from the learners' own experiences and questions.

Acquiring knowledge can be demanding, although once knowledge has been acquired and understood it is relatively easy to retain. It often "sits" in the brain or in the body, and is personal. It is also a lifelong process and occurs in conjunction with our surrounding and social environment. We sometimes learn alone, and at other times we exchange thoughts, ideas and knowledge with others. Learning therefore takes place continuously and in a social and cultural context. This view of knowledge emphasises the importance of starting from the individual's previous knowledge base, in whose body that particular knowledge is formed and sits, and building from there. Creating a democratic dialogue with learners does not only improve motivation, it is the very core of ESD.

Process-oriented – paying attention to relations and systems.
What is the best way of reducing CO_2 emissions? One answer is to reduce the use of fossil fuels! While the answer to the question might be easy, implementation is a struggle. The goals set for ESD involve processes carried out in realistic or simulated contexts. In a process-oriented perspective learning is focused on how to solve a problem, whether alone or together with others, rather than on the actual result. Here the learner has to deal with people's different opinions in a democratic way. The aim is to provide competence and pave the way for action and participation. Motivation and learning come automatically when one is involved in a process, although a teacher naturally has to find suitable methods and set clear goals for a meaningful and challenging learning.

In this perspective setting aside time for critical thinking and position-taking is important. We are continuously bombarded with different impressions; only a fraction of which we are able to digest and experience. Taking time to pause and reflect means that experience has time to be transformed into knowledge and something meaningful. Reflection can take many forms, however. It can be a continuous and subconscious dialogue, or a structured discussion with others. The forms can vary too. Listening, talking, writing and artistic creation are all important tools in the reflection process. Documenting what you do or have done, having a critical mind and asking questions are all valuable reflective tools and a necessary part of the learning process. In process-oriented teaching, and especially where we do not have all the answers at our fingertips when it comes to sustainable development in a changing society,

we need to continually re-think and question present trends and ways of thinking. This also includes teachers!

Society and nature-oriented – means involving the learners in real life happenings and ordinary societal processes.

School is not a training camp for a future life but an integral part of life in the here and now. Involvement is itself a motivating force for learning. Learning outside in nature, in an urban environment, or being involved in well-planned study tours in which learners can make direct observations, offer both challenge and stimulation. Very young children can also benefit from real-life practical activities, such as learning how to make bread, feed the chickens or take care of their own laundry. In secondary school, teaching and learning tends to be much more oriented towards and integrated with society, such as through structured projects where the activity leads to the acquisition of knowledge and skills and where students are motivated. But learning in real contexts does not only empower and motivate, it also develops social competency and the skills needed for an active participation in sustainable development. As a teacher it is important to choose and design learning environments that are best suited to the intended purpose.

Most people spend about 20 percent of their entire lifetime in schools or educational establishments. Finding activities where learners can be involved in the processes of planning and realisation in a real context is therefore essential if learning is to have any real meaning.

Integrated – a holistic approach that includes different subjects and perspectives. An education for sustainable development that feels relevant, meaningful and is anchored in reality for the students is simplified by a holistic approach. Having a basic knowledge of the green circle (*see the diagram on page 12*) and the outer ecological framework of society is essential in this context. A holistic approach includes acquiring knowledge about ecological frames, systemisation, energy flows, different re-cycling systems, interactions in nature and biological diversity as well as knowledge about human requirements, language, culture and creation. Questions relating to ethics and the meaning of life, as well as how we, with all our technical possibilities and solutions, can meet the future's challenges with energy and resource saving constructions, are also part of a holistic approach. Different subjects contribute too, such as science for discovering, identifying and analysing relations, social subjects for looking at the background to situations and events and identifying the know-how necessary for change and development, and language and art for creative expression and communication.

The school as a learning environment – consumption and decision-making. A school is a consumer of resources.

You only need to look at what comes in and what goes out – such as the enormous flow of water, waste and energy – to realise that. As the school is a major consumer of paper, it is important that people in school know, for example, where paper comes from and what happens to all the used papers and textbooks. Not to mention what happens when you flush the toilet or turn on the tap for water! Here you can involve the school caretaker, the cleaning staff and the cooks. Remember too that a school garden is not only attractive but is also a useful leaning resource as well as a source of fresh flowers and vegetables. The main thing here is to be realistic and make realistic plans to create and maintain a sustainable school. Involve the students in both the planning and the implementation. Ask others in the community for assistance and resources, and invite parents and companies to cooperate. Learning about and acting in sustainable ways helps to reduce your school's Ecological Footprint!

A systematic way of working with this is to introduce a simple environmental management system suited to the school situation. Such a system could address e.g. energy, water, transport, goods and food, as well as the education itself. Further information is available on the Baltic University homepage, **http://www.balticuniv.uu.se/educ**.

Reflection Box 3. Education for Sustainable Development

1. Democracy is essential for sustainable development! What are the advantages and disadvantages of democracy when it comes to achieving sustainability? Do we have time for democracy? Are there "short cuts" to sustainability, and if so, what might these be?

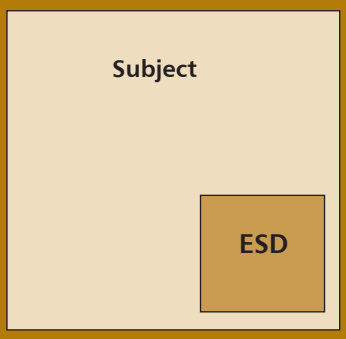
2. In what ways can education and the school environment help children to actively participate in sustainable development?

The ESD Roadmap

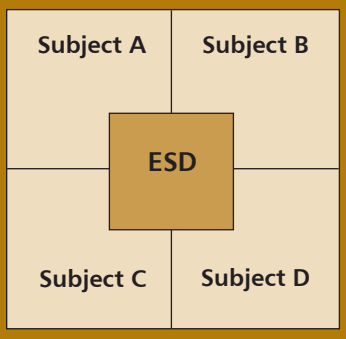
This Roadmap below takes the form of a process matrix and allows educators to follow ESD progress. The matrix incorporates the learner perspectives discussed above and outlines the different stages of participation and involvement in ESD. Take the cornerstones one by one and follow the process from a stage where few educators in the school are aware of a whole school approach. Discuss which text you would like to see written in the blank squares, formulate it and write it down.

Table 4. Education for Sustainable Development process matrix, or "Roadmap" for a whole school approach.

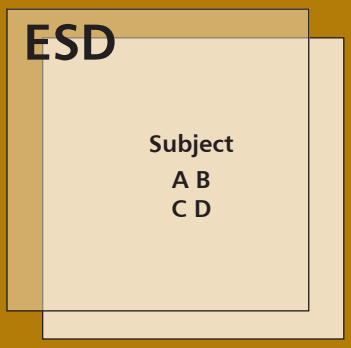
ESD perspectives	Pre-engaged stage	What steps have to be taken to involve the whole school? Fill in the gaps!		Whole school approach
Learner oriented	The learners do not affect content or methods. Teachers are the senders and learners the receivers of facts.			Teaching is built on learners' experience as a group or as individuals. Planning, implementation and evaluation of all education are based on democratic decision-making
Process oriented	Education is mainly focused on results and which facts or skills should be taught .			Education is mainly focused on how and why fact or skills can be learned. Teachers use methods that develop the learners' understanding in structured ways.
Oriented towards actions in society and nature	Education teaches what can be done – later. Learners make direct contact with people and places outside the school. Information is mainly transformed via teachers and books.			Getting involved in well planned activities in school and in society is part of teaching and learning. The school is a natural partner in sustainable development in society and requested by different stakeholders. Society and nature close to the school are natural "learning environments".
Integrated	Teachers of specific subjects such as chemistry, history, etc., meet separately to develop their subjects. The subjects are taught separately and learners have to piece the facts together.			Teaching and learning is integrated and based on the aims stated in the curriculum (even if the curriculum is structured according to subject). Teachers work in teams and have time for structured planning.
The school as a learning environment	Teaching is the sole responsibility of the teacher. The maintenance and planning of school buildings is carried out and decided by others. Only economic aspects are taken into account in the purchase of material and food.			The school is "an institution that teaches". The school requests that students and staff use paper, food and other products in a sustainable way. Materials are used in a sustainable way. The management of buildings and surroundings is an integral part of the education.



ESD is a part of most subjects.



ESD is a part of cooperation between subjects.



ESD as a perspective for integration between subjects.

What is integration and ESD for you?

Reflection Box 4. Education for Sustainable Development

1. How can you respond to student initiatives and at the same time achieve the goals set in the curricula?

2. When thinking about education as being oriented towards action in society and nature…. what are the difficulties of leaving the classroom? How might such difficulties be overcome? What is to be gained from teaching and learning beyond the confines of the classroom?

3. Most educators see integration and a holistic approach as something quite natural and desirable. But do we all have the same picture of integration? Use the questions outlined in Figure 7 to describe integration. Discuss and explain ESD integration in your own words.

Figure 7. Relations between ESD and different subjects.

Values and the teaching profession

In education for sustainable development the aim is to support young people in developing the relevant knowledge, values and skills. As a starting point, the following questions may help you to focus on your own and your team's values and identify the kind of values, knowledge and skills you want to encourage and develop in your students.

Questions for you as an educator

- Can education change the world?
- What does living a good life mean?
- What is sustainable development for you?
- What are your views on the three aspects of sustainable development: ecological, social and economic?
- Which view of knowledge do you have and which knowledge do you regard as being especially important in a sustainable society?
- Reflect on the word "curiosity" and sustainable development.
- Education for sustainable development makes demands on the teacher. What kinds of roles do you think a teacher can play in this context? What are the possibilities and difficulties for the teacher in this/these roles?
- Our competency to act is described as a combination of knowledge, possibilities and motivation. Do you agree with this (*see the picture on page 22*)?

Questions for staff, students and parents

- How can we encourage the whole school to participate – all teachers, students, school administration and parents?
- How can we develop the methods and resources further?
- How might the students become more involved in decisions that affect their learning and their school?
- How can we develop the school's cooperation with the local community in order to identify and deal with the different questions and issues that arise in that context?
- How might the teaching and non-teaching staff and the students in our school be encouraged to work more actively and in a more structured way to improve school maintenance and the use of resources?

Attitudes filter

Many of our attitudes to life and the future reflect fundamental values that are often based on our particular culture and experiences from childhood, adolescence and growing up. We are not always aware of the attitudes and values we have, how they control our actions or where they originate from.

Let us look at our attitudes towards cars as an example. Today we know a lot about how our environment is negatively affected by driving a car. This knowledge in itself should be sufficient for us to change our patterns of behaviour and use more public transport. But other things also play an important role. Some people enjoy the freedom of being able to use their own cars and go where they want, while others enjoy the speed and efficiency of driving, and so on. Even though people say that they care about the environment, such freedom and pleasure often results in people using their cars much more – rather than less. In other words, our behaviour, attitudes and values with regard to cars has little to do with facts and more to do with feelings. Even though the facts exist they are "filtered" through our "attitudes filter". It is not until we stop to take stock of these facts and allow them to influence and change our attitudes that action results. The whole point of working with values methodology is that every individual is encouraged to achieve an active ethical norm. The first step in this may often lead to becoming aware of your own opinions and actions and how they are determined. Here values exercises can be of help in that they clarify how you think and feel about certain issues.

In pedagogical terms values exercises increase people's awareness of their own values. Examining your own values can either lead to a willingness to change or a resistance to change. A fundamental rule for those working with values methodology is therefore to regard all the answers or responses as being valid, i.e. neither right nor wrong. Everybody must be given the right to express their attitudes or values without being afraid that they will be regarded as "wrong". It should also be made clear that participation in such an exercise is voluntary.

The second step is to communicate or express one's thoughts to other people and share them. It may be preferable to do this on a one-to-one basis to start with, rather than with the whole group. Different types of values exercises can be used in the two different stages.

Planning and assessing

When offering a learner-oriented education it is important to find out what the students already know and what values they have before you introduce new concepts or topics.

Pre-knowledge

Here it is advisable to use a short and simple questionnaire at the beginning of a new unit in order to find out what the students already know about the topic. Develop a questionnaire with two or three open-ended questions, short-answer questions or about ten multiple-choice questions on the concepts or topic in question. Be careful to phrase the questions so that the students will easily understand what you are asking for. Avoid using terms or vocabulary they are unfamiliar with. You can either write the questions on the blackboard or prepare paper or computer-based questionnaires.

Be sure to tell the students the results of the questionnaires the next time you meet them. You can also use the results as a basis for small group discussions, where the students discuss the questions and responses together.

Vee Heuristic

Vee heuristic is a graphic representation that helps teachers and students clarify research and development processes. It helps you to examine the processes and organisational structures that assist change. Originally Novak and Gowin (1984) presented Gowin's Vee diagram or Vee heuristic to promote meaningful learning. Later Mauri Åhlberg presented an improved Vee Heuristic.

The main parts of the improved Vee heuristic design are planning (the left side of the V), implementing (the foot of the V) and evaluation (the right side of the V). Inside the Vee heuristic is a place for the focus question or research problem that definines what you actually want to know. Good focus questions usually begin with why, how, or what. For example, what methods can NGOs use to work for a change of agriculture policy in the EU to support more sustainable food production? This is the starting point of the research and development process.

The phases on the planning side of the Vee should be completed before the research, development or learning project has begun. This part is important for many reasons, most of all because it deals with value basis. The solutions defined in this part of the project form a scientific and practical footing for the project. The right hand side lists the results and conclusions for assessment, evaluation and further development. This method facilitates the identification of the relevant knowledge and values. It is a powerful tool for group discussion and team work in general.

PLANNING	1. Focus question(s)	EVALUATING
2.Value basis. Why do you want to spend time and resources on answering the focus question(s)? **3. Theoretical basis.** What do you already know? **4. Conceptual basis.** Which main concepts are included in your theoretical basis? **5. Methodological basis.** Which methods do you plan to use to answer the focus question(s)?		**10. Value claims.** What has changed? **9. Knowledge claims**. Which new ideas emerged? **8. Transformations.** How were the conclusions arrived at? **7. Records.** What kind of data was collected?
IMPLEMENTING		
6. Description of what has been done in order to answer the focus question(s)		

Figure 8. Improved Vee heuristic is a useful graphical representation for designing projects eg. for implementing sustainable development in curricula.

Formative and summative assessment

The objective of assessment is to find out what the students have learned and how successful or otherwise this learning has been. In this context we are talking about formative or continuous assessment, which is assessment carried out during the learning process with the objective of improving the quality of learning. When assessment is undertaken at the end of a learning process, or at the end of a school term or year, it is known as summative assessment.

As no specific assessment techniques are designated for education for sustainable development a variety of tests or exams can be used depending on the topic or unit being worked on. Examples of such techniques include common multiple-choice tests, true-false tests, matching tests, essay tests, short-answer tests, problem sets, oral exams, performance tests, take-home tests, open-book tests, group exams, paired tests and portfolios. In this context it is important to be aware of what kind of knowledge is actually being assessed. Using Bloom's taxonomy to develop a test can be enormously helpful. When framing the kinds of questions to be used in assessment the following paragraphs serve as a useful guideline:

When measuring or assessing knowledge (i.e. terms, facts, principles, procedures, etc) use the following verbs in the formulation of questions: define, describe, identify, label, list, match, name, outline, reproduce, select, state.

When measuring or assessing comprehension (i.e. the understanding of facts and principles, the interpretation of material, etc) the following verbs can be used to formulate the questions: convert, defend, distinguish, estimate, explain, extend, generalise, give examples of, infer, predict, summarise.

When measuring or assessing application (i.e. the solving of problems and applying concepts and principle to new situations, etc) use these verbs: demonstrate, modify, operate, prepare, produce, relate, show, solve, use.

When measuring or assessing analysis (i.e. the recognition of unstated assumptions or logical fallacies, the ability to distinguish between facts and non-facts, etc) use these verbs: analyse, indicate, differentiate, distinguish, illustrate, infer, point out, relate, select, separate, sub-divide.

When measuring or assessing synthesis (i.e. the integration of learning from different areas or solving problems by creative thinking) use these verbs: categorise, combine, devise, design, explain, generate, organise, plan, rearrange, reconstruct, revise, tell.

When measuring or assessing evaluation (i.e. judging or assessing) use these verbs: appraise, compare, conclude, contrast, criticise, describe, discriminate, explain, justify, interpret, support.

Self-assessment

In an educational setting self-assessment involves students making judgments about their own work. This means that students are asked to critically assess their own essays, reports, projects, presentations, performances, dissertations or exam scripts. You can best support your students in their self-assessment efforts by providing regular, uninterrupted time for students to think about their progress. At first it may be necessary to guide their reflection with questions such as the following:

- What did I learn today?
- What did I do well in and what didn't I do so well in?
- What am I confused about?
- What do I need help with?

- What do I want to know more about?
- What am I going to work on next?

As students take part in the self-assessment process they will have opportunities to collect their own items of work and react to things they have read.

Reflection Box 5. Education for Sustainable Development

ESD deals with learning processes. Which assessment and evaluation methods do you find useful in your own teaching?

How to avoid some of the obstacles

The following text comes from action research carried out by Małgorzata Puchowska and Sylwester Zielka at Gdańsk University. The researchers observed a group of teachers being trained in the Study Circle method. We have reproduced part of the article here because we think it will be useful for teacher trainers and teachers in a similar position. The entire article can be accessed on ***http://www.balticuniv.uu.se/educ/***

Is it possible to modernise the school quickly and painlessly without a thorough reorientation of the theory of education?

The pilot study undertaken in the context of the Education for Change project, carried out among 29 teachers at three schools in northern Poland, revealed the presence of obstacles in implementing education for sustain¬able development. The project assumed that the work undertaken in the self-educating study circles would convince the teaching staff, the students and their peers, that participation in local community life was essential.

It was unfortunate that the teaching programmes created within the project only expanded the content of the already existing ecological and pro-health educational paths and the suggested solutions only focused on those elements of sustainable development generally identified with its ideas. The teachers also failed to cooperate with their students' parents, local authorities and other inhabitants in the region.

- People failed to think about themselves as members of a local community. The school was supposed to initiate actions,
- Students were not presented as members of the local communities but only as those who carried out the teachers' orders.
- Sustainable development should not only include educational content and methods of teaching but also mutual relations between teachers, students, parents and the local community.

Consequently, we have to look for teaching methods that support learning processes and school development. It is expected that the individual, as well as the team of teachers:

- will focus all actions on the comprehensive development of students;
- will recognise students as active participants in the learning process and themselves as consultants in the said process;
- will have a positive attitude towards implementing innovations and will not simply concentrate on adjusting to the existing situation;
- will plan their development and the development of the school as a system;
- will be open to the needs of the local community and to far-reaching cooperation with the community;
- will participate in partnership relations with educational institutions;
- will promote teamwork involving students, teachers and parents, appointed every time for particular projects;

– will constantly develop themselves.

Routine work must give way to creativity and in the case of human relations, dominance must yield to partnership.

It is difficult to talk about education for sustainable development as a certain product to be implemented. Such reasoning would mean the approval of the pre-existing discipline of knowledge and presenting the reality in parts. Understanding education for sustainable development as a separate subject is also a mistake. The scheduled implementation of education for sustainable development requires a departure from recognising the school as a teaching organization towards recognition as a learning organisation. It entails changing the perception of the place and role of students, parents and teachers, allowing them to optimise the creative possibilities of a single person.

Apart from the immediate implementation of separate, properly equipped university courses focused on sustainable development and designated for students in all pedagogical faculties, it is important to promote and facilitate all methods of informal education, and particularly the study circle method, as long-term development.

Reflection Box 6. Education for Sustainable Development

1. Why can it be problematic to change pedagogical perspective without a thorough reorientation of education?

2. What kind of steps should be taken if motivated teachers want to reorient teaching and learning to include sustainable development? What would your advice be?

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CHAPTER 3. METHODS

As has already been mentioned, no special "ESD methods" have been designed or created for the teaching and learning of sustainable development. Having said that, it has been found that some methods are much better suited to ESD than others. Typical for most ESD methods is the focus on the learning process. It goes without saying that the method chosen needs to fit the particular pedagogical or learning situation or environment. This learning environment also needs to be created by each professional educator.

We have compiled a checklist of things that are worth taking into account when choosing methods and activities for a shorter or longer period:

- ESD Roadmap: Develop your education according to the ESD matrix for a whole school approach, illustrated on page 27 of this handbook.
- Pre-knowledge: What do your students already know and what attitudes do they have?
- What are the aims of the education in question?
- Which skills and knowledge are you intending to create and improve and what attitudes are you intending to develop?
- Which methods and activities will best support the aims?
- How will you asses and evaluate what has been learned?
- How will the students be involved in the planning and progress?
- How will you make your work visible for others?

Teaching is built on learners experience´ as a group or as individuals.

In the following section we present a number of practical methods and activities that have been found to be useful and relevant in ESD. These methods include "values clarification", with exercises like; "incomplete sentences", "ranking", "change circles", "standing on a line", "four corners" and "the hot seat", "forum play", "role play", "case studies", "problem based learning", "debates, discussions and problem-solving" and "storyline".

Values clarification

In complex subjects that are interdisciplinary in character facts alone cannot guide or influence our behaviour. Instead, values clarification or active value methods are used to explore people's attitudes, opinions and values. Although a values clarification will not provide any "correct" answers it will help you to identify what your opinions are, how you can change or develop them and how to acquire new perspectives and communicate them. When working with values the emphasis is on the process and the individual learner. Many different activities can be used for values clarification – the important thing is to use them with care and respect for the participants so that nobody will feel inferior or imagine that they have the "wrong" answers or attitudes. John M. Steinberg first used values clarification in health education to help young people identify their values, talk about them, behave in ways that were consistent with them and to respect other people's values.

In the following section we have provided a number of examples of values clarification exercises. Our advice would be to try out the exercises in advance and see which suits you, your group and the topic best. Many people find it difficult to express their opinion and change their standpoint openly in front of a group. Although many of these values clarification exercises might seem like a game, it should be remembered that they are primarily educational. People can also react differently to them, particularly as our viewpoints are private and personal and we can easily be hurt if these opinions come under attack.

Some of the exercises are described in brief in this chapter, and further activities can be found in Chapter 4.

Incomplete sentences

This exercise uses incomplete sentences as a baseline in order to find out a little more about what your students think about certain issues or things before starting a new piece of work or topic. Understanding and opinions can also be developed by using incomplete sentences with pairs of students or in small groups.

Incomplete sentences, like the examples given below, are written on a piece of paper or on the whiteboard. The participants are asked to complete the sentences according to their own beliefs and opinions. In a group where people don't know each other very well it is probably best to do this exercise in writing and individually, although if you wish you could ask the participants to voluntarily read some of their sentences aloud or discuss them in pairs.

Examples of sentences are:

1. An animal that I would like to have is . . . . . .
2. The type of nature where I feel most happy is ... ….
3. Individual: "The most important things for me to learn in school are……."
   Small group: "The most important things to learn in school are……."
4. Individual: "I want a car because ....."
   Small group: "Cars are very useful because ……."
5. Individual: "Something that I think WWF should work hard for is……."
   Small group: "A problem we would like WWF to work hard for is ……."

Ranking

Values clarification exercises can also be used as an introduction to a particular topic or for getting to know one another in a group. This exercise involves ranking and prioritising from a given list. The questions and ranking examples can be adapted to suit the particular topic you are working with. The idea is to rank the alternatives from 1 to 3, where 1 has the highest priority. The exercise can be individually or group based. Ask the participants to indicate their answers on paper first and then discuss their rankings with classmates. By way of conclusion you can ask some of the participants to explain their opinions to the whole group. Prioritising from a number of different alternatives is also a model that can be used for individual reflection and group discussion. It is possible to vary the degree of difficulty by having alternatives that are not quite so clear cut and that depend on a variety of circumstances.

Examples of ranking questions are:

What would scare you most of all to meet in nature?

– a moose
– a dog
– an unknown person

What needs to be prioritised in your home community?

– waste water treatment
– cycle routes
– a football arena

Which organisation would you prefer to be a member of?

– WWF
– The Red Cross
– I would prefer to start a new organisation

Another good example of ranking is to individually reflect and write down lists that can later be used as a starting point for making priorities. An example of this is to ask the students to "Write down at least ten of your favourite meals".

The students should make their lists without speaking to one another. It is important to allow everyone to think for themselves without being influenced by other people's opinions. When the students have written their lists they can prioritise them according to taste, transportation, cost, Ecological Footprint, etc. It is important to remind them that there are no right or wrong answers. When the participants are ready they can compare their lists in pairs and discuss their priorities and reasons.

Change circles

This is a quick exercise that is also silent. The nature of the exercise is such that participants can indicate their standpoints in relative anonymity in that there isn't time to observe how others are responding. Begin the exercise with basic and neutral questions so that the participants get some idea about how it works. You can also use change circles as a warm-up exercise to get people's ideas flowing and to get an overview of what your students already know about a subject and how they position themselves with regard to certain issues.

This is how it works. The group or class forms two circles, an outer circle and an inner circle. The circles then move slowly in opposite directions. The teacher or facilitator reads out questions and if you agree you change circle, and therefore direction. If you don't agree with the question you stay in your existing circle and continue moving in the same direction.

Examples of questions that can be used:

- Autumn is a pleasant time of the year
- My feet never get cold
- In school I learn important things
- We are all responsible for the future
- Politicians are responsible for sustainable development
- I like meat
- I am interested in agriculture
- I do not pollute soil or water
- We are all fighters!

Standing on a line

This is a values clarification exercise that can be used in order to make perspectives clearer in the whole group. The exercise also enables positions to be challenged and encourages people to communicate their opinions.

The teacher introduces the specific issues one at a time and asks the participants to think very carefully about their responses. The first issue is introduced and the participants are asked to draw a line on a piece of paper and mark 6 positions on it, numbered from 1 to 6. Each person has to mark their own position on the line with a cross depending on their viewpoints.

The students are then asked to stand in or on a line (which can be imaginary or marked in some way on the floor of the room) and take up their positions according to the issues being presented – all this being done in silence. Each person then moves to the position of their choice and thereby indicates their individual standpoint. When everybody has taken up their position the participants are then asked to tell the person standing next to them why they are standing where they are. As it is likely that a few people will be standing in each position – thus forming a group – the students in each group can be asked if someone would like to be spokesperson for that particular group and tell the class why they are standing in that

position. As a result of the arguments indicated people might want to change groups – and people can be invited to do this if they wish. Before starting the exercise explain to the entire class that in this activity they can show their feelings and express their opinions freely about the different topics.

The teacher reads a statement that has been prepared in advance. Two different versions of the exercise are indicated below:

Version 1.

– Who has precedence, nature or man?

Nature 1 2 3 4 5 6 Man

Version 2.

Make a line on the floor with the words AGREE and DISAGREE at each extreme end. If you stand in the middle of the line it can either mean that you are unsure or you don't care. Everybody should cut down on their use of energy!

Agree Disagree

Note that in both the above values clarification versions the participants are asked to communicate their views. It is important to explain at the beginning that everyone has the right to express an opinion and that no-one will be judged or corrected for having a belief or opinion that is different to that of others. Tell everyone that they can change their standpoint on any particular value at any time, if they so wish. When the exercise is over ask everyone to return to their original seats. As follow-up at a later date you can, if do desired, use the same questions and assess whether changes of views have occurred and what kinds of changes have taken place.

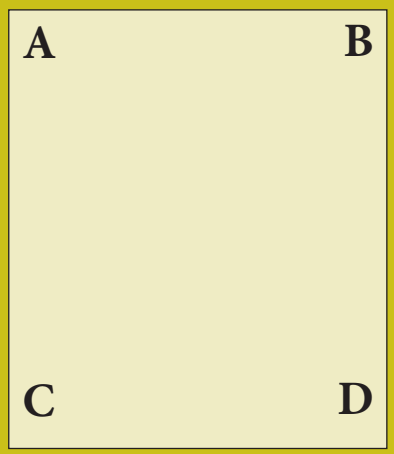
Four Corners

This exercise is suitable for more complex questions. Three alternatives and one OPEN question are always included in the exercise. There must always be an open question for those having answers or responses that are not covered by the other alternatives. Each corner of the room is assigned a specific alternative answer – see the example given below – with one corner always being reserved as "open" for alternative responses.

– What is most important for you when buying a new sweater?

Corner A. The price
Corner B. The style – whether it's in fashion
Corner C. Where it comes from and how it has been produced
Corner D. Open for alternative responses

The teacher reads out the question and indicates which corner of the room has been allocated to each alternative. Each person is encouraged to silently reflect on which alternative to choose before moving to the relevant corner. If somebody goes immediately to a corner there is a risk that others will simply follow and choose the same alternative without first reflecting on why they are making that particular choice. When people have assembled in their various corners ask them to discuss – as a group – why they have chosen that particular alternative. Each group can then choose a spokesperson and that person can tell the whole group about why they have chosen that particular corner. The participants are allowed to change corners if they change their minds. Encourage the participants to think independently and make their own decisions.



The Hot Seat

One of the most important aspects of values clarification exercises is not the actual position taken by the students but the fact that they begin to reflect about the questions for themselves. The actual process – thinking, motivation and oral communication – is more important than the end product, i.e. their response.

Arrange chairs in a circle and ask the students to sit on these chairs. The teacher then reads out a statement that has been prepared in advance and that is relevant to the topic or theme being studied. Those students who agree with the statement move to a different chair and those who do not agree remain in their places. The students are then encouraged to explain their thinking to a classmate sitting next to them or to the whole group. The teacher then reads out the next statement and the same procedure is followed.

Examples of statements are:

Eating fish from the Baltic Sea is dangerous.

Everybody in our countries should consume less.

The opinions of Lithuanian boys and girls are similar to those of Swedish boys and girls.

Nuclear power stations should be closed.

People in the past had a better life than people of today.

We have democracy!

There is a big difference between schools.

Every polluting factory should be shut down as soon as possible.

China is a leading country.

You can also allow the students to formulate statements themselves. Like with the other values clarification exercises there are no "correct" answer to these questions. As a teacher you should avoid giving your own answers as there is a risk that the students may construe your answer as the "correct" one.

More values clarification activities can be found on page 47-52.

Reflection Box 1. Methods

Answer the following questions after you have tried some of the above exercises and become familiar with values clarification.

1. What is important to consider when "designing" values clarification exercises?
2. What is important for you as the leader of a values clarification exercise?

Forum Play

Forum Play challenges and makes attitudes and values visible in a safe environment. The different roles adopted and the interactions between the audience and the actors are not only useful for learning how to solve make-believe conflicts, but have also proved useful for solving real conflicts. In this exercise the participants practice working with different crisis situations in a constructive way that also involves having to take a variety of aspects into consideration.

Forum Play is a valuable method for personal development in that it works with the emotions and values and offers a safe space for expression. The process is just as important as the outcome.

Forum Play originates from the Brazilian director Augusto Boal and his work with dropouts in Sao Paulo. The purpose of Forum Play is to make values and attitudes more visible and thus easier to approach. Forum Play opens with a role-play situation that develops into a crisis.

After the entire situation has been played out a short break is taken, and after the break the entire sequence is repeated. After this the audience takes over and, with help of a joker or a spokesperson, decides which actors they want to replace. When this has been decided and the actors replaced the role-play begins again, although the play can be interrupted at any time by someone from the audience shouting "Freeze!" or "Stop!" A new person then takes over one of the actor's roles and a new twist to the story becomes possible. The play continues in this way right up to the end of the "story". A discussion between the actors and audience then follows.

On page 54 you will find details of a Forum Play entitled Stand Up for SD! This is followed by two dilemma exercises suitable for Forum Play.

Role-play

Role-play allows people to separate the relevant information from the less important, to express and to defend opinions, to listen to others and to be tolerant of different opinions. Role-play helps you to put yourself in somebody else's shoes, imagine what their situation might be like and understand something of your opponent's views or opinions. Role-play is also designed to foster and develop personal values. Playing out real life situations in this way helps us to build up enough confidence to take responsibility for what is happening in different areas or activities and affect the outcomes.

Role-play therefore enables us to take part in a number of very different real-life situations and discuss possibilities and opportunities for a variety of outcomes. The method is particularly suited to ESD issues.

Before the actual role-play begins the participants should be provided with a description of the situation in question, details about the characters involved and what they are expected to do. The participants then decide which roles they would like to try out and how they are going to portray the characters in the particular scenario they are working with. For this they will need to work out their arguments and how they are going to get their message across. Those who aren't assigned roles or who prefer to observe can make up the audience and take note of what is happening in the role-play. At the end of the role-play both the characters involved and the audience are encouraged to discuss what has taken place and evaluate the processes and outcomes. Apart from helping to build up confidence, role-play is also a good way of helping students to develop problem-solving strategies and learn how to act in different situations.

As a teacher it is important to ensure that other students do not judge the role-players too harshly. The whole point of role-play is that it allows you to step outside your ordinary everyday character frame and play the bad or the good guy without feeling inhibited. You don't have to like the character you are playing either! It's simply a chance to experiment with something that is quite different in a safe environment.

Three useful steps for getting the students involved:

- Brainstorm (a problem-solving technique involving the spontaneous contribution of ideas from all the members of a group) six or eight roles that the students can act out in the planned scenario. In identifying the characters the consequences of a particular action will also need to be considered. For example, a role-play about forcing the local chemical plant to spend a lot of money on cleaning up its land will probably mean that people will lose their jobs. Local business people who rely on the plant's workers for income will be also affected, and people living close to the chemical plant will also be adversely affected by the clean-up operation.
- Each role should be described clearly and in brief.
- Decide which line of action each role player should take. This might be holding a town council meeting to decide whether or not the chemical plant should clean up its site immediately. Simplicity is the key to the success of role-play, so avoid making things too complicated.

Preparing the students for the role-play

If background information research is necessary for the role-play the teacher should allow time for this before the actual role-play is performed. Giving the students time to read and discuss both the topic and the roles is also important. When it's time for the performance you or the group can select the actors, while the remainder of the group can act as advisors or supporters to the individual actors and observe what is being played out.

The action

The teacher can introduce the role-play scenario to the audience or a student can be chosen to do this. In any case, introducing the role-play scenario is important so that everyone – the actors and the audience – knows what to do and what to expect. This introduction doesn't need to be very detailed and it should certainly not reveal too much about what will or will not happen in the actual role-play! The person doing the introducing should introduce the role-play, outline the problem being portrayed, indicate how long the play is likely to be, whether some of the actors will take "time out" of the play for advice and what will happen after the role-play (i.e. that a discussion on the issues raised will take place). After this introduction the actors take over and play out the planned scenario.

Whole class involvement

If the entire class is to be involved in the final discussion they will need to know this in advance (see above) so that they can make notes during the role-play if they wish.
One way of starting off the discussion is to first of all allow the players to say how they felt in the roles and whether alternative actions might have been possible. Such a discussion can then be widened to include the audience's views. The entire class can also discuss whether the actors could have played their roles differently, and if so how and why.

Two specific role-plays about oil drilling and fishing can be found on pages 52 and 54.

Case studies

Working with case studies encourages students to analyse and discuss specific dilemmas and enables them to develop their ability to formulate and express a variety of arguments.

A number of features are common to so-called cases or case studies:

- a case study describes a real situation
- a case study relates to a problem that has to be solved and where decisions have to be made
- a case study is normally described from the decision-maker's viewpoint and allows the student to assume this particular role.

Case studies differ from other learner-oriented activities in the following ways:

- Both the source and background material are authentic and describe a situation that has actually taken place
- A case builds on field data and real-life observations or research in "the field", such as through documents, interviews, articles, reports and so on
- The content of each case varies and often involves a decision-making situation
- The reason for making use of the case must be educationally sound – did the students learn, practice and gain the expected experience?

Case studies can either be taken from textbooks or, if preferred, a real-life situation can be used. This method also lends itself to guided discussions where the teacher prepares the material and the students work in groups with a final class discussion to round off the proceedings. Cases can be chosen for different reasons, e.g. looking at different values, ways of doing things, to learn communications skills, learning management skills, and so on.

Case studies specific to education for sustainable development (in English) can be accessed on ***www.colby.edu/personal/t/thtieten/cases.html***

Problem-based Learning

Problem-based learning, or PBL for short, is a student-centred instructional problem-solving method. At its most fundamental level it is characterised by the use of "real world" problems as a context in which students can learn critical thinking and problem-solving skills and acquire knowledge about the essential concepts of the course of study in question. In using PBL students also acquire lifelong learning skills, such as the ability to find and use appropriate learning resources.

The PBL process can be described as follows:

1. Students are presented with a problem in the form of a case, research paper or video. In groups they organise and assemble their ideas and previous knowledge related to the problem and attempt to define the problem they are dealing with.
2. By means of discussion the students pose questions, in this context referred to as "learning issues," on those aspects of the problem they do not understand. These learning issues are then recorded by the group as a whole. Students are continually encouraged to define what they know - and more importantly - what they don't know.
3. Students rank the learning issues generated in the session in the order of importance. They then decide which questions need to be followed up by the whole group and which issues can be assigned to individuals, who later teach the rest of the group. The students and their teacher or instructor also discuss which resources they will need in order to research the learning issues and where these might be found.
4. When the students meet up again they explore the previous learning issues and integrate their new knowledge of the problem being studied. Students are also encouraged to summarise their knowledge and connect new concepts to old ones. They also continue to define new learning issues as they work their way through the problem. In this way students realise that learning is an ongoing and never-ending process.

Debates, discussions and problem-solving

Discussion involves group collaboration in the clarification and discussion of important issues and identifying suitable solutions.

In the discussion forum students are able to develop their skills of formulating and expressing their ideas, listening to others, understanding and accepting different opinions. In the discussion students take account of a diversity of views as well as try to find solutions to the problems being discussed or answers to relevant questions. An evaluation of facts, opinions, experience and possibilities is also a feature of discussions.

There are different kinds of discussions, for example:

Debate – students present two different and opposing opinions or standpoints and get involved in a debate about the issue in focus. For example, this might be to do with solving the energy problem through building atomic power plants. Students are divided into two groups – those for and those against the proposal. Each group is given an opportunity to present its particular standpoint and justify it. Counter-arguments are then raised and presented and the debate continues until a satisfactory conclusion is reached – or until the time allocated for the debate runs out.

Panel discussion – a panel of 3 to 5 students is chosen and the students invited to express their opinions and arguments. After 15 – 20 minutes the leader of the panel discussion invites other students – who have up to now been listening to the panel's contributions – to participate in the discussion. At the end of the discussion the leader presents a short summary of the main points raised.

Pyramidal discussion – the teacher asks the students to choose three out of a number of possible solutions as to how to improve the school's energy efficiency. The students then discuss their choice in pairs and agree on one common solution. They then continue to discuss their choice in a group of 4 students and do the same thing, i.e. choose one common solution from the 2 solutions presented. The group of 4 then joins up with another group of 4 and agrees on one common solution. This continues until the entire class accepts one common decision. When this has been achieved the students evaluate the common decision and the process in which this has been arrived at in their original pairs.

Plenary discussion – occurs in a large group of 10 to 30 or more students. The topic to be discussed in made known in advance. The leader or teacher starts the discussion off by asking a question and inviting someone to respond. The leader facilitates an interchange of views among those present, sets a time limit for the discussion and summarises the main points raised at the end.

As sustainable development is based on democracy and stakeholders' involvement, discussions of problems and the identification of solutions that benefit everyone concerned are essential. Providing the students with opportunitieis in which they can discuss a variety of topics and find solutions to problems is therefore of the utmost importance.

Tips for successful discussions

Pre-knowledge: Even if your students have little formal knowledge about a topic a discussion can be a good way of starting a unit. Starting with a general discussion about the topic in question enables you – the teacher – to assess the range of views and opinions held. Having some idea of your students' previous knowledge and standpoints is useful in that it helps you to target your teaching more effectively.

Motivation: Encouraging students' interest in a topic is vital if they are to become enthusiastic and motivated about learning. Presenting the material in a lively and interesting way is therefore important. If students feel engaged and motivated they will be more inclined to search for information to substantiate their views or to facilitate a deeper understanding. Encouraging them to present their findings in a creative way is also very motivating.

Learner-oriented: Another reason for involving students in a discussion is that it aids understanding, enables them to listen to other people's opinions and to express their own views.

Assessment and evaluation: Discussion is also a way of openly assessing students' understanding of a topic in that it allows the teacher to identify who has actively participated, what students said, whether their comments demonstrated an understanding of the topic and which concepts need to be repeated or addressed in a different way so that student understand and can use the concepts easily and correctly.

If discussions are held at the beginning of the unit you could ask the students to list those topics they feel they need more information about in order to make a reasoned decision. You can then plan the lessons or assignments in a way that incorporates their suggestions.

Two or three students could be asked to summarise the discussion results; each person summarising a different point of view. The ideal would be to assign a student who had expressed a different point of view during the discussion to summarise a view that he or she is opposed to!

You will find the outline of a debates on page 54. On pages 56 and 57 you will find details of problems that can be addressed and solved with the help of discussions and debates. Try to find examples from reality too, as this is much more challenging!

Storyline

The Storyline method originates from Scotland and is designed to support learning through reflection, creativity and problem-solving, both individually and in groups. Based on the principle that if learning is to be meaningful it has to be memorable, Storyline can be regarded as a kind of structured role-play.

The main features of a Storyline can be summarised like this:

- A story in which the excitement is gradually built up, where something specific happens and where this "crisis" or "conflict" is finally resolved
- Characters are created that the students can easily identify with
- The framework for the story is created by means of time and place
- Key questions are included, i.e. when the teacher poses questions that enable the students to develop the story
- A problem or challenge is addressed in its specific context.

You can read more about the Scottish Storyline method on the following website:
http://www.storyline.org/about/index.html

The teacher (or teaching team) is responsible for creating the framework or structure of the Storyline and for deciding which curriculum objectives are to be included and addressed. It is very important that sufficient time is allowed for planning work and that all teachers in the team participate. In short, the teachers construct the framework and the students fill it with content. When the students have created the characters and the environment the teacher presents them with a dilemma, which they then have to solve.

The characters

When working with a Storyline the students create their own characters - imaginary people with made-up looks, qualities, clothes and an environment that is appropriate. They can be members of the same family, farmers, or anyone that would fit into the chosen period and environment outlined in the framework.

An exciting start

Ensuring that the students feel that they are part of the Storyline process right from the very beginning is very important. Tricks that can be used to encourage such participation include writing an imaginary letter in which the students are asked to help a group of ornithologists due to visit their area, or an advertisement looking for people to help in a research project in the Baltic Sea region. Once the students are engaged in the topic a Storyline can be developed.

Another technique to encourage engagement and involvement is to use open questions – ones that invite full answers rather than a yes/no response. These are also useful for assessing the students' understanding of the topic being worked with. Examples of open questions are:

What do we know about the Baltic Sea?
What do you think is sustainable development?
In what way do you think we should reduce the use of energy?

Invite the students to discuss the answers to these questions in small groups and write their answers on pieces of paper. Neither the teacher nor other students should comment on or criticise the responses.

A third way of encouraging engagement in a topic and generating ideas for a Storyline is to use key questions. Examples of such questions are:

- *What qualities or education is necessary to participate on a research vessel?*
- *What kind of people do you think lived along the coastline previously?*

Everyone is encouraged to answer these questions and no answer will be judged as right or wrong. Key questions are a way of stimulating learning rather than controlling it. The teacher should be clear from the very beginning as to which curriculum objectives are to be achieved with Storyline work. The teacher should also decide in advance how best to formulate the key questions in order to steer the students towards the objectives covered by the Storyline exercise.

A short version of Storyline example about reducing our use of energy can be found in Chapter 4, on page 65.

CHAPTER 4. PRACTICAL EXAMPLES

Teaching and learning is integrated and based on the aims stated in the curricula (even if the curricula are structured according to subject).

This section of the Education for Change handbook is devoted to a variety of examples that have been successfully tried and tested by experienced teachers and are particularly suitable for ESD purposes. Beneath each example you will find the name of a person or school. Although some of the activities are a result of the educator's own creativity, it is quite likely that many of the exercises will have a variety of sources, especially as activities and lesson plans are often spread, used and reused by lots of teachers, which means that identifying the original designer is almost an impossible task. Having said that, however, accrediting the activities to particular people or schools is really to indicate that they have been tried and tested and have been specifically used for ESD purposes.

We invite you to make use of the activities yourselves and adapt them to fit your particular situations, courses, curricula and students. We have not indicated any specific age group or subject for the activities. Skilled educators will know at a glance whether the examples will be useful or not for their students. Student teachers may need to ask more experienced colleagues for advice, however, or perhaps simplify the exercise to fit the situation and circumstances. Note that the examples we have provided are intended to inspire and encourage teachers to experiment in the ESD teaching and learning context. You might even want to add your own activities and ideas!

In short, in this handbook we encourage you to incorporate ESD in your school and make use of the learning perspectives, the Roadmap and other aspects outlined in the previous chapters. We also encourage you to develop and collect your own practical exercises and "share" them with others.

Baseline

The baseline reproduced below comes from a school in Sweden with 84 students and was created because the teachers wanted to find out what kind of knowledge and attitudes the 15-year-old students had about the topic Nature, environment and sustainable development. The baseline can perhaps be described as a questionnaire in which students respond to specific questions set by the teacher. In this baseline the teachers used both values clarification and more traditional questioning. Note that a baseline is not anything that is scientifically proven but is something that gives the teachers a basic idea of previous knowledge and is a useful planning aid. The same questions can be used at a later stage to see whether group members have changed their views or opinions.

1. **I know what sustainable development is about** – 69% response
   I am not sure what sustainable development is about – 24% response
   No answer – 7% response

2. **I know the meaning of following expressions**
   Ecosystem – 64% response
   Eutrophication – 45% response
   Agenda 21 – 12% response
   Biodiversity – 19% response
   Ecological footprint – 17% response

3. **In my opinion questions about nature and environment are important.**

4. **I want to act positively for nature, the environment and good societal development.**

5. I like to be out in nature.

6. Together we can change a lot

7. School gives me knowledge and motivation to act for SD

8. It is important for the school to provide knowledge and motivation to act for SD

Four visions for the future

This is an example of values clarification where you work with expectations for the future. The outcome is developed skills in critical thinking, clearer expectations for the future and an ability to take a stand, form opinions and discuss things in a democratic way. It may also serve as an opening for a better understanding of sustainable development.

The only thing we can say about the future is that it will probably not turn out to be exactly how we imagine it… We might, however, discover a certain direction that is positive or favourable. In this exercise we experiment with thoughts and ideas about the future.

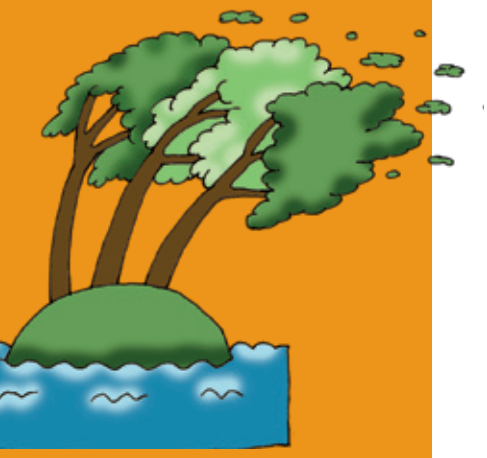
Imagine that you are one generation forward in time. Four different visions of the future are outlined below. Read them as though they were descriptions of reality and written by someone living in the years 2060 - 2070. Read the four future visions carefully (on your own) and think about them for a little while. Then decide if they are unlikely to happen or likely to happen. Draw a circle around the number on the scale that best corresponds to your own ideas about whether such a thing is unlikely or likely to happen. After you have read and decided on all four visions, underline the vision that you think is the most likely of all four to happen in the year 2060. After you have done that, think about which of the four alternatives you would select as being most favourable. Mark the alternative that you believe to be the most favourable with an ”X”.

1. Threats were exaggerated…

The climatic changes predicted for the beginning of the century did not occur. With the use of modern technology, emissions of carbon dioxide from power plants using coal as fuel can be dissolved in sea water. But the emissions did not increase to the same extent as at the end of the 19th century. Today, large amounts of hydrogen gas are produced with the help of solar energy and can be stored in fuel cells, which means that our cars now run on hydrogen. Fusion energy is the latest milestone in energy technology. Hydrogen atoms from sea water are fused together to form helium atoms. Large amounts of energy can now be “produced” and there is enough energy for everyone in the world.

Unlikely					Most like
l	2	3	4	5	6
Not favourable					Most favourable
1	2	3	4	5	6

2. What happened would have happened anyway…



At the end of the last century scientists warned about serious climatic change if we did not reduce our emissions of fossil produced carbon dioxide. But since then the use of oil and coal has increased rather than decreased. All the countries in the world acted in their own interests instead of for the benefit of everyone. Industry was driven by short-term economic values. Climate change was much more dramatic than anyone had predicted. Many regions suffered severe droughts, while other areas were subject to extreme flooding. In addition, hurricanes and storms struck areas that were not at all prepared for such events. Food production was affected to the extent that large-scale starvation is now a fact in areas that were formerly quite rich and productive. The global economy is in a state of severe crisis. Many of the companies on the stock market are facing bankruptcy.

Unlikely					Most likely
1	2	3	4	5	6
Not favourable					Most favourable
1	2	3	4	5	6

3. The EU and western countries will probably benefit …

Droughts, flooding and severe storms have led to catastrophic damage in many countries. Large-scale drought conditions mean that people have been forced to leave their home areas and become climate refugees. Situations like this put international solidarity to the test. The world economy is in crisis. Western societies seem to have coped quite well with the changes and in many instances have benefited from climatic change. For example, a couple of extra degrees and a higher temperature mean that the west can produce more food and different varieties of crops.

Unlikely					Most likely
1	2	3	4	5	6
Not favourable					Most favourable
1	2	3	4	5	6

4. Easy – a piece of cake…

The prognosis of disaster turned out to be wrong. The emissions of carbon dioxide were much lower than stated in international agreements and by governments at the turn of the century. This was because industry and "the market" recognised that sustainable development could be an important competitive issue. With "energy smart technology" the use of energy decreased rapidly. Solar energy had a technical and economic breakthrough and, together with wind power, is now the main source of energy. Fossil fuel is now only used for the production of plastics that have not yet been replaced by the new organic polymer material. New priorities meant that our consumption of non-renewable natural resources was reduced to just a fraction of what had been regarded as normal at the beginning of the 21st century.

Unlikely					Most likely
1	2	3	4	5	6
Not favourable					Most favourable
1	2	3	4	5	6

Four Corners .... in practice

After having completed the above exercise we can now progress to what is known as the four corners exercise. As this has already been outlined on page 38 we will not repeat the instructions here. Decide which subject is to be assigned to which corner, and ask the students to choose the corner that best represents their opinion of what is most likely. The students then discuss in small groups why they have chosen this particular corner and listen to each other's reasons. Working as a group, they should then try to make their vision clearer and discuss which perspectives they think are missing.

The students then try to decide on two or three actions that need to be taken in order to make their "most likely vision" happen.

The discussion can also be extended to include the whole class and to answer questions like: Did this exercise give me any new insights, and if so, what? Do we need more facts in order to make a decision? Where can we get this information from? What needs to be done?

Peter Wiborn, SV

Green or red, show your opinion

This exercise is a more provocative version of values clarification and involves problem-solving in groups with only two possible alternatives. The discussions that are held both before and after "voting" are the most important educational aspects, so be sure to allow time for discussions either in pairs or in groups. Voting is also a useful way of interrupting or drawing never-ending discussions and debates to a close.

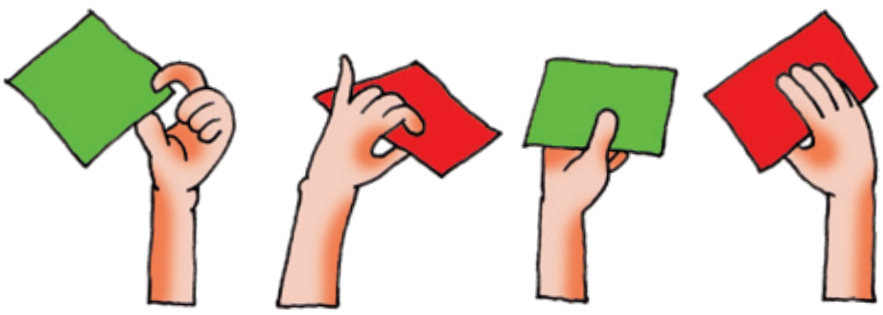
This particular exercise involves deciding what is possible for the fishery industry and fish processing in the future. Prepare green and red "voting" papers for each person in the group in advance. As this voting system is open and visible, all people need to do is to hold up whichever colour they choose to register their vote. If they agree with the statement they hold up a green paper and if they do not agree they hold up a red paper.

Agree = GREEN Do not agree = RED

1. Is it possible to catch and process cod more rationally?
2. It is possible to get a healthy population of cod back?
3. Is it possible to change methods for catching cod?
4. Is it possible to change the culture of consumption?

Note that in this exercise the voting results give a very clear picture of whether people agree or disagree but do not say anything about how or why or what needs to be done to improve the situation.

Liudmila Glushkova, I. Kant Kaliningrad State University, Russia



Teacher training, ESD and values clarification

A number of educators gathered in Sigulda in Latvia to plan the Education for Change project. At this meeting Dr. Iann Lundegård from Stockholm University's Department of Education organised a workshop with the aim of improving the understanding of how seemingly simple and basic yet at the same time complex education for sustainable development can be incorporated into the curriculum.

Using active values and reflection as a base, Iann introduced the following questions and activities during the workshop:

- What does ESD stand for? What is learning and what is knowledge in this context? How does the group view the relationship between process and content in these questions?

In order to start a discussion I will formulate several statements. Everyone should take a position and account for their understanding. (*Here Iann made use of active values, and you can read more about this method on page 35*).

The first assertion is…..

Changing lifestyle is more important than technical solutions when creating a sustainable development.

I fully agree I do not agree

Do you agree? Not at all or perhaps just a little? Iann asked the participants to take up a position on a ranking line drawn on the floor (see page 36 for more details about this).

Today there is an ongoing discussion about environmental education and lifestyle changes. In my view this can be divided into two separate questions:

1) Can we influence people's lifestyle patterns through education?
2) Should we influence people's lifestyle through education?

The question is do people make rational choices based on consistent attitudes? If that is the case, does knowledge influence our choices? I naturally believe that education is important, although it is perhaps not so important in terms of people taking ordinary decisions relevant to everyday life. I do believe, however, that education is important in terms of students feeling that they can be part of a decision-making process. It has been said that democracy is something that every generation must re-acquire. ESD is largely about education that awakens the students' consciousness and sense of having the power to participate in democratic processes. So, in this context I believe that ESD is absolutely essential.

The second question relates to the occasionally heated debate on how standardised we should be in our teaching of sustainable development:

- In Baltic 21, the so-called Haga Declaration (Baltic 21 Series No 02/2002) outlines what knowledge about ESD implies: "Sustainable development is … a fundamental part of a strong democracy and an active citizenship. Real democracy is based on people respecting each other, speaking to each other, exchanging information, talking about their experiences, listening to each other and comparing their respective opinions before making their choices and decisions."

Here it is emphasised that people with different perspectives address these questions. Teaching of sustainable development is in the main about teaching people to cope with them. In my view it is important for us teachers to think about how we want our students to acquire knowledge and what sort of knowledge we want to prioritise. It is possibly more important to discuss the questions and critically evaluate the answers than to be taught about how things are or should be.

The next statement is: the science teacher should have overall responsibility for ESD.

Here the aim is to indicate the angle from which the question of sustainable development should be tackled. If I remember correctly a fairly large proportion of the group thought that some knowledge of the natural sciences was a pre-requirement. Many people today think that allowing ecologists to dominate the interpretation of what is important for the future is much too one-sided. In fact, this is a question that we usually put to the students on our courses in sustainable development. The majority of students usually take the opposite view, i.e. that it is not obvious that natural scientists should dominate the subject. I know that you are beginning to involve all categories of teachers in your work, which in my view is good.

My next statement is: outdoor education is a necessary and important component of ESD.

In this project it is apparent that many agree that outdoor education is a good way of increasing environmental consciousness. I have myself actively worked with outdoor education in many situations for a long time. When teachers want students to develop a feeling for nature, which can later form the basis of wanting to protect or work with nature in some way, I believe that outdoor education is unsurpassable. However, after working with environmental education for a short period in Pakistan, I believe that if we want to involve everybody in the world in a discussion on sustainable development we have to keep an open mind about the possibility of starting from values other than nature. In many parts of the world such values can be found in religion. What you possibly should be thinking about is how you can use nature education as a platform, and in the long-term for including more democracy and the capacity to take action.

The next assertion suggests that human dignity could be an area that creates values: AIDS could be the subject of a school project in ESD.

As I have already mentioned, it is not evident that ESD should start with an ecological content and that economic, social, and cultural perspectives should be included and thereby contribute to a more complex picture. Instead, it might sometimes be more important and relevant to start with a social question. ESD is primarily a tool that enables students to be competent citizens in a democracy. When this process in itself becomes the content it is important to start with something that affects them. The best way of finding this out is to ask them. I've taken the question of AIDS as an example, as this is a real problem in many parts of the world. I would even go so far as to say that if these countries are to become sustainable a solution to the problem must be found.

Finally we conducted a "four corner" exercise, which went as follows …

Imagine you are the teacher of a class of fifteen-year-old students. You have arranged a case study about the Baltic Sea and expect the students to work in small groups. The assignment is to find the best strategy for action relating to the Baltic Sea in the future. All the groups have worked hard on this assignment for a couple of lessons. Most of the groups came up with different suggestions as to how to clean up the environment and preserve it as it is. But one of the groups came up with a rather unusual idea. Their suggestion was to eradicate cod and start breeding other types of fish, for example, salmon.

What would you do?

- Give them more knowledge
- Thank them for their good work
- Suggest an open discussion that involves the other groups
- Open corner, other solutions

As in previous descriptions of this exercise, one corner is allocated to each opinion. The participants choose which view they support most and go and stand in that particular corner.

(Iann again) The reason I've given you this example is to listen to the seminar group's thoughts about this way of teaching and relate them to the intentions of ESD as I understand them. The thinking behind ESD is, among other things, based on a discussion of what knowledge and teaching/learning really are. In actual fact ESD is based on two particular viewpoints.

The first viewpoint, as I see it, is that there is no right or wrong in a discussion on sustainable development. Knowledge is always connected to values, although knowledge on its own can never tell you which way is best. Knowledge is important in that it can indicate what kind of consequences can be expected from particular choices of action, but in the end it is up to people to decide for themselves.

The second is that the teaching/learning is a process that implies that you have to make a commitment to human values. Learning something is not just about piling facts in a heap or drawing a more or less exact map or diagram of the situation. That people learn things means that they define a problem and weigh up the advantages and disadvantages connected with it. Those people who continually create a more eco-centric perspective of the world will take the side of nature and preserve it more or less as it is for the coming generations. That is meaningful for them. Others maintain that other values are more important for the future of their own generation and that of future generations. As a teacher I think it is vitally important here to be humble and above all think about how far one can go in allowing the democratic process to have priority. I also believe that one should think about what is primary and secondary for people in other parts of the world. This information can only be acquired by directly asking those involved.

My final question, and one I leave you to think about, is: *in what way can Environmental Education be developed towards ESD?*

With this I would like to wish you good luck in your work and say that this work is also something very close to my heart!

Reflection 1. Practical Examples

Imagine that your colleagues have been invited to take part in the workshop in Sigulda. Imagine too that you are Iann and will lead the group! What will you say and how will you get your message across? Use the "values clarification" guidelines outlined on page 35 to help you in this task.

Drama, role-play and debates

"Is extracting petroleum from the Baltic necessary?"

This role-play is based on a real problem in the Kaliningrad region.

A public meeting about petroleum extraction on the Baltic shelf, close to the Kaliningrad coast, was held in the city of Kaliningrad. The economic situation and power producing capacity of the Kaliningrad area is very difficult. Cheap and accessible petroleum could be extracted from the sea bed on the border with Lithuania to help to solve these problems. As Kaliningrad is situated a long way away from other petroleum production sites, this naturally results in expensive petrol and oil; both of which are necessary for human activity.

The planned petroleum extraction site is located at a distance of 22 km from the Curonian Spit – one of Russia's National Parks and a specially protected Baltic Sea zone. The Curonian Spit has also been named as a World Heritage site by UNESCO and is one of the region's most popular tourist areas. The Spit attracts thousands of migrating and permanent bird species and is one of the few surviving habitats for a number of rare species. In the event of accidents or overflows in connection with petroleum extraction beaches and other significant parts of this area would become severely polluted. The coastlines of many other Baltic countries would also be polluted.

Activity

Many different groups and individuals are interested in or concerned about this problem, as outlined below:

Group A ("for" petroleum extraction): the manager of the petroleum company, an unemployed person, a driver

Group B ("against" petroleum extraction): a tourist, an ecologist, a fisherman

Divide the class into six groups, three "for" and three "against" groups. Read the problem description. Discuss in groups how the energy problem could be solved in Kaliningrad and write down arguments for and against the proposed petroleum extraction. Construct arguments for each of the characters named above and decide who will represent them and what kind of personality or approach they will have. An outline of each character is provided, below, to help with this task.

The 'manager' group writes a speech "We should extract this petroleum!" All the other groups prepare one or two important questions for the manager. The manager then makes a speech. Chosen representatives of each group ask questions in response to the speech and the manager answers. Did the manager convince you? If not, describe your ideas about how to solve the area's economic problems with the least damage to the environment.

Characters

Manager of the petroleum company

You were appointed to this post 2 months ago and want to keep it. But your business is not doing very well, because local sources of petroleum are running out. You are now in the posi¬tion where you have to think seriously about how to expand oil extraction. One option is to extract petroleum from the sea. But, unfortunately, the best place for this oil extraction is very close to the National Park. You are sure that the engineering technology available will reduce the risk of petroleum overflow to zero. And, even if an accident does happen, your workers will quickly and reliably remove the petroleum spills and slicks. You have now definitely decided that this is a viable project and you are getting ready to go ahead with it.

The unemployed person

You lost your job one year ago and are still trying to find new employment. You have got two children and you are the main supporter of your family. You are therefore extremely anxious to get a job, and especially one that is regular and where the salary is good.

The driver

Your business is to transport people - both local people and tourists. Your main problem is the quickly rising price of petrol. You hope that local petroleum production will allow you to reduce your charges and increase your earnings. You are also aware that price rises and pollu¬tion problems can result in an eventual loss of business.

The tourist

As a tourist you are naturally keen to visit a clean and beautiful area. Your first visit to the National Park was about 6 years ago, and you love this narrow strip of land with its wide beaches, sandy dunes, beautiful flowers, and wonderful bird life. This area has made many deep and unforgettable impressions on you. You have also told other family members about the charms of this coastal area and they too now have their own favourite spots. You feel that you want to come back to this perfect place over and over again.

The ecologist

Yor main area of investigation is the sea birds in the National Park. This is a unique place for both the nesting and migration of a large number of bird species. This narrow strip of land is on the main migration route for birds from Northern Russia, the Baltic countries and parts of Scandinavia. You are very active and committed to nature protection. You have written an article for the local newspaper and are now participating in the public meeting.

The fisherman

You are a young fisherman. Your father and grandfather were also fishermen … but your business is on the decline and the sea is much more polluted now than it was in your father's and grandfather's time. You are deeply concerned about any pollution of the sea environment, which will naturally lead to a reduction in fish supplies.

Alexey Golubytskiy, The Guide Environmental Group, Kaliningrad

Panel debate

The following panel debates are a mixture of role-play and discussion. Participants can try out different roles and identify themselves with different groups. Preparation in terms of both facts and performance, or in groups or individually is important. The roles can be created by either the teachers or the students, or both. The more realistic they are the better!

1. Menu for the school canteen.

Debate with representatives of the following: students, parents, nutritionists, economists, environmentalists, farmers and other food producers and dealers. Students are asked to prepare information about health, economy, sustainability and food production in advance of the actual debate.

2. Building a dam for the production of hydro-electric power in China.

Debate with representatives of the following: the regional administration boards, the WWF or other nature conservation organisations, local industry, local farmers, local politicians, Coca Cola, limnologists (scientists studying the conditions of lakes and fresh water areas), ethnographers (researchers specialising in race, peoples and culture) and nomads living upstream of the catchment area. Students are asked to prepare for the debate in advance by finding out about water resource management, fresh water ecology, something about the geographical conditions of the region and a little about regional rules and regulations.

Teachers work in teams and have time for structured planning.

The chairperson opens the meeting with a few remarks and indicates that he or she hopes for an open and constructive discussion. Each representative is given two minutes to speak and present their case – the order in which they speak can be decided beforehand by drawing lots. When each speaker has had their turn time is allowed for responses, questions and answers. The responses must not be more than one minute in length, however. The chairperson can interrupt and ask his or her own questions at any time. After 30 minutes a final and concluding round, in which each panel participant is allowed one minute to sum up his or her view of the discussion and propose one suggestion for action, signals the end of the discussion.

After the panel debate a discussion is held about how the debate was actually carried out, how people felt in their different roles and people's thoughts about the value and possibilities of arranging something similar in real life. If the group consists of more than 7 people the number of characters can be increased, the audience can be enlarged, representatives from the media can be included, and so on. It would also be possible to have two separate panel debates which could later report on their outcomes. Distribute the tasks and characters in advance so that participants can prepare themselves with the necessary information, materials or even suitable costumes. Write the names of the characters on name-tags on the tables as well, so that everyone knows which character is which, etc.

The EduC team

Stand Up for SD!

This interactive drama is related to Forum Play with an interactive audience.

1. Character creation

The pupils are asked to:

1) walk around the classroom at their own speed
2) find a place in which they'd like to sit down
3) sit down (or lay down) and relax
4) close their eyes and imagine:
    a) a place on the Earth
    b) a country
    c) a city
    d) a person - and come up with his/her:

– gender
– age
– job and place of work
– religion
– economic status
– marital status
– biography
– language spoken
– dreams
– future (in 10 years she/he will be….)

The students could also be asked to fill in the "Sustainable Development Enterprises" application form, see below.

2. Characters in their roles

The pupils are asked to:

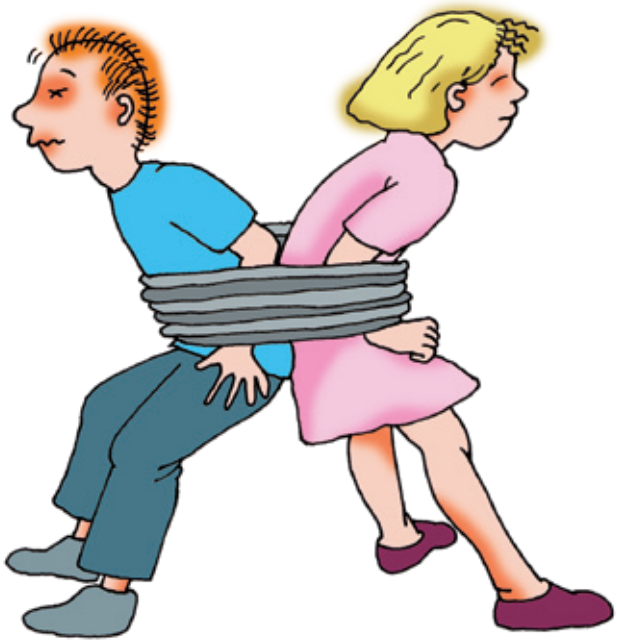
– imagine a usual (or unusual) situation in their character's life
– walk around the classroom and talk (or stay silent), move (or stay still) behave *as if*[2] they were their characters.

The teacher then tells the students to freeze, or stop moving, and stay still. One pupil is asked to continue moving around. This person also continues with his/her improvisation. The others are asked to behave spontaneously and immediately become possible partners of the main character. This is the moment when the whole group can take part in the character's world.
The above procedure should be repeated for each pupil and each character.

3. Characters in action!

In this exercise the students stay in the roles they have been playing in the previous exercise. This time they are asked to lie on the floor and imagine that they are tied together with the invisible idea of sustainable development. They are then asked to STAND UP!

Of course they may protest, reject the idea or try to convince or force each other to stand up. (They could be bound together with a real rope – just to experience how uncomfortable and difficult standing up together really is). At the end the students' feelings and how people were persuaded to stand up should be discussed. This exercise can be repeated with students trying out different roles and characters, adopting another perspective and trying to "do as if" in another and quite different role.



[2] *Do as if… – i*s said to be the best definition of drama made by Gavin Bolton

Application Form

Sustainable Development Enterprises

1.	Place on the Earth
2.	Continent
3.	Country
4.	City
5.	Sex
6.	Age
7.	Religion
8.	Profession
9.	Job or place of work
10.	Marital Status
11.	Children
12.	Education
13.	Salary (EUR per year)
14.	Language
15.	What I truly like in people is
16.	Before going to sleep I think about
17.	In 10 years time I will

Alicja Sadownik, Gdansk University

Dilemmas

The following examples of dilemmas can also be used for values clarification (*see page 35*), forum play (*see page 39*), role-play (*see page 40*) or debates (*see page 42*).

Your kind neighbour

This dilemma exercise prepares students for real situations and strengthens their motivation to act.

The exercise is of greatest value if the group members really trust each other. If they trust each other they will both dare to and want to share their own attitudes and values.

You are having problems starting your car. The old, black oil might be the problem and your nice neighbour volunteers to help you change it. You invite him to dinner as a thank you. From the kitchen window you can see the landscape, the meadows and the small river where you caught the salmon you now are preparing for dinner. You can also see him working on your car. He's collecting the old oil in a metal bowl and it looks as though he has almost finished. He bends down, picks up the bowl of old oil and walks down to the river with it….

– What do you do?

Discuss the possible alternatives. Make a list of all the alternatives you can think of and ask the students to choose the best alternative. Continue the discussion in small groups and then open it up to the whole class.

Gitte Jutvik, WWF

Different ways of travelling

Problem-solving in groups can either be structured by the teacher or be more flexible and loosely structured. Try to involve all group members in a democratic way.

A group of 10 popular musicians and dancers have received a special invitation from WWF to the Baltic Festival, to be held in Stockholm. They have to decide how they will travel from place X on the east side of the Baltic Sea to the Baltic Festival in Stockholm and back. The task is to find the best way of travelling. Cost, time and the environment are all important aspects to take into consideration in finding the optimal solution. Right from the start it is clear that the musicians and dancers have very different opinions, although they are all aware of the economic and ecological aspects. Work in pairs and come to an agreement about the best way of travelling and be ready to motivate your decision. Each pair can decide for themselves where place X is.

Gitte Jutvik, WWF

The wolf and the farmers

A dilemma is made visible for students with help of forum play. The content of the play and the ending can be changed by substituting different "actors".

It is late April and two farmers are out and about looking after their sheep and the new born lambs. They find the animals in good condition grazing in the meadow. They check the water trough and find dog-like tracks in the mud beside the trough. They follow the tracks and see a wolf near the fence. A sheep with a young lamb is not very far away and the farmers understand immediately what could happen. Later the younger farmer contacts the county administration and asks for help, but is told that there is nothing they can do. The wolf is protected by the law and, as the wolf has not harmed the sheep or lamb, there is nothing the farmer can do. The following day the farmers find a dead sheep and a dead lamb and a second lamb seems to be missing its mother. The farmers involve people from the village. The older farmer starts to track the wolf and meets an ornithologist and a WWF supporter. They know that wolves are on the country's list of threatened species and protected by law, but become suspicious when they hear the story and see the farmer carrying a gun. FREEZE the action here!

At this critical point a short break is taken, after which the sketch is performed once more. During this repeat performance the observing audience can intervene at any time and replace some of the "actors", and instead play another possible course of action. Can you identify where alternative courses of action would be possible? Where? Is it possible to resolve the crisis positively for any (or all) of the different parties?

Teacher's Guide Living with Large Carnivores, WWF

Visions and backcasting

Cast your eyes to the future and then back again to the present! Make sustainable life and the way to get there visible. Visions and backcasting help to train holistic thinking, improve knowledge and writing skills and involve the learner in the various processes.

What exactly is backcasting? In a nutshell, backcasting is a concept that is often used in connection with sustainable development and is a way of planning successful outcomes for the future. Such planning is often accompanied by the question "What do we actually need to do now to reach the successful outcome we envisage?" This approach has been proved to be more effective than forecasting, which often results in a more limited range of options. Backcasting is regarded as being very creative and, perhaps more importantly, is useful for projecting today's problems and sustainable solutions into the future.

The future is difficult to predict and visions are usually unrealistic, but by combining visions with backcasting you not only make the future visible but also the steps and stages needed to realise the vision. Learn from success stories in your own areas and examine the steps taken in achieving both the goal and the vision.

An example of visioning and backcasting is to imagine what your town, country or the world will look like in 2045?
Make a sustainable future visible! Describe the ways of getting there, how such a future has been decided and how it could be implemented. Which problems have been resolved and which problems still need to be resolved? What obstacles did you meet along the way? How will the media report the events you describe in 2045?

Provide details about life, work, culture, nature, education, etc., in 2045.

- What decisions have been made to reduce the greenhouse effect?
- What decisions have been made to reduce the number of toxic substances in nature?
- What has been done to reduce AIDS and poverty?
- What has been done to stop the degradation of fish stocks, ecosystems, etc?

What kind of knowledge will be important in 2045 and how can we prepare ourselves for an unknown future with today's knowledge? These are all vital questions to ask if we are to succeed.

WWF, Learning sustainable ways, Sellgren

Letter to the Editor

Writing letters to newspaper editors is a good exercise in learning how to formulate a well-structured and well-founded argument. It also develops skills in taking a stand and expressing this in writing. Ask the students to write well formulated letters with strong arguments with a view to sending them to their local newspaper and influence local developments!

Below you will find suitable topics taken from Coalition Clean Baltic, or CCB for short. It is often better to use local examples and identify suitable people to send the memo(s) or letters to. The examples given below are also suitable for panel debates.

1. The local coastal authorities in Latvia disregard the law relating to protected areas designed to defend the dune zone situated some 300 metres from the sea. Neither the state not the local authorities react to the illegal constructions in the protected 300-metre dune zone. Many of these illegal buildings are expected to be legalised in the process of territorial and special planning. New areas of the dune zone are planned as construction and camping areas. This means that the unique coastal ecosystem will suffer considerable damage or be completely destroyed. Situated in the western part of Latvia, Lake Engure and its floating base for ornithologists is an example of such an endangered area. The whole area is a natural reserve and protected by the Ramsar Convention. The above-mentioned problems were the result of actions taken by the Mersrags community in the Talsi region, which is one of the most environmentally unfriendly coastal communities in Latvia.

2. Tourism development in the coastal areas of the Baltic Sea is expected to bring economic gains to the region. In order to cope with the anticipated number of tourists numerous recreation centres and marinas are being planned or have already been constructed in shallow water areas. It is likely that these will have considerable impact on coastal ecosystems (e.g. on the breeding and nursery areas for fish species) and pose a serious threat to landscapes and the biodiversity of the respective areas.

3. A number of fun parks and marinas are planned along the coast to attract tourists. On Bug Peninsula, on the Isle of Rugen, a recreation centre with up to 2,000 beds and 400 leisure boats places is planned. The peninsula forms part of a NATURA 2000 area. Two hotels, three large holiday home complexes, a marina and and golf course with accompanying infrastructures are to be constructed on an old military site next to the Vorpommernsche Boddenlandschaft National Park. Intensive tourism activities will lead to considerable disturbance in these sensitive surroundings and endanger the area's flora and fauna.

4. The dunes (up to 30 m) on the south shore of the Gulf of Finland (Russian Baltic) are to be destroyed due to the construction of the Batarynaja Oil Product Terminal and nuclear units belonging to the Nuclear Technology Institute.

The EduC Team

My fantastic journey around the Baltic Sea

The best way of learning is to build on your own experiences rather than rely on books. We know that this is not always possible, however. In this exercise students work with traditional books, maps and the internet, although in an active rather than a passive way.

The idea is that you will travel around the Baltic Sea area. You start from your home town and travel in pairs. During the journey you will pass, visit or do the following:

- All the Baltic Sea countries
- Dive with an experienced diver
- Write a short poem about the city's statue
- Go fishing in a stream
- Find out how houses are heated
- Visit two islands
- Go out to sea in a fishing boat
- Tell an inquisitive journalist about the teaching in your school
- Write your name in Russian
- Study life on a beach or in a meadow
- Visit an industry
- Solve a problem
- Explore three capital cities
- Draw the city's church tower
- Travel by bus and talk to the person sitting beside you
- Eat the country's typical dishes
- Draw an impressive building
- Study a breeding bird at close quarters
- Travel through an old forest
- Meet three animals; one of which should be a furry animal.
- Find out which names are common boys' and girls' names in the country you visit
- Interview a Prime Minister
- Be able to say "Hello!" or "My name is…." in three languages

You can decide whether you are going to travel westwards or eastwards around the Baltic Sea area. Draw your journey on a map. Tell others about your journey. Make your Baltic Sea journey as interesting and enjoyable to read about as possible!

Östersjögrannar, WWF

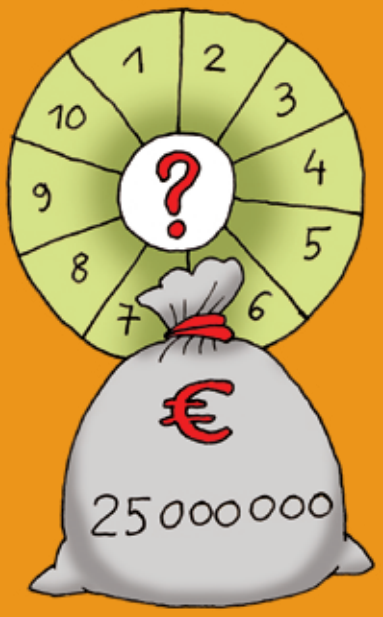
Positive developments –examining different suggestions

The aim of this exercise is for the students to form an opinion about different perspectives relating to community development and to prioritise and discuss these different alternatives.

The EU allocates funds for different development projects in the Baltic Sea region. A discussion exercise is outlined below in which different organisations and government authorities within the EU area try to attract support for their projects. The projects are outlined below.

Method

- Working individually the students pick out the three most important projects they think should be supported. At this stage there shouldn't be any discussion between the students – this will come later.
- Form small groups and allocate imaginary EU funds to a maximum of six projects. Support the motivation for support in writing.
- Now that the allocations are complete you are presented with a problem. Due to changes in the EU budget it has been decided that only half of the funds can be allocated this year. The task now is to re-allocate the funds to only three of the projects.



Imagine that you are in a group that will allocate 25 million Euro to development projects in one of the countries in the Baltic Sea region.

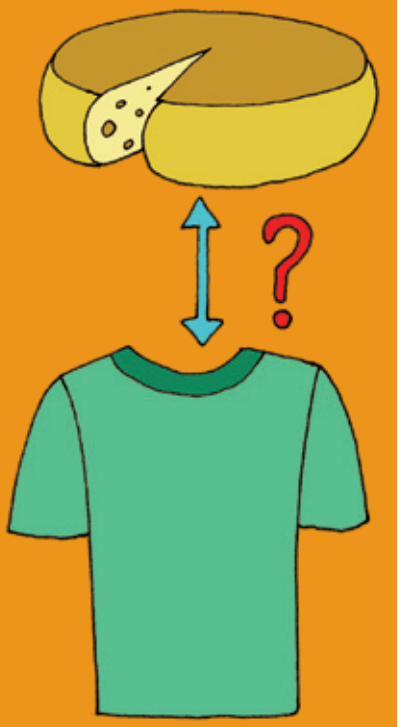
How does your group allocate the funds to the following projects?

1. A sewage-treatment plant that cleans waste water from large towns and cities so it does not pollute waterways, lakes and our common sea.
2. A modern fishing fleet with enough effective equipment to catch fish in other seas in order to reduce fishing in the Baltic Sea.
3. An education project to provide new teachers with more knowledge about sustainable development and how to use this knowledge in their teaching.
4. A technical high school to train engineers to develop and strengthen the country's industrial base so that consumers will be able to buy high quality products and sufficient income will be generated from exports.
5. A gas pipeline from Eastern Russia to replace oil and coal, thus reducing carbon dioxide emissions.
6. A programme for sustainable development based on renewable natural resources.
7. A crime fighting programme to free the country from crime, drug abuse and AIDS.
8. Better roads, railways, harbours and airlines that enable our country to develop into a modern and prosperous society.
9. A development programme for small-scale employment so that people living in small villages and towns can support themselves without having to move to large cities with all their environmental and crime-based problems.
10. A dairy that produces butter, cheese and other dairy products from milk supplied by local farmers rather than having to rely on imported foodstuffs.

Östersjögrannar, WWF

Life Cycle thinking

The Life Cycle concept is an approach to thinking about processes, products and services. It recognises that all life cycle stages have environmental, social and economic impacts.



This activity gives participants the opportunity to engage in dialogue with each other and contribute actively.

– Make an assessment of products from two different producers, e.g. cheese, oil, juice, shrimps, T-shirts, paper. Compare two products in terms of their environmental impact and make an analysis and life cycle of this product in terms of the extraction and processing of raw materials, manufacturing, transportation and distribution, use/reuse and recycling and waste management and the environmental and economic impacts.

– Make a recommendation which includes an assessment of just how sustainable each product is and how it could be made more sustainable.

– Discuss other effects, such as ethics, social, economic aspects and also personal, local and global perspectives. What does Life Cycle thinking mean for me personally, for me as teacher, or as a citizen of our planet? How do these activities impact consumers, producers and authorities?

Rudite Grabovska, Daugavpils University, Latvia

Critical thinking about food

This exercise is designed to develop critical thinking skills and practice expressing an opinion based on values and facts.

The students answer the questions for each product individually. Although they do not have to write anything down they do have to be able to formulate and express their arguments to others.

> *Why will I buy this product (banana, cutlet, bread…) ?*
> *Why won't I buy this product (banana, cutlet, bread…)?*

When the students have worked out their answers to these questions they should discuss their responses in small groups. The teacher can also ask spontaneous questions, for example:

What is the most important feature of your decision? The price, how the product has been produced, how long it takes to cook, others? You can also use values clarification in conjunction with the four corners exercise (see page 38).

It won't be long before genetically modified (GMO) food arrives on our plates and tables. Some people think that this will solve our planet's food problems, while others think that genetically modified food is a threat to the world.

Students are divided into groups and gather information about GMO food. After preparing themselves by collecting information from articles, the internet, etc., each group describes:

> *Why we will buy this banana, cutlet, bread…!*
> *Why we will not buy this banana, cutlet, bread…!!*

If the group members have different opinions they should also say what they are and give reasons.
You can exchange GMO food with Spanish tomatoes, take away salad, mango fruit, cod etc.

Ineta Mikelsone, Jaunpils Secondary School, Latvia

Different kinds of agriculture

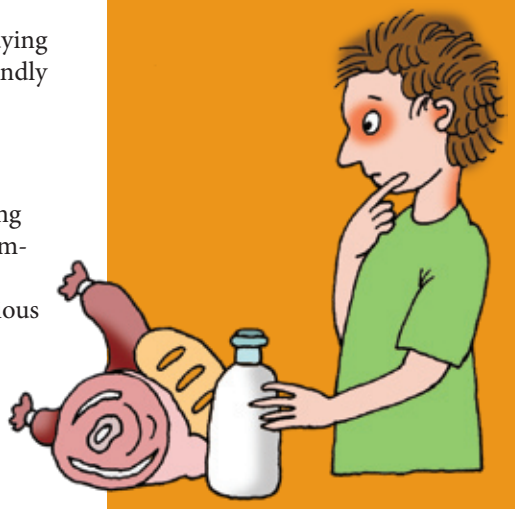
Use this structure for organising discussions to develop critical thinking skills and promote the students' understanding.

As consumers we often buy food or other goods. But do we know how food is produced and how it gets to the shops and our plates? Where have the crops been grown? Where has the cutlet been born and reared? How far has it travelled? What does it give in terms of nutrients and energy and what does this cost the environment?

As consumers we are able to affect the way in which food is produced by buying or not buying the product. When we buy products that have been produced in an environmentally-friendly way we encourage farmers to use more environmentally-friendly technologies.

Try this exercise:

1. The teacher divides the students into five groups. Each group makes a shopping list for one week. Students then present their shopping lists and decide on one common list.
2. The same groups then work with all the texts listed below and discuss the various possibilities.
3. The class then forms new groupings and each group works with the common



shopping list decided on in step 1. They are asked to prioritise the items on the list with regard to ecological, economic and social sustainability.
4. Display the prioritised shopping lists and discuss them in class.
5. Continuation work: Study menus from the school canteen and local restaurants and write an article to the local newspaper about the importance of buying, cooking and eating organically and sustainably.
6. For homework. Students are asked to identify and assess agricultural development tendencies in the local community.

A. Intensive agriculture means producing more in a shorter time. This process is highly mechanised and uses considerable amounts of chemicals. Global corporations often carry out such intensive agriculture in underdeveloped countries in order to make bigger profits. More often than not the environmental and social standards or regulations in these poorer countries are not as strict as those in developed western countries. As a result of this production often leads to pollution and damage to the environment. In addition, the workers are paid very low salaries and are not provided with protective clothing when spraying dangerous chemicals or pesticides on the crops. The use of too many artificial fertilizers also leads to the land becoming more and more impoverished – and to nitrogen, phosphorous and other nutrients being washed out of the soil and accumulating in lakes and seas. This latter effect, also known as eutrophication, is a real environmental problem in the Baltic Sea.

B. Guidance for fruit buyers

Imported fruit: In order to ensure that fruit will stay fresh and remain in good condition in the shops:

- pesticides are used 8-15 times during the growing season
- after harvesting the fruit is treated with fungicide
- the fruit is then processed with antioxidants during storage so that it keeps its colour
- before being sold the fruit is processed with wax so that it will stay as fresh as possible for as long as possible.

Fruit that has been processed in this way will stay fresh for about 20-30 days.

Local fruit: Pesticides are used about 3-5 times or even less during the growing season. After harvesting the fruit needs to be stored in cool conditions. As the fruit has not been treated with pesticides it stays fresh in the supermarket for about 5-7 days.

Organically grown fruit: In organic agriculture pesticides are not used at all. Instead natural antagonists (like insects or birds) are used. Good light and air circulation is very important for fruit grown in this way.

C. About animal ethics

Everyone needs food – this is part of life. But getting food and meat to our tables is not always straightforward and can include a range of different problems. Here are a few examples:

Antibiotics against your wishes

Intensive meat production is only possible with the use of antibiotics. On large farms the animals are often prone to disease and the only way these diseases can be kept in check is by using antibiotics. When we eat the meat we also (often unknowingly) eat a lot of antibiotics as well!

The life of a bullock

A bullock is taken away from its mother a few days after birth and kept in conditions that help to make its flesh soft and tender.
On organic farms the animals live together all the time, graze in the meadows and live as natural a life as possible.
Chicken factories

Did you know that chickens are usually fattened in about 33 - 47 days? They are fed with food containing antibiotics and are kept in small cages. The overpowering smell of ammonia on these farms often leads to the chickens going blind and developing respiratory diseases.
On organic farms hens and chickens are free to roam in the meadows and eat properly balanced and natural food.

D. Happy flowers to the happy man/woman

Sixty percent of flowers exported from the Netherlands are actually grown in under-developed countries like Kenya, Zimbabwe, Tanzania, Ecuador and Columbia. Flight costs from these countries are very cheap and flowers grown here need less energy in comparison with those grown in the Netherlands. For example, growing 65 roses in Kenya uses the same amount of energy as growing 7 roses in the Netherlands. Kenya has enough solar energy to grow roses efficiently. Savings are also made on salaries – a worker's salary in the Netherlands is equal to 38 percent of the cost of the flowers, whereas in Kenya this is only 1 percent!

Cost of 1 rose

salary of a Kenyan	1 cent
chemicals	1.5 cents
plants	2 cents
profit	3.5 cents
losses	3 cents
packaging	1.5 cents
transport to the airport	7 cents
agent's commission	3.5 cents
money, which stays in Kenya	23 cents
import costs	7 cents
flight costs	3 cents
wholesale costs	17 cents
retail price (100 %)	50 cents
selling price	1.00 EUR

E. Organic agriculture Organic agriculture is sustainable because it is based on an understanding and use of natural processes. Organically grown products are produced using natural methods – not by using chemicals but by relying on the warmth and light of the sun, a rich soil, water and micro-organisms. In an organic system having a rich and fertile soil – created by adding organic compost or green or animal manure – that also feeds the plants is very important. Local varieties of plants and animals should be grown or reared in order to maintain biological diversity.

Vija Ziverte, Jaunpils Secondary School, Latvia

Together we can change!

Small changes mean a lot and make a difference. Combine your efforts and use maths to show that small changes by only one person can make a lot of difference.

Try this experiment. Brush your teeth with the tap running. At the same time, ask another person to fill empty milk or other containers with the running water until you've finished brushing your teeth. Make a note of how many milk or other containers have been filled. Then use this information to work out how much water your family uses when brushing their teeth. Multiply this by the number of family members in the class, inhabitants in your com-

munity, inhabitants in the country, inhabitants in the Baltic Sea region, etc., and work how much water is wasted just by people brushing their teeth! What about when people brush their teeth with warm water that has to be heated with fuel or electricity? How much energy is wasted then?

There is also a problem with waste water. Lots of toxins and nutrients are washed or flushed into our water systems without being properly or efficiently cleansed or processed. Some detergents used for washing clothes and dishes contain phosphates. Find out what kind of cleaning materials and detergents your family uses. Ask your family to consider changing to cleaning materials and detergents that do not contain phosphates!

The school is "an institution that teaches" Materials are used in a sustainable way. The management of buildings and surroundings is an integral part of education.

No climate change, sustainable use of energy

Find out how much electricity/fuel is used in your school and for what purpose. Make a note of the daily electricity readings during the course of one week, if possible taking the readings at the same time each day. Decide to have an energy saving week. Select 3 days of the week on which you will try to use electricity/fuel economically, i.e. turn off the lights when they are not necessary, keep the windows closed to avoid heat loss, etc.

- Where do you get your electricity/fuel from?
- When did you use the least electricity/fuel?
- What was the reason for that?
- When did you use electricity/fuel most? Why?

Calculate the average amount of electricity/fuel you use in a year. How much money does it cost the taxpayer? Calculate the total cost of electricity used during the chosen energy saving week. The topic is How to reduce the Ecological Footprint in our school. Include the indicators for success in your report as well.

The EduC team

Sustainable and aesthetic

A deeper awareness of school practices and challenges relating to sustainable development gave rise to a broad cooperation, first of all with parents and later with the entire community.

This example describes an action for improving environmental awareness and improving the aesthetics of our surroundings. Pupils prepared coloured medals and hung them on the fences of the most sustainable and aesthetic houses. The activity was undertaken in cooperation with the local commune.

Nebrowo Wielkie, Zespół School, Poland

Students initiated a new organisation.

This activity requires the cooperation of teachers, students and parents and contact with local governing councils. This brief example is based on some of the ESD cornerstones outlined on page 27.

In June the students marked out a 40 kilometre long pathway. Additionally, and due to our students' creativity and involvement, a museum was established. One of the key issues in the programme was the initiation of cooperation with organisations, institutions and legal entities, all of which provided financial support for the renovation of the museum's rooms. The students contacted all the region's schools in order to set up a Cycling Lovers Association. The idea behind the association is to take care of existing cycle tracks as well as undertake repair work before the onset of the tourist season.

Jolanta Abramowska, Tadeusz Kościuszko School, Poland

Reducing our use of energy

This process-oriented exercise teaches students to communicate and prioritise the economic, social and ecological aspects of a reduction of energy at an individual level. The use of fictitious characters and an unexpected change indicates that this activity has been inspired by Storyline (see page 44 for further details of this process).

The teacher should provide the story's framework.

1. Each student creates a character and gives him/her a name, age, address and occupation. They also decide on the number of family members and write a short story about the character with a focus on energy: transport, heating, leisure and holidays…

2. Each student introduces the character they have created to the whole class or in small groups.
Without telling your students you (the teacher) pick out one of the characters to be the sender of a formal request from a fictitious or real organisation. Do not tell anyone about this in advance! Pretend that you've just found the letter of your desk or a colleague has just given it to you. This character (Stina Jung) then invites other characters to join the organisation and sign a contract where they promise to reduce the amount of energy they use by 50 percent.

Contract

In order to reduce climate change and pollution/Ecological Footprint on Earth we, the representatives of the international organisation Students for Sustainability SfS have decided, in accordance with the Kyoto Protocol, to:

Reduce our use of energy by 50 percent within five years

Resolution passed at the annual general meeting of SFS 17/5/2008

Stina Jung, Chairperson SFS

The Kyoto Protocol relates to the international Framework Convention on Climate Change with the objective of reducing greenhouse gases that cause climate change. It was agreed on 11 December 1997 at the 3rd Conference of the Parties to the treaty when they met in Kyoto, and came into force on 16 February 2005. As of November 2007, 174 parties have ratified the protocol.

– Would you like to become a member of the association and sign the contract?
– Those of you who have signed the contract have five years in which to reduce your consumption of energy. How do you plan to do this?

If you (i.e. your character) sign the contract to reduce your consumption of energy by 50 percent, how will your life need to change? What will you have to do? Will this result in changes in social welfare and the economy, and if so what kind of changes will these be? Make a plan of action for your fictitious character.

If you (i.e. your character) choose not to sign the contract state why you don't want to sign. Write an article in which your character explains why he or she doesn't want or need to reduce the use of energy. What might be done instead to avoid climate change? Motivate your reasoning!

Gitte Jutvik, Vitalisskolan, Trosa, Sweden

Walking with your food glasses on!

In this exercise the learner pays attention to objects in the neighbourhood associated with the consumption and production of food.

Put your "food glasses on"! Walk with your friends or classmates around the school environment and collect impressions. What kinds of things remind you of food? Perhaps you will see:

Fields of wheat or rye that can be used for making bread.
An empty tin can lying in the ditch that someone has carelessly thrown away.
A lorry transporting milk from a farm to the dairy.
Someone carrying shopping bags on his or her way home from the supermarket.
A cow that makes us think about a breakfast of bread with cheese and butter.
A lake, the sea or fish
The sea, a ship loaded with bananas from South America
A cat hunting mice.
Animal droppings.
An apple tree.
A leaf eaten by a caterpillar

Food on Sustainable way I, WWF

Pedagogical Greenhouse

An activity organised in cooperation with a botanical garden. Organising a suitable environment for learning is very important. Although the classroom is useful for certain activities, learning in direct contact with nature and society is much better in the context of education for sustainable development.

The following activity is about climate change and the possibilities of reducing this by making wise, everyday choices.

Botanical gardens are very energy-consuming constructions and their educational potential is not always used effectively. Gardenia Botanical Garden organised a theme week entitled "Are we able to save the snowy winters?" The tropical, enjoyable atmosphere of the botanical garden was used as a motivating learning environment for teaching and learning about climate change. Every school class that took part spent a two-hour learning period in the garden consisting of an introduction to the theme, pupils' own explorations in the garden, a summing up and a brainstorm about possible ideas and solutions.

The introduction was given in drama style: "An expert" wearing a white laboratory coat explained the causes of climate change while her assistant interrupted the session with all sorts of everyday tasks related to climate change (the excess use of electronic equipment, heating, travelling and eating habits).

After the introduction the students walked an exploratory trail that had been set up in the botanical garden. This trail consisted of eight treasure chests or boxes hidden amongst the vegetation and the students had to walk around the garden in order to find the boxes. In every box the students found a question and three alternative answers. The questions were about everyday life choices, such as how travel, sport, consumer products and eating habits affect climate change. The answers were printed on pieces of jigsaw puzzle. The students had to decide, for example, what they would give their friend as a birthday present. The alternatives were a DVD film, a T-shirt or a ticket to a rock concert. Before choosing they had to consider which one of the alternatives was the most climate-friendly. When they had decided they took their preferred answer – written on a jigsaw puzzle piece – out of the box. After finding all the eight boxes they ended up with eight puzzle pieces.

The trail was put together in such a way that if the pupils made the best choices they ended up with a puzzle illustrating a beautiful snowy winter in Finland. If their choices were of the "mediocre" variety their puzzle instead showed the picture of a flood. If all their choices were the worst ones imaginable their puzzle was a picture of severe drought and famine. Of course, most of the groups had answers from all three categories, which meant that their puzzle picture was a mixture of these three photos.

After the activity the results were discussed by the whole group and students then had an opportunity to reconsider their choices and question the outcomes. If groups had conflicting views on, for example, whether a DVD or a T-shirt was better for the climate, different aspects of the products' life cycle (buying from a flea market, downloading from the internet, etc) were examined further. Every class was provided with the calculations and explanations used to determine the respective prioritising of choices in each case. Students were also encouraged to search the internet for more in-depth answers.

At the end of the session a brainstorm was organised in order to generate new ideas about how students can reduce climate change through their everyday activities. These ideas were collected and compiled at the end of the theme week and sent to all the participating schools. Students then arranged displays or school radio broadcasts on these themes.

Hanna Nordström, WWF and Gardenia-Helsinki Botanical Garden, Finland

The school is a natural partner in sustainable development in society and requested by different stakeholders.

Reflection Box 2. Practical Examples

How would you make the example above more learner and process oriented? Refer to the ESD perspectives and Roadmap on pages 27 to help you with this exercise.

Sustainable thinking and bridge construction

In this activity problem-solving, techniques, a choice of material based on social, environmental, economic and aesthetic aspects and the learning process are all in focus.

Your assignment is to build a bridge across a waterway somewhere in the world. For this you need to think about durability, environment, safety, economy and aesthetics.

1. Imagine the place and history behind the building of the bridge:

What do the water and surroundings look like in the place chosen for the bridge? Why is the bridge being built? Who is going to use it? Who has decided to build it and who is going to pay for it?

2. Build your imaginary bridge between two milk or other containers. Use building materials from the "store" of materials listed below. Each building material and how much it costs is listed separately to help you in your calculations. Note that you have to limit your spending to a budget of 30 RON.

3. The "actual bridge" is ready! Make a drawing of the bridge on its opening day and write a newspaper article about it in which you stress the environmental effects, and describe interference with the eco-system, the material chosen, transport, people's opinions, etc.

4. Make a financial account of the materials used to build your bridge, as chosen from the list below.

The currency is called Ronork, or RON. The budget is 30 RON	
Planks (cut from milk cartons, 1 x 8 cm)	1 RON per plank
Pipes (straws)	3 RON
Beams (spaghetti)	2 RON
Cement (clay)	4 RON
Support poles	2 RON/pole
Frames (matchsticks)	½ RON
Wire (string)	1 RON/dm

Gitte Jutvik, Vitalisskolan, Sweden

Reflect – Design – Act!

This is a structure used to help students design a realistic work plan from the investigation to the action stage.

The mapping of problem areas

1. Brainstorm the problems of a particular topic*. Encourage everyone in the class to participate in order to generate the maximum number of ideas possible.
2. Analyse and prioritise the brainstormed ideas.
3. Identify four specific problem areas.

Stakeholders and an action plan

1. Set realistic goals, define how to achieve them and disseminate the results.
2. Identify the stakeholders.
3. Design a coordinated system: identify what is desirable or not desirable and what is probable or not probable.
4. Decision-making by consensus.
5. Outline the action plans using concrete ideas and specific scenarios.

Rudite Grabovska, Daugavpils University, Latvia

* *How to reduce the Ecological Footprint in our school* test the structure in the above activity of Reflect – Design – Act! In this exercise include ideas about what you and the students can do.

Our seashore

Adopt about 3-500 metres of a river bank or seashore and take care of it. It will surely "thank" you by its surprising and unique beauty. "The adopted area of coastline or river bank" will be very glad to see you and taking care of it will reward you with good health and happiness.

Take photos of your site and make drawings of it. Write poems about it and pay attention to its positive and negative aspects.

Use the Naturewatch Baltic survey to learn more about your shoreline and stretch of water. *See the references on page 34 for more information about this.*

Discuss the results with your group.

How would you describe the present situation of the coastal zone?
Who is responsible for looking after the coastal zone and keeping it in good condition? What exactly do they have formal or informal responsibility for?

- Local municipalities
- Tourists; foreigners, locals, nature lovers
- National government
- EU or other countries
- Companies, shop owner, farmers, fishermen
- Others. Who?

Sit on your beach and watch the waves and listen. What ideas are the waves whispering to you?

Try to guess what this area of beach or water might have looked like when your parents were your age. Ask your parents and teachers if they can remember and write down their answers.

Now think about the future. What might happen to you and your site in 25 years time? What will you and your site look like then? How might your life have changed and how might the coastal conditions have changed?

Work in teams and prepare short reports using the results of your research and discussions. Each team then appoints a spokesperson and tells the class what your group discovered. Each group has a maximum of 5 minutes in which to make their oral reports. The reports can be creative and original!

Olga Glushkova, I. Kant Kaliningrad State University, Russia

Action Tadpole

As a teacher you often come into contact with some kind of conflict. This topic is taken from real life and was initiated by the students themselves. When students are motivated to act in this way the potentials for teaching and learning are considerable.

It was a hot summer, and the lake had gradually been drying out. Schoolchildren from the summer camp "Vodokanal" discovered that tadpoles were unable to get from the shallow ditch to the stream and were dying as a result. The students and their teacher decided to prepare a management plan for rational water use among local water organisations and thereby help to save the lives of amphibians like tadpoles. This "Lovely Tadpole" action included lectures on amphibian life and outdoor investigations. The media and people responsible for nature conservation were also involved.

Julia Danilova, Baltic Fund for Nature, St. Petersburg, Russia

Parents as partners

As education for sustainable development deals with values and attitudes it is therefore reasonable to involve parents as a way of continuing the work at home. Meeting and developing positive links with parents and between parents is important and can help to strengthen school activities.

The following activity is an excellent way for parents, teachers and pupils to spend time together and learn. In this particular course the ecological, social and economic aspects of sustainability were taken into account and it was such a hit that another course is already being planned.

The school has its own vegetable garden, which is a very important part of its ideology and identity. The participants were able to improve their organic gardening and farming practices both in their school activities and with their parents.

Käpylä School, Helsinki Finland

Challenge your friends

In his publication, Pedagogy of Work, the famous French educationalist, Célestin Freinet, put a high value on work as meaningful learning. His pedagogy is also appropriate for the realisation of ESD.

During the "Sustainability Week by Week" project teachers and pupils challenged each other to take action towards sustainability. In the school's radio broadcast every Monday morning one class would challenge another class. They might, for example, ask students to avoid using private cars and walk, cycle or take the bus to school. The challenges could also be about saving electricity, not wasting food, having good manners, being nice to fellow students, helping older people, etc. In this project all the dimensions of sustainability were taken into account through different kinds of challenges.

One class rose to the challenges by trying to do their best in the different areas every day. They made notes about their changed behaviour and summed this up at the end of the week. They then challenged another class in another area of sustainability on the following Monday. Other members of the school community were also invited to take part in each week's sus¬tainability actions and to make changes in their behaviour or lifestyles.

Puistola School, Helsinki Finland

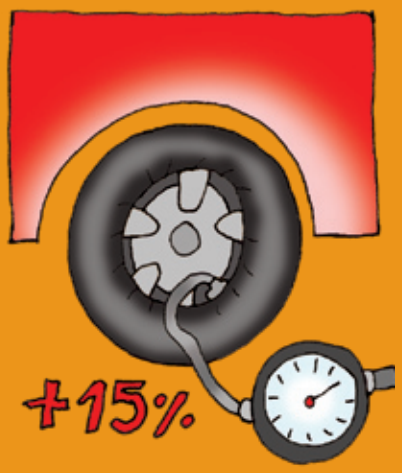
Reflection 3. Practical Examples

Compare three well-known pedagogues and find out in which ways they could be used as spokespeople for ESD.

Car owners learn from students

Challenge your students to assume the role of teachers. They will have to prepare for this so that in their positions as educators they will be able to develop their students' values and interest. A similar effect is gained by asking older students to involving younger students in common activities.
Sixteen year old students were involved in a campaign that aimed to improve car-owners'

knowledge about how their driving techniques and the condition of their car affected the environment. The idea was to help car-owners to regularly check and adjust the air-pressure in their car tyres in order to reduce their fuel consumption and thereby reduce their CO_2 emissions. We also wanted some of the car-owners to participate in eco-driving courses. Research has shown that if you increase the air pressure in your car's tyres by 10-15% of the amount stated in the car´s instruction manual you will reduce your fuel consumption by approximately 5%.



The students took part in a climate change course dealing with cars and emissions, tyres and tyre pressures and how to work with information in a campaign. The students then worked at petrol stations in teams of 3-6 for several weekends. They recorded statistics about their work and talked to a lot of car-owners.

The success factors in this activity included:

- The inspiration and joy of the students
- The strong connection between theory and practice
- The cooperation between organisations, local authorities and companies
- The support of educators and marketing experts,
  and, most important of all, the feeling of doing something real for the environment.

Peter Wiborn, SV, Sweden

Press conference – one way of reporting

Let's assume that the class has been working for some time with energy, the Baltic region's history or another similar theme and are expected to give an account of their knowledge and comment on its content. The students may also have produced pictures or drawings. The class has also had a short course in journalism in which they have had to write a variety of articles, discuss the reasons for holding a press conference and how this is arranged. They might also have produced a press release.

Teachers use methods that develop students understanding in structured ways.

As a result of this training each student feels prepared and secure in their role both as an expert and as a journalist. The class is now divided into an expert group and a journalist group. Experts in the same field prepare a presentation by agreeing on key words. The journalists require time to prepare and allocate the questions.

One representative from each group of experts gives a short presentation, possibly with pictures, for the journalists. The journalists take notes and ask additional questions. After the first press conference the groups change roles.

At the end of the second and final press conference each student works with the acquired material and develops it into an editorial column in which they argue their respective viewpoints. This method of reporting means that everybody both repeats and develops new material based on their opinions, their previous knowledge and experience of the press conferences, and presents this orally to the whole group and in writing in the form of an editorial.

From Östersjögrannar, WWF, Svanberg and Jutvik

As a final "afterword" we hope that you and your colleagues have found this education for sustainable development handbook useful. We have tried to include information and exercises that teachers and student teachers will find both inspiring and of use in their ESD teaching. We also hope that teachers and students will be inspired to create their own information and activities and above all to "practice what they preach".

Good luck!

Education and Culture

Socrates
Comenius