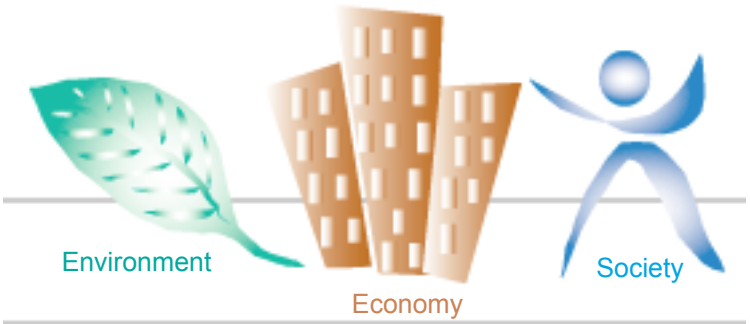

Education for Sustainable Development Toolkit

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The Education for Sustainable Development Toolkit can be downloaded free of charge at http://www.esdtoolkit.org

Author's Note

The *Education for Sustainable Development Toolkit* is based on the idea that communities and educational systems within communities need to dovetail their sustainability efforts. As communities develop sustainability goals, local educational systems can modify existing curriculums to reinforce those goals. As we developed the *Toolkit*, it became apparent that many communities have not developed sustainability goals or action plans on which to base educational change. As a result, we include some exercises to help communities develop such goals. We also include a few exercises to explain the concept of sustainable development.

I was inspired to develop the *ESD Toolkit* after attending the United Nations (UN) Commission on Sustainable Development (CSD) in 1998. Each year, the CSD reviews several chapters of *Agenda 21* from the Earth Summit (Rio de Janeiro, 1992). When I attended this meeting, the CSD reviewed Chapter 36, "Promoting Education, Public Awareness, and Training." Through the meeting, delegation after delegation affirmed the importance of education in achieving sustainable development. Nevertheless, I noted growing frustration that education for sustainable development (ESD) was not advancing more rapidly; that no one had taken responsibility for ESD nor raised money to promote it; that no one knew where or how to start; and that people were pointing fingers at others, accusing them of not doing enough.

I returned from the CSD meeting with the sense that community leaders and educators needed an easy-to-use manual that would help them get started in the business of educating for sustainable development. To that end, I sought funding from the University of Tennessee's Waste Management Research and Education Institute (WMREI), a state sponsored center of excellence. When WMREI generously granted the request, I began developing the *Education for Sustainable Development Toolkit*. I enlisted the help of Charles A. Hopkins of York University and Regina Rizzi of the University of Tennessee. The first edition of the *ESD Toolkit* was published in 2000 in both hard copy and on the World Wide Web <http://www.esdtoolkit.org>. The Web site

version of the *ESD Toolkit* was immediately popular, visited by thousands from around the world. I have received requests for permission to translate all or parts of the *ESD Toolkit* into 10 languages. The requests for permission were granted with the stipulation that the original work and authors be cited. With the continuing generous support of WMREI, I revised the *ESD Toolkit* in 2002. Charles and Regina helped with the revisions, as did Marianne Chrystalbridge who joined the effort later. I greatly appreciate their hours of work, extraordinary effort, and dedication to the ideals of sustainability and the importance of education. I would also like to thank Constance Griffith and David Brill for their superb editing.

I sincerely hope the *ESD Toolkit* helps you and your community, your school, or your institution take the first steps toward creating an education for sustainable development program.

Rosalyn McKeown
May 2002

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I. INTRODUCTION

Education is an essential tool for achieving sustainability. People around the world recognize that current economic development trends are not sustainable and that public awareness, education, and training are key to moving society toward sustainability. Beyond that, there is little agreement. People argue about the meaning of sustainable development and whether or not it is attainable. They have different visions of what sustainable societies will look like and how they will function. These same people wonder why educators have not moved more quickly to develop education for sustainability (EfS) programs. The lack of agreement and definition have stymied efforts to move education for sustainable development (ESD) forward.

It is curious to note that while we have difficulty envisioning a sustainable world, we have no difficulty identifying what is unsustainable in our societies. We can rapidly create a laundry list of problems - inefficient use of energy, lack of water conservation, increased pollution, abuses of human rights, overuse of personal transportation, consumerism, etc. But we should not chide ourselves because we lack a clear definition of sustainability. Indeed, many truly great concepts of the human world - among them democracy and justice - are hard to define and have multiple expressions in cultures around the world.

In the *Toolkit*, we use three terms synonymously and interchangeably: education for sustainable development (ESD), education for sustainability (EfS), and sustainability education (SE). We use ESD most often, because it is the terminology used frequently at the international level and within UN documents. Locally or nationally, the ESD effort may be named or described in many ways because of language and cultural differences. As with all work related to sustainable development, the name and the content must be locally relevant and culturally appropriate.

An important distinction is the difference between education *about* sustainable development and education *for* sustainable development. The first is an awareness lesson or theoretical discussion. The second is the use of education as a tool to achieve sustainability. In our opinion, more than a theoretical discussion is needed at this critical juncture in time. While some people argue that “for” indicates indoctrination, we think “for” indicates a purpose. All education serves a purpose or society would not invest in it. Driver education, for example, seeks to make our roads safer for travelers. Fire-safety education seeks to prevent fires and tragic loss of lives and property. ESD promises to make the world more livable for this and future generations. Of course, a few will abuse or distort ESD and turn it into indoctrination. This would be antithetical to the nature of ESD, which, in fact, calls for giving people knowledge and skills for lifelong learning to help them find new solutions to their environmental, economic, and social issues.

Sustainable Development

Sustainable development is a difficult concept to define; it is also continually evolving, which makes it doubly difficult to define. One of the original descriptions of sustainable development is credited to the Brundtland Commission: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p 43). Sustainable development is generally thought to have three components: environment, society, and economy. The well-being of these three areas is intertwined, not separate. For example, a healthy, prosperous society relies on a healthy environment to provide food and resources, safe drinking water, and clean air for its citizens. The sustainability paradigm rejects the contention that casualties in the environmental and social realms are inevitable and acceptable consequences of economic development. Thus, the authors consider sustainability to be a paradigm for thinking about a future in which environmental, societal, and economic considerations are balanced in the pursuit of development and improved quality of life.

Principles of Sustainable Development

Many governments and individuals have pondered what sustainable development means beyond a simple one-sentence definition. The *Rio Declaration on Environment and Development* fleshes out the definition by listing 18 principles of sustainability.

- People are entitled to a healthy and productive life in harmony with nature.
- Development today must not undermine the development and environment needs of present and future generations.
- Nations have the sovereign right to exploit their own resources, but without causing environmental damage beyond their borders.
- Nations shall develop international laws to provide compensation for damage that activities under their control cause to areas beyond their borders.
- Nations shall use the precautionary approach to protect the environment. Where there are threats of serious or irreversible damage, scientific uncertainty shall not be used to postpone cost-effective measures to prevent environmental degradation.
- In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process, and cannot be considered in isolation from it. Eradicating poverty and reducing disparities in living standards in different parts of the world are essential to achieve sustainable development and meet the needs of the majority of people.
- Nations shall cooperate to conserve, protect and restore the health and integrity of the Earth's ecosystem. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.
- Nations should reduce and eliminate unsustainable patterns of production and

consumption, and promote appropriate demographic policies.

- Environmental issues are best handled with the participation of all concerned citizens. Nations shall facilitate and encourage public awareness and participation by making environmental information widely available.
- Nations shall enact effective environmental laws, and develop national law regarding liability for the victims of pollution and other environmental damage. Where they have authority, nations shall assess the environmental impact of proposed activities that are likely to have a significant adverse impact.
- Nations should cooperate to promote an open international economic system that will lead to economic growth and sustainable development in all countries. Environmental policies should not be used as an unjustifiable means of restricting international trade.
- The polluter should, in principle, bear the cost of pollution.
- Nations shall warn one another of natural disasters or activities that may have harmful transboundary impacts.
- Sustainable development requires better scientific understanding of the problems. Nations should share knowledge and innovative technologies to achieve the goal of sustainability.
- The full participation of women is essential to achieve sustainable development. The creativity, ideals and courage of youth and the knowledge of indigenous people are needed too. Nations should recognize and support the identity, culture and interests of indigenous people.
- Warfare is inherently destructive of sustainable development, and Nations shall respect international laws protecting the environment in times of armed conflict, and shall cooperate in their further establishment.
- Peace, development and environmental protection are interdependent and indivisible.

The “Rio principles” give us parameters for envisioning locally relevant and culturally appropriate sustainable development for our own nations, regions, and communities. These principles help us to grasp the abstract concept of sustainable development and begin to implement it.

Sustainability

Here are some effective explanations of sustainable development created for different audiences.

Sustainable development has three components: environment, society, and economy. If you consider the three to be overlapping circles of the same size, the area of overlap in the center is human well-being. As the environment, society, and economy become more aligned, the area of overlap increases, and so does human well-being.

The National Town Meeting on Sustainability (May 1999) in Detroit, Michigan, established that the term “sustainable development,” although frequently used, is not well understood. We believe that it means new technologies and new ways of doing business, which allow us to improve quality of life today in all economic, environmental, and social dimensions, without impairing the ability of future generations to enjoy quality of life and opportunity at least as good as ours.

The human rights community says that sustainability is attainable through and supported by peace, justice, and democracy.

The Great Law of the Hau de no sau nee (Six Nations Iroquois Confederation) says that in every deliberation we must consider the impact on the seventh generation.

Economics educators say sustainability is living on the interest rather than the principle.

History of Education for Sustainable Development

From the time sustainable development was first endorsed at the UN General Assembly in 1987, the parallel concept of education to support sustainable development has also been explored. From 1987 to 1992, the concept of sustainable development matured as committees discussed, negotiated, and wrote the 40 chapters of *Agenda 21*. Initial thoughts concerning ESD were captured in Chapter 36 of *Agenda 21*, "Promoting Education, Public Awareness, and Training."

Unlike most education movements, ESD was initiated by people outside of the education community. In fact, one major push for ESD came from international political and economic forums (e.g., United Nations, Organization for Economic Co-operation and Development, Organization of American States). As the concept of sustainable development was discussed and formulated, it became apparent that education is key to sustainability. In many countries, ESD is still being shaped by those outside the education community. The concepts and content of ESD in these cases are developed by ministries, such as those of environment and health, and then given to educators to deliver. Conceptual development independent of educator input is a problem recognized by international bodies as well as educators.

Education: Promise and Paradox

Two of the major issues in the international dialog on sustainability are population and resource consumption. Increases in population and resource use are thought to jeopardize a sustainable future, and education is linked both to fertility rate and resource consumption. Educating females reduces fertility rates and therefore population growth. By reducing fertility rates and the threat of overpopulation a country also facilitates progress toward sustainability. The opposite is true for the relationship between education and resource use. Generally, more highly educated people, who have higher incomes, consume more resources than poorly educated people, who tend to have lower incomes. In this case, more education increases the threat to sustainability.

Unfortunately, the most educated nations leave the deepest ecological footprints, meaning they have the highest per-capita rates of consumption. This consumption drives resource extraction and manufacturing around the world. The figures from the United

Nations Educational, Scientific and Cultural Organization (UNESCO) *Statistical Yearbook and World Education Report*, for example, show that in the United States more than 80 percent of the population has some post-secondary education, and about 25 percent of the population has a four-year degree from a university. Statistics also show that per-capita energy use and waste generation in the United States are nearly the highest in the world. In the case of the United States, more education has not led to sustainability. Clearly, simply educating citizenry to higher levels is not sufficient for creating sustainable societies. The challenge is to raise the education levels without creating an ever-growing demand for resources and consumer goods and the accompanying production of pollutants. Meeting this challenge depends on reorienting curriculums to address the need for more-sustainable production and consumption patterns.

Every nation will need to reexamine curriculum at all levels (i.e., pre-school to professional education). While it is evident that it is difficult to teach environmental literacy, economics literacy, or civics without basic literacy, it is also evident that simply increasing basic literacy, as it is currently taught in most countries, will not support a sustainable society.

Thresholds of Education and Sustainability

Consider for instance, that when education levels are low, economies are often limited to resource extraction and agriculture. In many countries, the current level of basic education is so low that it severely hinders development options and plans for a sustainable future. A higher education level is necessary to create jobs and industries that are "greener" (i.e., those having lower environmental impacts) and more sustainable.

The relationship between education and sustainable development is complex. Generally, research shows that basic education is key to a nation's ability to develop and achieve sustainability targets. Research has shown that education can improve agricultural productivity, enhance the status of women, reduce population growth rates, enhance environmental protection, and generally raise the standard of living. But the relationship is not linear. For example, four to six years of education is the minimum threshold for increasing agricultural productivity. Literacy and numeracy allow farmers to adapt to new agricultural methods, cope with risk, and respond to market signals. Literacy also helps farmers mix and apply chemicals (e.g., fertilizers and pesticides) according to manufacturers' directions, thereby reducing the risks to the environment and human health. A basic education also helps farmers gain title to their land and apply for credit at banks and other lending institutions. Effects of education on agriculture are greatest when the proportion of females educated to threshold level equals that of males.

Education benefits a woman in life-altering ways. An educated woman gains higher status and an enhanced sense of efficacy. She tends to marry later and have greater bargaining power and success in the "marriage market." She also has greater bargaining

power in the household after marriage. An educated woman tends to desire a smaller family size and seek the health care necessary to do so. She has fewer and healthier children. An educated woman has high educational and career expectations of her children, both boys and girls. For females, education profoundly changes their lives, how they interact with society, and their economic status. Educating women creates more equitable lives for women and their families and increases their ability to participate in community decision making and work toward achieving local sustainability goals.

Another educational threshold is primary education for women. At least a primary education is required before birthrate drops and infant health and children's education improve. Nine to 12 years of education are required for increased industrial productivity. This level of education also increases the probability of employment in a changing economy. Few studies have been carried out on how education affects environmental stewardship, but one study suggests that a lower-secondary education (or approximately nine years) is necessary to intensify use of existing land and to provide alternative off-farm employment and migration from rural areas. Finally, a subtle combination of higher education, research, and life-long learning is necessary for a nation to shift to an information or knowledge-based economy, which is fueled less by imported technology and more by local innovation and creativity (UNESCO-ACEID, 1997).

Education directly affects sustainability plans in the following three areas:

Implementation. An educated citizenry is vital to implementing informed and sustainable development. In fact, a national sustainability plan can be enhanced or limited by the level of education attained by the nation's citizens. Nations with high illiteracy rates and unskilled workforces have fewer development options. For the most part, these nations are forced to buy energy and manufactured goods on the international market with hard currency. To acquire hard currency, these countries need international trade; usually this leads to exploitation of natural resources or conversion of lands from self-sufficient family-based farming to cash-crop agriculture. An educated workforce is key to moving beyond an extractive and agricultural economy.

Decision making. Good community-based decisions - which will affect social, economic, and environmental well-being - also depend on educated citizens. Development options, especially “greener” development options, expand as education increases. For example, a community with an abundance of skilled labor and technically trained people can persuade a corporation to locate a new information-technology and software-development facility nearby. Citizens can also act to protect their communities by analyzing reports and data that address community issues and helping shape a community response. For example, citizens who were concerned about water pollution reported in a nearby watershed started monitoring the water quality of local streams. Based on their data and information found on

the World Wide Web, they fought against the development of a new golf-course, which would have used large amounts of fertilizer and herbicide in maintenance of the grounds.

Quality of life. Education is also central to improving quality of life. Education raises the economic status of families; it improves life conditions, lowers infant mortality, and improves the educational attainment of the next generation, thereby raising the next generation's chances for economic and social well-being. Improved education holds both individual and national implications.

II. WHAT IS ESD?

Education is held to be central to sustainability. Indeed, education and sustainability are inextricably linked, but the distinction between education as we know it and education for sustainability is enigmatic for many. The following section describes the components of education for sustainability.

ESD carries with it the inherent idea of implementing programs that are locally relevant and culturally appropriate. All sustainable development programs including ESD must take into consideration the local environmental, economic, and societal conditions. As a result, ESD will take many forms around the world.

ESD was first described by Chapter 36 of *Agenda 21*. This chapter identified four major thrusts to begin the work of ESD: (1) improve basic education, (2) reorient existing education to address sustainable development, (3) develop public understanding, awareness, and (4) training. Let's look at each of the four components.

Improving Basic Education - The First Priority

The first priority of ESD as outlined in Chapter 36 was the promotion of basic education. The content and years of basic education differ greatly around the world. In some countries, for instance, primary school is considered basic education. In others eight or 12 years is mandatory. In many countries, basic education focuses on reading, writing, and ciphering. Pupils learn to read the newspaper, write letters, figure accounts, and develop skills necessary to fulfill their expected roles in their households and community. Girls, for example, may learn about nutrition and nursing. Pupils also learn how their government functions and about the world beyond their community.

Simply increasing basic literacy, as it is currently taught in most countries, will not advance sustainable societies. Indeed, if communities and nations hope to identify sustainability goals and work toward them, they must focus on skills, values, and perspectives that encourage and support public participation and community decision making. To achieve this, basic education must be reoriented to address sustainability and

expanded to include critical-thinking skills, skills to organize and interpret data and information, skills to formulate questions, and the ability to analyze issues that confront communities.

In many countries, the current level of basic education is too low, severely hindering national plans for a sustainable future. In Latin America and the Caribbean, many countries have six to eight years of compulsory education with approximately five to 15 percent of the students repeating one or more years. In parts of Asia, especially Bangladesh, Pakistan, and India, many children only attend school for an average of five years. A complicating factor in this region is that many girls receive fewer years of schooling to create that average. In parts of Africa, where life is disturbed by drought or war, the average attendance in public education is measured in months, not years. Unfortunately, the lowest quality of education is often found in the poorest regions or communities. The impact of little and/or poor-quality education severely limits the options available to a nation for developing its short- and long-term sustainability plans.

As nations turned their attention to education in the 1990s and the new millennium, they have made much progress in basic education. In fact, enrollment rates in primary education are rising in most regions of the world. Also, enrollment of girls has increased faster than that of boys, which is helping to close the gender gap evident in so many countries. At the global level, the gender gap in both primary and secondary school is narrowing. Despite all of this progress, too many female children remain out of school, and the gender gap will not close prior to the "Education For All" target date of 2005.

The recognition of the need for quality basic education sets ESD apart from other educational efforts, such as environmental education or population education.

Reorienting Existing Education - The Second Priority

The term "reorienting education" has become a powerful descriptor that helps administrators and educators at every level (i.e., nursery school through university) to understand the changes required for ESD. An appropriately reoriented basic education includes more principles, skills, perspectives, and values related to sustainability than are currently included in most education systems. Hence, it is not only a question of quantity of education, but also one of appropriateness and relevance. ESD encompasses a vision that integrates environment, economy, and society. Reorienting education also requires teaching and learning knowledge, skills, perspectives, and values that will guide and motivate people to pursue sustainable livelihoods, to participate in a democratic society, and to live in a sustainable manner.

The need to reorient basic and secondary education to address sustainability has grabbed international attention, but the need at the university level is just as great. Society's future leaders and decision makers are educated there. If these young people are expected to lead all sectors of society (e.g., government, medicine, agriculture, forestry,

law, business, industry, engineering, education, communications, architecture, and arts) in a world striving toward sustainability, then the current administration and faculty members must reorient university curriculums to include the many and complex facets of sustainability.

In reorienting education to address sustainability, program developers need to balance looking forward to a more sustainable society with looking back to traditional ecological knowledge. Indigenous traditions often carry with them the values and practices that embody sustainable resource use. While returning to indigenous lifestyles is not an option for the millions of urban dwellers, the values and major tenets of indigenous traditions can be adapted to life in the 21st century.

Reorienting education to address sustainability is something that should occur throughout the formal education system - that includes universities, professional schools (e.g., law and medicine), and technical schools in addition to primary and secondary education.

Public Understanding and Awareness - The Third Priority

Sustainability requires a population that is aware of the goals of a sustainable society and has the knowledge and skills to contribute to those goals. The need for an informed voting citizenry becomes ever more important with the increase in the number of democratic governments. An informed voting citizenry, which lends support to enlightened policies and government initiatives, can help governments enact sustainable measures. Citizens also need to be knowledgeable consumers who can see beyond the “green wash” (i.e., public-relations efforts that highlight the activities of corporations that are more environmentally responsible while ignoring or hiding the major activities that are not). In today's world, people are surrounded by media (e.g., television, radio, newspapers, magazines) and advertisements (e.g., bill boards, banners on World Wide Web sites, and logos on clothing). As a result, people must become media literate and able to analyze the messages of corporate advertisers.

Years of resource management has shown that a public that is aware of and informed about resource-management decisions and programs can help achieve program goals. In contrast, an uninformed public can undermine resource-management programs. Education has also been essential in many other types of programs, such as public-health efforts to stop the spread of specific diseases.

Training - The Fourth Priority

Training was also stressed in Chapter 36. The world needs a literate and environmentally aware citizenry and work force to help guide nations in implementing their sustainability plans. All sectors - including business, industry, higher education, governments, nongovernmental organizations (NGOs), and community organization - are

encouraged to train their leaders in environmental management and to provide training to their workers.

Training is distinct from education in that training is often specific to a particular job or class of jobs. Training teaches workers how to use equipment safely, be more efficient, and comply with regulations (e.g., environmental, health, or safety). For instance, a training program might teach workers to avoid changing the waste stream without notifying their supervisor. Further, if an employee is involved in a nonroutine activity, such as cleaning a new piece of equipment, she or he is instructed not to dispose of the cleaning solvent by pouring it down a storm sewer drain that leads to the river. Some training, such as training women to use solar cookers rather than cooking on open, wood-fueled fires, involves tremendous change in social dynamics and practices. In this case, women must not only learn the mechanics of solar cookers, but they must also change daily routines of meal preparation to cook while the sun is high in the sky, rather than in the evening.

Training informs people of accepted practices and procedures and gives them skills to perform specific tasks. In contrast, education is a socially transforming process that gives people knowledge, skills, perspectives, and values through which they can participate in and contribute to their own well-being and that of their community and nation.

Formal, Nonformal, and Informal Education

For a community or a nation, implementing ESD is a huge task. Fortunately, formal education does not carry this educational responsibility alone. The nonformal educational sector (e.g., nature centers, nongovernmental organizations, public health educators, and agricultural extension agents) and the informal educational sector (e.g., local television, newspaper, and radio) of the educational community must work cooperatively with the formal educational sector for the education of people in all generations and walks of life.

Because ESD is a lifelong process, the formal, nonformal, and informal educational sectors should work together to accomplish local sustainability goals. In an ideal world, the three sectors would divide the enormous task of ESD for the entire population by identifying target audiences from the general public as well as themes of sustainability. They would then work within their mutually agreed upon realms. This division of effort would reach a broader spectrum of people and prevent redundant efforts.

III. REORIENTING EDUCATION

ESD is more than a knowledge base related to environment, economy, and society. It also addresses learning skills, perspectives, and values that guide and motivate people to seek sustainable livelihoods, participate in a democratic society, and live in a sustainable manner. ESD also involves studying local and, when appropriate, global

issues. Therefore, these five (i.e., knowledge, skills, perspectives, values, and issues) must all be addressed in a formal curriculum that has been reoriented to address sustainability. Simply adding more to the curriculum will not be feasible in most schools; they already have a full curriculum. Deciding what to leave out - what does not contribute to sustainability or is obsolete - is an integral part of the reorienting process. Let's look more closely at these five components of an education reoriented to address sustainability.

Knowledge

Sustainable development encompasses environment, economics, and society. Therefore, people need basic knowledge from the natural sciences, social sciences, and humanities to understand the principles of sustainable development, how they can be implemented, the values involved, and ramifications of their implementation. Knowledge based on traditional disciplines supports ESD.

The challenge for communities in the process of creating ESD curriculums will be to select knowledge that will support their sustainability goals. An accompanying challenge will be to let go of those topics that have been successfully taught for years but are no longer relevant. In the event that your community has not defined sustainability goals, you can substitute principles and guidelines for sustainability. (See following box.) Section XII: Exercises to Create Sustainability Goals through Public Participation of this *Toolkit* includes exercises that will assist communities in identifying community sustainability goals.

Guidelines for Sustainable Development

To identify a knowledge base that will support sustainability goals, citizens must first select goals. To help in this process, here is a list of statements, conditions, and guidelines for sustainability, which have been identified by prominent authors.

Herman Daly, author of *For the Common Good: Redirecting the Economy toward Community, the Environment, and a Sustainable Future*, gives three conditions of a sustainable society:

(1) Rates of use of renewable resources do not exceed their rates of regeneration.
(2) Rates of use of nonrenewable resources do not exceed the rate at which sustainable renewable substitutes are developed.
(3) Rates of pollution emission do not exceed the assimilative capacity of the environment.

Other authors consider peace, equity, and justice necessary for a sustainable society.

Donnella Meadows, author of *Limits to Growth*, outlined these general guidelines for restructuring world systems toward sustainability:

(1) Minimize the use of nonrenewable resources.
(2) Prevent erosion of renewable resources.
(3) Use all resources with maximum efficiency.
(4) Slow and eventually stop exponential growth of population and physical capital.
(5) Monitor the condition of resources, the natural environment, and the welfare of humans.
(6) Improve response time for environmental stress.

Julian Agyeman, Assistant Professor at Tufts University, interprets that "[sustainability] places great emphasis upon the need to: ensure a better quality of life for all, in a just and equitable manner, whilst living within the limits of supporting ecosystems."

Of course, communities must choose culturally appropriate and locally relevant sustainability goals that reflect their current and future life conditions and needs. With time, major guiding principles selected for the curriculum will become infused into local worldviews.

Issues

ESD focuses largely on the major social, economic, and environmental issues that threaten the sustainability of the planet. Many of these key issues were identified at the Earth Summit in Rio de Janeiro and are found in *Agenda 21*. Understanding and addressing these issues are the heart of ESD, and locally relevant issues should be included in any program related to educating for sustainability.

Agenda 21: Chapters, Statement, and Conventions

Section 1 - Social and Economic Dimensions
International cooperation, Combating poverty, Changing consumption patterns, Population and sustainability, Protecting and promoting human health, Sustainable human settlements, Making decisions for sustainable development.

Section 2 - Conservation & Management of Resources
Protecting the atmosphere, Managing land sustainably, Combating deforestation, Combating desertification and drought, Sustainable mountain development, Sustainable agriculture and rural development, Conservation of biological diversity, Management of biotechnology, Protecting and managing the oceans, Protecting and managing fresh water, Safer use of toxic chemicals, Managing hazardous wastes, Managing solid waste and sewage, Managing radioactive wastes.

Section 3 - Strengthening the Role of Major Groups
Women in sustainable development, Children and youth, Indigenous people, Partnerships with NGOs, Local authorities, Workers and trade unions, Business and industry, Scientists and technologists, Strengthening the role of farmers.

Section 4 - Means of Implementation
Financing sustainable development; Technology transfer; Science for sustainable development; Education, awareness and training; Creating capacity for sustainable development; Organizing for sustainable development, International law; and Information for decision making.

Accompanying the 40 chapters of *Agenda 21* were the Rio Declaration and the following conventions and statement of principles: Statement of Forests, Convention on Climate Change, Convention on Biological Diversity, Convention on Desertification.

While *Agenda 21* clearly identifies many of the critical issues that governments around the world agreed to address, additional issues were discussed for which no formal international agreement or plan of action could be reached. In addition, issues that are important to enhancing the understanding of sustainability (e.g., globalization) have continued to emerge since the Rio de Janeiro conference. These additional issues, not included in Agenda 21, are part of international discussions of sustainability and include, but are not limited to, topic such as war and militarism, governance, discrimination and nationalism, renewable energy sources, multinational corporations, refugees, nuclear

disarmament, human rights, and media influencing rapid change of worldviews. These issues are pertinent to reorienting education to address sustainability and should be included when relevant. Including local issues will foster innovative solutions and develop the political will to resolve them.

The last major content area in educating for sustainability stems from the major UN conferences in the 1990s and new millenium that expanded our understanding of sustainable development. Key examples of the issues explored are Environment and Development (Rio de Janeiro, 1992), UN Global Conference on the Sustainable Development of Small Island Developing States (Barbados, 1993), International Conference on Population and Development (Cairo, 1994), World Summit for Social Development (Copenhagen, 1995), Fourth World Conference on Women (Beijing, 1996), Second UN Conference on Human Settlements (Istanbul, 1996) and World Food Summit (Rome, 1996). Each conference advanced understanding of issues that cause much suffering and threaten global sustainability. Each conference also developed a series of requests for public awareness and understanding and identified the individual responsibilities and behavior changes that would ameliorate each issue.

Communities creating ESD curriculums cannot teach all of the issues associated with *Agenda 21*, the statements of principles and conventions, and these major UN conferences. The quantity of study would be overwhelming. Communities should, however, select a few issues in each of the three realms - environment, economics, and society. The issues selected should be locally relevant. For example, a land-locked country could study sustainable mountain development and either ignore or lightly cover protecting and managing the oceans. Some topics, such as women in sustainable development or combating poverty, have relevance to every country.

Framework for Teaching or Analyzing Environmental Issues*

Teachers should be equipped to help pupils identify and think about the complexities of issues from the perspectives of many stakeholders. Older pupils and university students need to acquire skills to analyze issues, analyze proposed solutions to those issues, understand the values underlying opposing positions on issues, and analyze conflicts arising from those issues and proposed solutions. The following framework of 13 questions is for analyzing an environmental issue whether the issue confronts a local community or a country on the other side of the world.

1. What are the main historical and current causes (i.e., physical/biotic, social/cultural, or economic) of the issue?
2. What is the geographic scale, the spatial distribution, and the longevity of the issue?
3. What are the major risks and consequences to the natural environment?
4. What are the major risks and consequences to human systems?
5. What are the economic implications?
6. What are the major currently implemented or proposed solutions?
7. What are the obstacles to these solutions?
8. What major social values (e.g., economic, ecological, political, aesthetic) are involved in or infringed upon by these solutions?
9. What group(s) of people would be adversely impacted by or bear the costs of these solutions?

10. What is the political status of the problem and solutions?
11. How does this issue relate to other environmental issues?

The next two questions help people integrate knowledge into daily living.
12. What is a change you can make in your daily life to lessen the problem or issue?
13. Beyond changes in your daily life, what is the next step you could take to address the issue?

* This framework for teaching, studying, and analyzing environmental issues was developed for North American university students through a research process by Rosalyn McKeown and Roger Dendinger.

Skills

To be successful, ESD must go beyond teaching about these global issues. ESD must give people practical skills that will enable them to continue learning after they leave school, to have a sustainable livelihood, and to live sustainable lives. These skills will differ with community conditions. The following list demonstrates the types of skills pupils will need as adults. Note that skills fall into one or more of the three realms of sustainable development - environmental, economic, and social.

- The ability to communicate effectively (both orally and in writing).
- The ability to think about systems (both natural and social sciences).
- The ability to think in time - to forecast, to think ahead, and to plan.
- The ability to think critically about value issues.
- The ability to separate number, quantity, quality, and value.
- The capacity to move from awareness to knowledge to action.
- The ability to work cooperatively with other people.
- The capacity to use these processes: knowing, inquiring, acting, judging, imagining, connecting, valuing, and choosing.
- The capacity to develop an aesthetic response to the environment (McClaren, 1989).

In addition, pupils will need to learn skills that will help them manage and interact with the local environment. Such locally relevant skills may include learning to:

- Prepare materials for recycling.
- Harvest wild plants without jeopardizing future natural regeneration and production.
- Grow low-water-need cotton.
- Draw water from unpolluted sources.

Perspectives

ESD carries with it perspectives that are important for understanding global issues as well as local issues in a global context. Every issue has a history and a future. Looking at the roots of an issue and forecasting possible futures based on different scenarios are

part of ESD, as is understanding that many global issues are linked. For example, over-consumption of such consumer goods as paper leads to deforestation, which is thought to be related to global climate change.

The ability to consider an issue from the view of different stakeholders is essential to ESD. Considering an issue from another viewpoint besides your own leads to intra-national and international understanding. This understanding is essential for creating the mood of cooperation that will underpin sustainable development.

The following is a partial list of perspectives associated with ESD. Students understand that:

- Social and environmental problems change through time and have a history and a future.
- Contemporary global environmental issues are linked and interrelated between and among themselves.
- Humans have universal attributes (e.g., they love their children).
- Looking at their community as well as looking beyond the confines of local and national boundaries is necessary to understand local issues in a global context.
- Considering differing views before reaching a decision or judgment is necessary.
- Economic values, religious values, and societal values compete for importance as people of different interests and backgrounds interact.
- Technology and science alone cannot solve all of our problems.
- Individuals are global citizens in addition to citizens of the local community.
- Individual consumer decisions and other actions effect resource extraction and manufacturing in distant places.
- Employing the precautionary principle by taking action to avoid the possibility of serious or irreversible environmental or social harm even when scientific knowledge is incomplete or inconclusive is necessary for the long-term well-being of their community and planet.

When taught to a generation of pupils, such perspectives will become infused into local worldviews.

Values

Values are also an integral part of ESD. In some cultures, values are taught overtly in the schools. In other cultures, however, even if values are not taught overtly, they are modeled, explained, analyzed, or discussed. In both situations, understanding values is an essential part of understanding your own worldview and other people's viewpoints. Understanding your own values, the values of the society you live in, and the values of others around the world is a central part of educating for a sustainable future. Two common

techniques - values clarification and values analysis - are useful to the values component of ESD.

In ESD, values have different roles in the curriculum. In some ESD efforts, pupils adopt certain values as a direct result of instruction or modeling of accepted values. In other cultures, studying the relationship between society and the environment leads pupils to adopt values derived from their studies. In cultures where inquisitiveness is encouraged, pupils come to value curiosity and questioning. In democratic societies, pupils also develop shared values around concepts of democratic process, community participation in decision making, volunteerism, and social justice. Each of these approaches contributes to the overall goal of sustainability.

World Citizenship: A Global Ethic for Sustainable Development

In some countries, the religious values and ethics of the dominant religion are taught in schools; in other countries they are not. The Bahá'í International Community has articulated a statement of ethics, which follows, that supports sustainability.

"The greatest challenge facing the world community as it mobilizes to implement Agenda 21 is to release the enormous financial, technical, human and moral resources required for sustainable development. These resources will be freed up only as the peoples of the world develop a profound sense of responsibility for the fate of the planet and for the well-being of the entire human family.

"This sense of responsibility can only emerge from the acceptance of the oneness of humanity and will only be sustainable by a unifying vision of a peaceful, prosperous world society. Without such a global ethic, people will be unable to become active, constructive participants in the world-wide process of sustainable development."

"[W]orld Citizenship... encompasses the constellation of principles, values, attitudes and behavior that the people of the world must embrace if sustainable development is to be realized.

"World Citizenship... encourages a sane and legitimate patriotism, it also insists upon a wider loyalty, a love of humanity as a whole. It does not, however, imply abandonment of legitimate loyalties, the suppression of cultural diversity, the abolition of national autonomy, nor the imposition of uniformity. Its hallmark is 'unity in diversity.' World citizenship encompasses the principles of social and economic justice both within and between nations; non-adversarial decision making at all levels of society; equality of the sexes; racial, ethnic, national and religious harmony; and the willingness to sacrifice for the common good. Other facets of world citizenship - all of which promote human honor and dignity, understanding, amity, cooperation, trustworthiness, compassion and a desire to serve - can be deduced from those already mentioned."

"So long as disunity, antagonism and provincialism characterize the social political and economic relations within and among nations, a global, sustainable pattern of development can not be established."

Social justice is another realm of study that involves values. Social justice, which is considered a central part of ESD in most countries, includes meeting basic human needs and concern for the rights, dignity, and welfare of all people. It includes respect for the traditions and religions of other societies and cultures, and it fosters empathy for the life conditions of other peoples. Ecological sustainability and resource conservation are considered part of social justice. Preserving and conserving the resource base of others prevents people from living in disadvantaged circumstances. Social justice concerns related to preservation of resources (e.g., fossil fuels, old-growth forests, and species diversity) extends to future generations; this is called intergenerational equity.

Values taught in school need to reflect the larger values of the society that surrounds the school. Where appropriate, the opinions of community members can be solicited. Then, a full range of values influenced by local traditions, aboriginal groups, ethnic populations, immigrants, religions, media, and pop culture will be revealed, inventoried, and considered for relation to and inclusion in ESD. In addition, curriculum decision-makers will decide if new values, which will help communities reach their goals of sustainability, need to be included in the curriculum.

The Earth Charter

The Earth Charter is a synthesis of values, principles, and aspirations that are shared by a growing number of women, men, and organizations around the world. Drafting the Earth Charter was part of the unfinished business of the Earth Summit. The Earth Charter was written with extensive international consultations conducted over many years. Currently, the Earth Charter is being disseminated to individuals and organizations in all sectors of society throughout the world and it says in part:

"We urgently need a shared vision of basic values to provide an ethical foundation for the emerging world community. Therefore, together in hope we affirm the following interdependent principles for a sustainable way of life as a common standard by which the conduct of all individuals, organizations, businesses, governments, and transnational institutions is to be guided and assessed."

I. Respect and care for the community of life

1. Respect Earth and life in all its diversity.
2. Care for the community of life with understanding, compassion, and love.
3. Build democratic societies that are just, participatory, sustainable, and peaceable.
4. Secure Earth's bounty and beauty for present and future generations.

II. Ecological Integrity

5. Protect and restore the integrity of Earth's ecological systems, with special concern for biological diversity and the natural processes that sustain life.
6. Prevent harm as the best method of environmental protection and, when knowledge is limited, apply a precautionary approach.
7. Adopt patterns of production, consumption, and reproduction that safeguard Earth's regenerative capacities, human rights, and community well-being.
8. Advance the study of ecological sustainability and promote the open exchange and wide application of the knowledge acquired.

III. Social and Economic Justice

9. Eradicate poverty as an ethical, social, and environmental imperative.
10. Ensure that economic activities and institutions at all levels promote human development in an equitable and sustainable manner.
11. Affirm gender equality and equity as prerequisites to sustainable development and ensure universal access to education, health care, and economic opportunity.
12. Uphold the right of all, without discrimination, to a natural and social environment supportive of human dignity, bodily health, and spiritual well-being, with special attention to the rights of indigenous peoples and minorities.

IV. Democracy, Nonviolence, and Peace

13. Strengthen democratic institutions at all levels, and provide transparency and accountability in governance, inclusive participation in decision making, and access to justice.
14. Integrate into formal education and life-long learning the knowledge, values, and skills needed for a sustainable way of life.
15. Treat all living beings with respect and consideration.
16. Promote a culture of tolerance, nonviolence, and peace.

IV. PROCESS FOR LOCALIZING THE GLOBAL INITIATIVE

While many delegates at the UN Commission on Sustainable Development (CSD) meeting in 1998 enthusiastically agreed that ESD was essential for achieving sustainable development, they were stymied about how to implement it. Progressing from the global concepts of ESD to locally relevant curriculum is a difficult process. Many decisions, assumptions about the future, and examinations of local cultures have to be made. Creating ESD curriculums will require knowledge of the present and foretelling of the future. Although the resulting ESD programs may be well- or poorly targeted, the consequences of doing nothing are unacceptably high. Therefore, even if it is not precisely targeted, creating an ESD program is imperative.

To create an ESD curriculum, educational communities will need to identify knowledge, issues, perspectives, skills, and values central to sustainable development in each of the three components - environment, economy, and society. Figure 1 is an example of what one community may select. However, many possible combinations of knowledge, issues, skills, perspectives, and values for ESD curriculums exist. The program should be tailored to fit community situations and needs.

Figure 1.

	Environment	Economy	Society
Knowledge*	hydrologic cycle	supply and demand	conflict
Issues	protecting and managing freshwater; managing hazardous wastes	combating poverty	changing consumption patterns
Skills	the ability to acquire, manage, and analyze data	the ability to identify components of full-cost accounting	the ability to think critically about value issues
Perspectives	linkage/interrelationship between/among contemporary global environmental issues	look beyond local and national boundaries	universal attributes of being human
Values	ecological value of undisturbed land	value of a sustainable livelihood	economic value, religious value, and societal value compete

* The integration of knowledge in the three sectors is important to show human-environmental interactions and impacts.

Strengths Model

The cost of reorienting education to address sustainability is so great that nations cannot afford to rely on a remediation model to retrain the world's 59,000,000 teachers. Rather than primarily retraining inservice teachers to teach sustainability, we need to design new approaches to pre-service and inservice teacher education to address

sustainability. One such innovative approach is the “strengths model.” In this approach, every discipline and every teacher can contribute to sustainability education.

Many topics inherent in ESD are already part of the formal education curriculum, but these topics are not identified or seen to contribute to the larger concept of sustainability. Identifying and recognizing components of ESD is key to moving forward. Fortunately this step is easy and affordable.

To implement the strengths model, begin by ensuring that educators and administrators understand the concept of sustainability and are familiar with its principles. Once they understand the concept of sustainability, educators from each discipline can examine the curriculum and school activities for existing contributions to ESD. Next, educators can identify potential areas of the existing curriculum in which to insert examples that illustrate sustainability or additional knowledge, issues, perspective, skills or values related to sustainability.

After identifying existing and potential contributions, leaders can create awareness among the educational community of these contributions to the larger ESD picture. Then, these contributions can be woven together to create ESD programs that are taught overtly to pupils and students. In this approach, the synergistic strengths of combined educational disciplines can convey the knowledge, issues, skills, perceptions, and values associated with ESD.

No one discipline can or should claim ownership of ESD. In fact, ESD poses such broad and encompassing challenges that it requires contributions from many disciplines. For example, consider these disciplinary contributions to ESD:

- Mathematics helps students understand extremely small numbers (e.g., parts per hundred, thousand, or million), which allows them to interpret pollution data.
- Language Arts, especially media literacy, creates knowledgeable consumers who can analyze the messages of corporate advertisers and see beyond "green wash."
- History teaches the concept of global change, while helping students to recognize that change has occurred for centuries.
- Reading develops the ability to distinguish between fact and opinion and helps students become critical readers of political campaign literature.
- Social Studies helps students to understand ethnocentrism, racism, and gender inequity as well as to recognize how these are expressed in the surrounding community and nations worldwide.

Each discipline also has associated pedagogical techniques. The combined pedagogical techniques and strategies of each discipline contribute to an expanded vision

of how to teach for creativity, critical thinking, and a desire for life-long learning - all mental habits that support sustainable societies.

The contributions of the environmental education and science education communities to the environmental strand of ESD have been well-documented in the literature; however, equal attention has not been focused on the social and economic strands. Yet, the efforts of schools to create more just, peaceable, and equitable societies suggest that the social strand appears to be well-developed in many countries. In fact, schools that have programs in multicultural education, anti-racist education, gender equity, anti-bullying, and peace education contribute substantially to the social strand of ESD.

Use of this strengths model requires that a cadre of educators and administrators, who are sufficiently well-versed in the transdisciplinary concepts inherent in ESD, pull together the disciplinary and pedagogical pieces to form a comprehensive ESD program. The integration process will prevent omissions and duplication. In order to create a generation of educators and administrators who understand the strengths model, it must be employed by institutions of teacher education and overtly taught to pre-service professionals.

ESD, an Evolving Concept

In reorienting education to address sustainability, it is important for educators not to lock the definition, content, scope, and methodology of ESD into a static time frame. The temptation exists to use *Agenda 21* to define ESD curriculums; however, the global discussion and understanding of sustainability has grown greatly since the 1992 Earth Summit. Educational efforts must reflect this broader understanding and its evolving nature.

While *Agenda 21* clearly identifies critical issues that governments around the world need to address, the concept of sustainability continues to evolve as societies change and as our awareness and perceptions of Earth, humanity, and human-environmental interactions correspondingly change. Subtle changes, such as a shift in focus or emphasis, will of course be regional in nature and reflect the conditions of local ecosystems and cultures. As a result of the maturing nature of sustainability issues, those educating for sustainability should continually adapt the content, scope, and methodology within geographic and temporal contexts. This constant adaptation will require flexibility on the part of educators as they work together on local and international projects. Definitions and practices that are admirably effective in one part of the world can be ineffective or inappropriate in another.

V. CHALLENGES AND BARRIERS TO ESD

While many nations around the world have embraced the need for education to achieve sustainability, only limited progress has been made on any level. This lack of progress stems from many sources. In some cases, a lack of vision or awareness has impeded progress. In others, it is a lack of policy or funding. According to Charles Hopkins, who has spoken with people at many levels of involvement in education (i.e., ministers of education, university professors, K - 12 teachers, and students), twelve major issues stymied the advance of ESD during the 1990s and new millennium. By addressing these critical impediments in the planning stage, governments can prevent or reduce delays or derailment of ESD efforts and, ultimately, the attainment of sustainability. In addition to these generic issues, governments at all levels will need to address issues that are specific to local conditions (e.g., the quality of the relationship between the school governors and the teacher union).

Issue 1 - Increasing Awareness: ESD is Essential

The initial step in launching an ESD program is to develop awareness within the educational community and the public that reorienting education to achieve sustainability is essential. If government officials or school district administrators are unaware of the critical linkages between education and sustainable development, reorienting education to address sustainable development will not occur. When people realize that education can improve the likelihood of implementing national policies, regional land and resource management programs, and local programs, then education is in a position to be reoriented to help achieve sustainability. This awareness forms the essential first step in the reorienting process.

Fortunately, at the international level, ESD is recognized as important and central to the success of sustainable development around the world. At the sixth meeting of the UN Commission on Sustainable Development, delegations from countries worldwide repeatedly mentioned the importance of ESD in achieving goals of sustainability. It was apparent that they were ready to move forward with the next steps; however, the importance of ESD must reach beyond the delegations and permeate the educational community and the general public.

Inherent in building awareness are efforts to outline important linkages between education and more sustainable societies (e.g., increases in female literacy reduces birthrates and improves family quality of life).

In large part, perceiving a need brings about a corresponding change in educational systems. Unfortunately, the need to achieve sustainable development is not perceived today as sufficiently important to spark a large response in the educational community. If

leaders at all levels of governance are to make progress, the recognition and active involvement of the education sector is imperative.

Response to an Educational Crisis

The "space race" brought about massive reform in science and mathematics education in the late 1950s and 1960s in the United States. The federal government was determined to create the scientific and engineering work force necessary to create a successful space exploration program. The National Science Foundation, professional organizations, and textbook publishers invested millions of dollars into rewriting curriculums, developing and publishing new textbooks, training teachers, and equipping school laboratories. The reform accomplished its goal in improving science and mathematics instruction and producing scientists and engineers to support the space program and a technical society.

Issue 2 - Structuring and Placing ESD in the Curriculum

Each country faces a fundamental decision in addressing an ESD strategy. Each country must decide on a method of implementation—whether to create another "add on" subject, (e.g., Sustainable Development, Environmental Education, or Population Education) or to reorient entire education programs and practices to address sustainable development. Nations also need to clarify whether their educators are being asked to teach *about* sustainable development or to change the goals and methods of education to *achieve* sustainable development. The answer to this question will profoundly affect each nation's course of action.

In reality, education related to sustainable development will be implemented in a wide range, in both depth and breadth. In some communities, ESD will be ignored; in others it will be barely addressed. In some, a new class dedicated to ESD will be created, and in others the entire curriculum will be reoriented to address sustainability. Communities must be aware of the limitations of educating about sustainable development. Teaching *about* sustainable development is like teaching the theory behind an abstract concept or teaching the principles of sustainability by rote memorization. ESD in its real and effective forms gives students the skills, perspectives, values, and knowledge to live sustainably in their communities. At the same time, true education is not indoctrination or inculcation.

Experimentation will determine what level of ESD will be appropriate and successful for communities to meet their sustainability goals. For example, a community may weave a few themes of sustainability into the curriculum, only to find the additions will not achieve sustainability for their community. In cases where schools carry total responsibility for ESD, complete curricular reorientation of education at all levels will probably be necessary. In communities where informal, nonformal, and formal education unite to create an integrated ESD program for citizens of all ages, a less intense approach in the formal education system might be effective. As programs are developed and implemented, problems will occur. Flaws and questionable practices will need to be addressed as ESD continues to develop and mature.

Issue 3 - Linking to Existing Issues: Educational Reform and Economic Viability

The effectiveness of the world's educational systems is already critically debated in light of the changing needs of society. The current widespread acknowledgment of the need for educational reform may help advance ESD. If it can be linked to one or more priorities of educational reform, ESD could have a good chance for success. However, if promoters try to add another issue to an already over-burdened system, the chances of success are slim**.**

One current global concern that has the potential to drive educational reform in many countries is economic security. Around the world, ministries of education and commerce are asking: What changes will prepare a workforce that will make my country economically viable in the changing economy of the new millennium?

One educational effort that can boost the economic potential of entire nations is educating females. During the last decade, some national leaders have recognized that educating the entire workforce, both males and females, is important for economic viability. In addition, Lawrence Summer of the World Bank says,"Once all the benefits are recognized, investments in the education of girls may well be the highest-return investment available in the developing world" (King and Hill, 1993, p vii). Accordingly, some nations are removing barriers to girls attending school and have campaigns to actively enroll girls in school.

Further, aligning education with future economic conditions is difficult, because economic and technological forecasting is an art based on imprecise science. Answers are elusive.

To be successful, ESD will need to catch the wave of educational reform. ESD proponents need to identify and illustrate the linkages between the principles of sustainability and the long-term economic well-being of each nation. If ESD can be linked to the current global educational reform movement, educating for sustainability will be swept along with the energy of the reform effort. If, however, the wave is missed, proponents of ESD will be looking for a foothold in the curriculum and trying to convince teachers to wedge sustainability principles, knowledge, issues, skills, values, and perspectives wherever possible. Linking to the reform movement can guarantee ESD to every child in school, while inserting ESD into the curriculum will be left to the whim of individual teachers. In the case of the latter, ESD will be characterized by huge gaps or possible redundancies.

The International Commission on Education for the Twenty-First Century, which was chaired by Jacques Delors, released its report, *LEARNING: The Treasure Within*, to UNESCO. The report strongly recommends that all reform be conducted in the spirit and essence of sustainable development and calls for the full-fledged pursuit of reorienting

education to attain sustainability. Accordingly, ESD and goals for sustainability have a legitimate place in whatever changes emerge from national or regional educational reform efforts.

Issue 4 - Facing the Complexity of Sustainable Development Concept

Sustainable development is a complex and evolving concept. Many scholars and practitioners have invested years in trying to define sustainable development and envisioning how to achieve it on national and local levels. Because sustainable development is hard to define and implement, it is also difficult to teach. Even more challenging is the task of totally reorienting an entire education system to achieve sustainability.

When we examine successful national education campaigns, we find they often have simple messages. For example, messages that encourage us to vaccinate our children and boil our water, or discourage us from driving drunk and taking drugs, are simple concepts compared to the complex range of environmental, economic, and social issues that sustainable development encompasses. Success in ESD will take much longer and be more costly than single-message public-education campaigns.

National Education Campaigns

When we examine successful national education campaigns, we find they often have simple messages. For example, AIDS education focuses on prevention. The message is, "people can prevent the spread of the HIV virus by taking certain precautions." To convey this message, national governments, nonprofit organizations, and schools spend millions of dollars. The AIDS prevention message is extremely simple. Nevertheless, AIDS is on the rise in many countries, not because the education programs are ineffective, but because the problem is complex.

Rather than being clear, simple, and unambiguous, the concepts involved in ESD are complex. Their complexity stems from the intricate and complicated interactions of natural and human systems. The challenge to educators is to derive messages that illustrate such complexity, without overwhelming or confusing the learner.

Issue 5 - Developing an ESD Program with Community Participation

Perhaps the greatest obstacle to reorienting the world's educational systems is the lack of clarity regarding goals. In simple terms, those who will be called upon to educate differently (e.g., the world's 59,000,000 teachers or agricultural instructors or water-treatment trainers) eventually will ask, "What am I to do differently?" "What should I do or say now that I didn't say before?" These simple questions leave most "experts" in a quandary and the questioner without an adequate response.

Education for sustainable development remains an enigma to many governments and schools. Governments, ministries of education, school districts, and educators have

expressed a willingness to adopt ESD programs; however, no successful working models currently exist. Without models to adapt and adopt, governments and schools must create a process to define what education for sustainability is with respect to the local context. Such a process is challenging. It calls for a public participation process in which all of the stakeholders in a community carefully examine what they want their children to know, do, and value when they leave the formal education system. This means that the community must try to predict the environmental, economic, and social conditions of the near and distant future.

Public participation processes whereby stakeholders examine the needs and desires of a community and identify essential elements of basic and secondary education can be adapted and implemented in many types of communities. Seeking the opinions of parents and workers to shape the education of their children will be a totally new idea in some cultures. Although community consultation and other forms of public participation can be effective tools, they should be introduced slowly and in accordance with local traditions and cultures where they have not been used previously. However valuable, the community consultation process is not without pitfalls. For example, an organized, educated, and articulate few might dominate the process; people who have received little formal education may not feel they have the expertise to take part in or contribute to the process; and the worldviews and life experiences of some people might prevent them from perceiving or accommodating the changes that will come to all regions of the planet in the coming decades. In these cases, how the outcome of the process is used becomes important. A continuum of implementation exists, ranging from ruthlessly implementing the results of a skewed process to totally ignoring the outcomes of the process. The interpretative, political, and interpersonal skills of the implementation team are key in this effort.

ESD carries with it the inherent idea of implementing programs that are locally relevant and culturally appropriate. Just as any sustainable development program must take into consideration the local environmental, economic, and societal conditions, so too must ESD programs consider these same conditions. As a result, each region must create its own ESD program. It is impossible to create an international, or even in many cases a national, curriculum that would be relevant to all communities.

It should be apparent to ministries of education and school districts that developing locally relevant ESD curriculums will be facilitated by creating public participation processes that allow communities to shape the major ideas underpinning their own curriculums. Rather than spending time searching for curricular models to adapt, it would be better to invest time and resources in developing processes by which communities of different sizes and traditions can define their own ESD programs.

Issue 6 - Engaging Traditional Disciplines in a Transdisciplinary Framework

ESD by nature is holistic and interdisciplinary and depends on concepts and analytical tools from a variety of disciplines. As a result, ESD is difficult to teach in traditional school settings where studies are divided and taught in a disciplinary framework. In countries where national curriculums describe in detail the content and sequence of study in each discipline, ESD will be challenging to implement. In other countries where content is described generally, ESD will be more easily implemented, although doing so will require creative teachers who are comfortable and skilled at teaching across disciplines.

Issue 7 - Sharing the Responsibility

Popular thinking promotes the myth that an informed society is solely the responsibility of the ministry of education. In reality, however, the ministries of environment, commerce, state, and health also have a stake in ESD, just as they have a stake in sustainable development. By combining expertise, resources, and funding from many ministries, the possibility of building a high-quality, successful education program increases.

Every sector of the government that is touched by sustainable development (i.e., every ministry and department) can play a role in ESD and the reorienting process. At the UN meeting of the Commission on Sustainable Development, ministries of the environment have taken the lead in stating that education, awareness, and training are essential tools in bringing about sustainable development. Ministries of the environment need to work with both formal and nonformal sectors of the education community to implement ESD. In addition, it is absolutely essential for teachers to be involved in the process of building consensus concerning ESD.

Issue 8 - Building Human Capacity

The successful implementation of a new educational trend will require responsible, accountable leadership and expertise in both systemic educational change and sustainable development. We must develop realistic strategies to quickly create knowledgeable and capable leadership. It is unrealistic to expect nations to retrain 59,000,000 teachers and thousands of administrators in either - or both - ESD and educational change. We must find ways, such as employing the strengths model, to use existing skills.

Two models of human resource development currently exist - inservice training and pre-service training. In the first, experienced professionals are provided with additional training. Then, they reshape existing programs by drawing on their new knowledge, previous expertise, understanding of national and local systems, and network of contacts. In pre-service training, concepts, principles, and methodologies are provided during initial training. The new professionals then step into their jobs with ESD as part of their expertise. Pre-service training is more cost effective than retraining educators and administrators later in their careers. For initial success in ESD, both inservice and pre-service training are necessary.

Many resources currently exist in the educational and administrative labor pools. Talented educators, especially in the fields of environment, population, and development, already teach strands of ESD and could easily expand their focus to include other concepts of sustainable development. Fortunately, every educator in every discipline has some existing strength to contribute to ESD via the strengths model. In this approach, the synergistic strengths of combined educational disciplines can convey the knowledge, issues, skills, perceptions, and values associated with ESD. However, use of this strengths model requires that someone be sufficiently well-versed in ESD to pull together the pieces and to form a complete picture of the role that individuals, communities, and nations must play in a sustainable world.

The following quote from Gro Harlem Brundtland emphasizes the importance of teachers in the ESD reorientation process.

> But first and foremost our message [sustainable development] is directed towards people, whose well-being is the ultimate goal of all environment and development policies. In particular, the Commission is addressing the young. The world's teachers will have a central role to play in bringing this to them.
>
> Foreword, *Our Common Future*, 1987.

While the effort can begin with the current teaching professionals around the globe, it is clear that teacher education institutions need to reorient pre-service teacher education to include ESD. Teacher education programs need to produce professionals who not only teach sustainability themes but also can "pull together" the various disciplinary strands that will give their students a holistic understanding of a sustainable future and the role of individuals, communities, and nations in a sustainable world. The development of this cadre of expertise will profoundly affect how rapidly nations will begin the move toward sustainability.

Institutions of teacher education are ideally situated to play central roles in educational reform, and teacher educators are the key change agents. Teacher educators train new teachers, provide professional development for practicing teachers, consult with local schools, and provide expert opinion to regional and national ministries of education. Teacher educators write not only pre-service teacher-education curriculum, but also contribute to committees that create teacher-education standards and officially mandated curriculum for primary and secondary education. Because of this broad influence in curriculum design, implementation, and policy setting, faculty members of teacher-education institutions can bring about far-reaching educational reform - even beyond training the teachers in the world. The question is, who will work with the teacher educators to develop their expertise?

To support global implementation of ESD, we need international cooperative programs for administrators, curriculum developers, teacher educators, and lead teachers. These programs should maximize and leverage the knowledge base and strengths already existing in the labor pool.

Model Inservice Program

Fortunately, excellent models of international cooperation exist for training professionals in new areas of expertise. One excellent program in Southeast Asia trains teacher educators to address ESD. It is called the Learning for a Sustainable Environment: Innovations in Teacher Education (LSE:ITE) project. Teacher educators from 29 countries are working with the UNESCO Asia-Pacific Centre of Educational Innovation for Development in Bangkok, Thailand, and Griffith University of Brisbane, Australia. The LSE:ITE project has two goals: First, it seeks to develop a model for providing effective professional development in the knowledge, skills, and values of environmental/sustainable development education for teacher educators throughout the Asia-Pacific region. Second, it seeks to provide carefully pilot-tested and culturally sensitive workshop materials that could be used as the basis for professional and curriculum development activities by teacher educators in Southeast Asia and in other parts of the world.

The LSE:ITE project created and supported an international network of volunteer teacher educators from throughout the region. Through the project, participants developed 10 workshop modules for teacher education. The volunteer participants engaged in an international process of creating materials, experimenting with innovative methodologies, sharing with colleagues, adapting materials for different cultural settings, evaluating, pilot testing, and refining the materials. For example, a teacher educator who wrote a module in her area of expertise was able to have it reviewed by members of a network of 70 colleagues in 20 countries. These colleagues reviewed the module and suggested adaptations and comments from their own societal perspectives. Next, the module was refined and sent to a larger network audience in nine additional countries, where it was reviewed, adapted for additional cultural settings, and field tested in this wider international context. Comments and results from the field testing were used to further refine the module and to assure its utility in many countries. The modules and accompanying case studies were published and disseminated through a central clearing house and will soon appear on the Internet. The modules are currently used in both pre-service and inservice teacher education programs throughout the Asia-Pacific region and have served as the framework for national training workshops for teacher educators in several countries.

Issue 9 - Developing Financial and Material Resources

Perhaps one of the greatest expenses of implementing ESD will come with providing appropriate basic education. Basic goals, which were established at Jontiem and reaffirmed at Dakar, include educating more children and increasing the universal average minimum of schooling to six years. Meeting these goals will require hiring many more teachers. These new teachers must be trained, and current teachers must be retrained, to reorient their curriculums to address sustainability.

The good news is that many countries are spending a larger percentage of their gross national product (GNP) on education. Two-thirds of the 123 countries listed in the UNESCO World Education Report 2000 that reported public expenditures on education as a percentage of GNP in both 1990 and 1996, reported spending more in 1996 than in 1990. Although governments are prioritizing education in terms of funding, how much of this funding is going to reorient education to address sustainability? As we pointed out in the "Education: Promise and Paradox" section, simply providing more education does not reduce the threat high resource consumption poses to sustainability.

One of the reasons why many experts perceive that little progress has been made regarding ESD since the Earth Summit in 1992 is that few financial resources have been dedicated to reorienting education to address sustainability. In fact, national and local governments have spent little on ESD beyond improving basic education. Yet, effective ESD will depend on funding at both national and local levels. At the national level, financial resources must fund curriculum, administration, and teacher education. At the local level, resources must finance curriculum development and accompanying materials, as well as teacher training.

Reorienting education to address sustainability will require new financial resources. One of the major problems with ESD is that current education must continue while the new curriculum is being designed and developed. The reality is that educators are so busy with the task at hand - planning, daily teaching, evaluating progress, writing reports - that they have little time or energy to research and create new curriculum. Teachers cannot be expected to do two jobs - design curriculum and teach - during the transition phase. Of course, current teachers should play an advisory role, but core design tasks should not fall exclusively on their already burdened shoulders. New funding and resources need to be provided during the start-up phase; governments cannot expect local administrations and educators to donate in-kind services to accomplish this important task.

Locally relevant and culturally appropriate curriculums and other educational materials often vary intra-nationally. For example, Chile extends several thousand kilometers from north to south. In the Atacama Desert of the north, environmental concerns involve the ocean and marine life; in the humid-temperate south, concerns involve the forests. As a result of these great distances and geographic diversity, a series of regional curriculums based around a common model would be more appropriate than one national curriculum. This same intra-national diversity (i.e., ecological, economic, and societal diversity) exists in many nations. Accordingly, regional and local curriculum could benefit many nations with internal diversity.

In addition, many countries are evaluating new educational technologies (e.g., distance learning, computers, Internet, TV) and strategies to implement them. ESD is already woven into many of these technologies. For example, many free sources of environmental data are available on the World Wide Web as are other teaching resources such as lesson plans. Governments and school districts investing in these technologies will offset expenditures with access to free ESD information and materials**.**

Funding for new educational programs

ESD is a cross-curricular effort. Historically, other cross-curricular efforts (e.g., educational technology) have been expensive. Bringing computers and the Internet into classrooms has required substantial investments by national, state, and local governments. For example, in the 1980s, Tennessee

Governor Lamar Alexander decided that every classroom in the state should have a computer. He knew that in many rural areas communities would resist spending large amounts of money on educational technology; in some areas of poverty, the schools could afford neither the hardware nor the software. Rather than waiting for individual districts to prioritize and fund technology, the state government paid for a computer for each classroom. In the 1990s, Tennessee also paid for an Internet connection for each school, because the state realized the importance of all students learning to access, manage, and use information from the World Wide Web.

Issue 10 - Developing Policy

To succeed, ESD must have an authoritative impetus from national or regional governments that will drive policy development. The omission of such an impetus proved to be the downfall of the 1970s global effort to infuse environmental education into the elementary and secondary curriculums. This same fate could befall the ESD effort. The reality of any educational reform is that success depends on both "top down" and "bottom up" efforts. Administrators at the top echelons of ministries are in a position to create the policies that will make reform occur. Together, administrators, teachers, and community leaders at the local level must interpret what the policy should "look like" locally.

Issue 11 - Developing a Creative, Innovative, and Risk-Taking Climate

In order to bring about the major changes required by ESD, we need to nurture a climate of safety. Policymakers, administrators, and teachers will need to make changes, experiment, and take risks to accomplish new educational and sustainability goals. They need to have the authority and support of the educational community to change the status quo. Teachers must feel that the administration will support their efforts if parents or vested interest groups in the community question or criticize their initiatives. We need to develop and implement policy to ensure administrators and educators at all levels have the right to introduce new or controversial topics and pedagogical methods. Of course, an over-zealous few could abuse these rights; therefore, a system of checks and balances within professional guidelines and cultural context should also be in place.

Issue 12 - Promoting Sustainability in Popular Culture

Perhaps the most difficult obstacle to address in implementing ESD is that of popularity. While many countries agreed that ESD is important, the themes of sustainability are not prevalent in popular cultures or governmental policies. For example, one principle of sustainable development is that the rates of use of renewable resources should not exceed their rates of regeneration. Yet, many societies have developed or are developing a "disposable culture." Disposable beverage containers, food wrappers, plates, and eating utensils pass through our lives daily. We use them once and then discard them to be buried, burned, or dumped in the water. This disposable culture is using such resources as trees and fossil fuels more rapidly than they can be replaced.

Because principles of sustainable development are not currently woven into daily life and governmental policy, the emergence of ESD could become an important "bottom-up" driver of community-based sustainable development. ESD could shape and encourage behaviors and ethics that support an informed, knowledgeable citizenry that has the political will to achieve a sustainable future.

Summary Remark about the 12 Issues

In summary, to successfully implement ESD, governments and school districts must plan ahead and develop strategies to address the 12 issues mentioned above. These issues should be addressed at every level, especially the national level, to ensure consistent implementation of ESD across the country. Purposeful deliberation and planning around these issues as well as issues particular to each region will increase the likelihood of successfully implementing ESD programs and reorienting curriculum to achieve sustainability.

VI. DOVETAILING ESD WITH COMMUNITY SUSTAINABILITY GOALS

The *Toolkit* is based on the idea that communities and educational systems within communities need to dovetail their sustainability efforts. As we created the *ESD Toolkit*, we knew that if sustainability were to be successful in a community, the education community would have to support the effort. As communities develop sustainability goals, the local educational systems can create programs or modify existing curriculums to reinforce those goals.

History of natural resource conservation management has shown us the efficacy of education programs. For example, when dams were built in the Tennessee Valley, farming practices were such that erosion and the accompanying deposition of sediment in waterways would eventually fill the reservoirs behind the dams and limit their lifetime and usefulness. Extensive agriculture education through the extension service and reforestation efforts significantly reduced erosion and extended the life of the dams. The same efficacy is pointed out in public health success stories in vaccination programs and the prevention of the spread of disease. These successes prove the point of using education to achieve sustainability goals.

As we wrote exercises to reorient the curriculum to address sustainability, we found ourselves repeatedly thinking that we needed to have a list of the community's sustainability goals to use in the activities. When we searched for community sustainability goals, it became apparent that many communities do not have sustainability goals or action plans on which to base educational change. Without such a list, the newly reoriented curriculum

would support only general principles of sustainability; therefore, the resulting curriculum would not be as satisfactory as a curriculum that supports local community sustainability efforts. To successfully design, reorient, or implement an ESD program, communities must create sustainability goals.

VII. CASE STUDY: TORONTO BOARD OF EDUCATION CURRICULUM REVISION AND REORIENTATION

by Charles A. Hopkins

In 1993, the Canadian Province of Ontario mandated that local school boards create outcomes-based curriculum. The first phase was to create a new curriculum for students from Junior Kindergarten (4 year olds) to Grade 9 (15 year olds). The provincial government gave broad guidelines; however, each community was to develop locally relevant curriculum to achieve provincial goals. The mandate was to consult with the community, build a new vision of an appropriate education for the twenty-first century, review the existing program, and then discard, reorient, or build anew. Sweeping changes were in order.

Knowing that a massive rewriting of the curriculum was necessary, the administration of the Toronto Board of Education undertook a large-scale community consultation. In preparation for the community consultation, the central office trained 200 people to lead focus groups. Any teacher could volunteer to become a focus group leader. The prospective leaders worked with staff developing the facilitation techniques and processes for use in the consultation. Notices went out to the three major newspapers and the more than 70 ethnic newspapers of Toronto. Efforts were made to contact the corporate sector, and speakers from the corporate world were invited to specifically address community groups during the consultations. All the schools announced the consultation process to their parents and most schools ran their own community-based meetings.

In addition, three consultation sessions were held across the city. Participants were requested to stay for the entire day, rather than making a statement and then leaving. The focus of the daylong inquiry was the simple question:

"What should students know, do, and value by the time they graduate from school?"

This straightforward question was posed to all sectors of Toronto society from corporate leaders to the students themselves.

To start the three daylong sessions, four keynote speakers representing Toronto's large business, arts, small and self-employed business, and labor sectors gave their answer to the question and the rationale for their perspective. These four keynote speakers were

different for each of the three citywide sessions, and the 12 presentations were video recorded and sent to each school for use in the local community-based discussions. The comments were insightful for parents because many stereotypes of these sectors' requirements were identified as no longer relevant. For example, the representative of large businesses claimed that a focus solely upon math, science, and technology was not the answer for Canadian industry. He pointed out that due to the lack of investment capital in Canada, any successful business would eventually be purchased by a foreign firm and moved out of the country. He stated that for ongoing Canadian success, math, science, and technology should be taught in conjunction with the arts to stimulate the creativity that would be necessary to recover from the loss of industry. The representative of labor surmised that the world of work for many people in the twenty-first century would be one of part-time employment in mundane service-sector roles. He spoke of the need for broad-based learning that involved lifelong learning. Labor's vision included the arts, parenting, and social skills that embraced a world beyond employment.

After nearly six months of consultation, more than 7,000 parents, students, staff, and members of the public had contributed to focus groups, school meetings, and public forums aimed at exploring how education should respond to the demands of a changing world. In addition, many other citizens submitted their thoughts in writing. The enormous number of comments generated by the consultation were recorded, entered into a computer, and analyzed by the research department of the Toronto Board of Education.

To answer the question - What should students know, do, and value by the time they graduate from school? - the Board had looked to the past to revisit the fundamental and recurrent questions people have always asked about life and education in general, and individual subjects in particular. They considered the challenges and opportunities of the world in which their children would grow and live: a world with not only great potential for advances in quality of life, knowledge, mutual respect, and peaceful cooperation, but also a world overwhelmed by technological and social change; beset by conflicts, injustice, and inequities; and faced with dwindling and threatened natural resources.

Analysis of the participants' comments revealed six overarching graduation requirements. These requirements were then translated into curriculum. In spite of the gravity of the issues facing them, the education that parents and the community wanted for their children was in many respects hardly revolutionary or even surprising. The six graduation outcomes specified were: literacy; aesthetic appreciation and creativity; communication and collaboration; information management; responsible citizenship; and personal life skills, values and actions. These differ from most traditional curricular objectives crafted solely by professional academics in that they are broader and more closely related to the needs and organization of life than to the requirements and structures of schooling. They were truly the vision of the community - Toronto is recognized by the

United Nations as the most culturally diverse community in the world.

Although the notion of “sustainability” was not imposed, it emerged as an essential value and perspective during the course of the consultation. When you look at the following one- or two-sentence descriptors of the six graduation outcomes, you see the essence of sustainability reflected in the wishes of the community at large as well as the parents, students, and educators.

Literacy
Our students will acquire knowledge and skills in all areas of the curriculum including skills in questioning, investigating, critical thinking, problem-solving, and decision-making. They will be able to apply what they have learned to further studies, work, leisure, daily living and a lifetime of learning.

Aesthetic Appreciation and Creativity
Our students will be sensitive to the aesthetic dimension of the natural and human world, develop flexible, imaginative ways of thinking, and participate in creative activity and expression.

Communication and Collaboration
Our students will express themselves clearly, listen to others responsively, and communicate effectively using a variety of technologies. They will work cooperatively with others to achieve mutual understanding of common goals.

Information Management
Our students will be able to find meaning in our world’s vast information resources. They will identify needs, conduct research and seek solutions using a variety of sources, strategies and technologies. They will evaluate and apply their findings to make sound decisions and to take responsible actions.

Responsible Citizenship
Our students will value the diversity of the world’s people, cultures, and ecosystems. They will understand and actively promote equity, justice, peace, the democratic process, and the protection of the environment in their own community, Canada, and the world.

Personal Life Skills, Values and Actions
Our students will care about the physical, emotional and spiritual health of themselves and others. They will pursue healthy, hopeful, purposeful lives and meaningful relationships. They will possess basic skills and good work habits, deal effectively with stress and change, and make wise choices for a sustainable future (both personal and global).

Together, the six graduation outcomes encompass the knowledge, skills, values, and perspectives of the environmental, social, and economic aspects that comprise sustainability. The desire to infuse the essence of sustainable development into the curriculum came from the community.

The development of the graduation outcomes took from September to March. The next step was to review the existing curriculum using the lens of the new graduation outcomes. Each subject coordinator organized a reflective process that involved their consultants, department heads, and all interested subject teachers. They reviewed what their discipline contributed and what it could contribute. The process of review, revision, and reorientation began immediately. By June, the revision work was well in place; during the summer holidays of July and August, teams of Toronto's finest teachers wrote the first draft curriculum to be field tested in the schools in September.

> The essence of the Toronto reform is that the curriculum is no longer focused exclusively on the traditional core subjects of language, mathematics, history, etc. Informed by the new vision of what the community felt tomorrow's students would need to know and be able to do, these disciplines underwent major revision. Mathematics, for example, now includes the skill of comprehending extremely large and extremely small numbers -e.g., ppm and ppb - which are essential to environmental literacy and understanding relative risk factors, both in personal life and at work. Health now includes environmental issues such as cancer, allergies, and food additives as well as 'consumerism.'
>
> UNESCO, 1997, p. 25.

Every facet of the curriculum that was in place at the beginning of the consultation process was reaffirmed, reoriented, or altered. The essence of sustainability became infused as the graduation outcomes were addressed subject by subject and grade by grade.

It also became apparent that the curriculum included not only *what* was taught but also *how* it was taught. The Board's practices were re-examined. For example, The Board examined its own purchasing policies to ensure that guidelines and practices were consistent with those same graduation outcomes. Energy, water, and waste management practices were altered, and the social concerns of equity and racism were addressed. For example, immigrant parents' worldviews were acknowledged and respected.

Building a new curriculum does not ensure its implementation. Several efforts were coordinated. Teachers who had written the new curricular material led inservice training. Teams of senior officials met with schools to search for even more refinements and suggestions. Finally, the Toronto Board revised report cards to reflect the changes. Again,

parents were deeply involved in developing a new report card. The new card was very detailed, and teaching the new material was essential to calculating marks for new subject areas.

> Much of the success of the Toronto reform is due to the fact that it was not and was not seen to be an effort to change education to meet goals set by an elite group or unduly influenced by outside pressures. The impetus to change came from within. The new curriculum had equal or greater academic rigor, but far greater relevance to life outside school walls. In its implementation, respect for teachers, parents, and students was a key ingredient. The Board tried to model the changes they wanted in the system. What it demonstrates is that education for sustainable development is simply good education, and good education makes children aware of the growing interdependence of life on Earth, interdependence among peoples and among natural systems in order to prepare them for the future.
>
> UNESCO, 1997, p. 26.

This experience showed that reorienting education to address sustainability can be based on a community's desires and strengths. The traditional approach was to have experts develop new materials and then perceive the teaching staff as in "need" of such expertise and training. The Toronto Board experience is a case of identifying a commonly developed community-based vision and then working on the strengths that lay within the existing personnel to achieve the communal goals. This was an early example of what is now being seen as working from a "strengths model" as opposed to trying to reorient based on a "needs model" where outside expertise is seen as necessary for local growth. Undoubtedly there is need for some outside help; however, once the community agrees upon a common vision, which includes respect for the best of the past and present, it can make tremendous strides by orchestrating existing academic strengths in a democratic fashion.

VIII. REORIENTING EDUCATION INVOLVES MANAGING CHANGE

Chapter 36 of *Agenda 21* calls for reorienting education to address sustainable development. Reorienting education can appear as an insurmountable task that requires reform at every level of education - reform that would require more funding than is currently available in national budgets. However, if the strengths model is applied beyond curriculum to administration, the efforts of existing ministries, departments, universities, etc. can contribute greatly toward reorienting education to address sustainability.

Donella Meadows, in her book *The Global Citizen*, talks about changing the status quo.

> [T]he most effective way you can intervene in a system is to shift its goals. You don't need to fire everyone, or replace all the machinery, or spend more money, or even make new laws—if you can just change the goals of the feedback loops. Then all the old people, machinery, money, and laws will start serving new functions, falling into new configurations, behaving in new ways, and producing new results.
>
> Meadows, 1991, p 250.

Those of us who work in ESD would be wise to ponder Meadows' words. We could accomplish more by working to shift institutional goals to further sustainability.

Shifting goals in isolation is usually insufficient for sustained systemic change. Studies of management systems show that a number of steps must be taken together for a new idea to go from vision to self-sustaining reality. Although each institution has its own way of bringing about change, three general starting points are common - the three Ps: program, policy, and practice. For ESD or any other innovation to become an integral part of an institution, these three areas must be addressed simultaneously or in short succession.

Programs, Practices, and Policies

Institutions of all kinds tend to resist change; formal education is no exception. In the following sections on program, policy, and practice, the theme of cultural diversity illustrates possible ESD activities. Real-life examples from teacher-education institutions illustrate recent ESD activities in program, policy, and practice.

Program. Program changes evolve from local responses to specific problems or needs. Innovators use their expertise to develop a programmatic change within their own institutions to address this need. Others hear about the innovation and adapt it or develop their own versions to fit the needs of their institutional settings. For example, a large urban North American school district wanted cultural diversity within its staff so that pupils would see their ethnic groups reflected in the professionals who taught them. To this end, the school district worked with a university to alter admission requirements, which allowed a broader ethnic base of applicants into the pre-service teacher-education program. The students admitted through the program were given additional counseling and support to help them become successful academically. This cultural diversity program was implemented in the faculty of education at one university. Professors reported the success of the program at conferences and in the media. Word spread about the success of the

program dealing with this prominent issue. Other institutions developed programs with similar intent but with different programmatic components specific to the needs of their universities and local school districts. Within a few years, the ethnic composition of teaching staffs in local schools began to change.

Innovative Program Example

Infusing ESD into Caribbean Literature, Mico Teachers' College, Jamaica

By Dr. Lorna Down, Head, Department of Languages

Infusing Education for Sustainable Development into Caribbean Literature has been a stimulating and refreshing learning experience for both students and teachers, even as it proved a challenging task.

The Subject

Caribbean Literature is a 90-hour, two-semester course. The texts studied included Jean Rhys' *Wide Sargasso Sea* and Dennis Scott's *An Echo in the Bone*.

The Students

These were Year 1 English Option students (i.e., students specialising in English) at Mico Teachers' College.

The Programme

I began the programme by providing students with an overview of Education for Sustainable Development using the UNESCO literature—I focused on the quality of human life in regard to relations/ relationships. Specifically I explored with students themes of Violence, Power Relations, Women's Rights, Racism & Violence.

These themes were first introduced by engaging students in a project—Global Pictures of Human Relationships. Here in groups they were expected to make a collage of pictures, headlines, and articles on one of the themes. These they presented with a brief discussion to the rest of the class.

In addition to exploring the texts in terms of their literary elements, I had students examine the high level of violence in Jamaica. This began with a journal entry and was followed by a discussion on violence. The exercise proved extremely useful: it was cathartic as it revealed how all of us in different ways were affected by the violence. Students spoke openly about their fears, obsessions, and plans for dealing with violence.

In order to help students cope with these fears, anxieties, etc., I had them examine alternative responses to violence, specifically Peace Initiatives. This was later followed by a lecture on Conflict Resolution. The guest speaker was a conflict resolution practitioner, who provided the students with practical and meaningful ways to deal with conflict.

Policy. Policy is an overall plan embracing the general goals and acceptable procedures of a government body or authoritative group. Policy is the next step after innovative practices have proven worthy of the time, effort, and resources expended. As more and more individuals recognize that an innovative program fulfills educational or political goals, management begins to look at expansion. Key to expanding innovative programs is the creation of policy. Policy is the "blessing" of the upper administration and the creation of institutional infrastructure that accompanies the "blessing." Once the innovation becomes policy, those who have pioneered the change feel validated and those who have not been involved must either become involved or be prepared to explain why they are not following

the policy. Because all teachers and administrators will encounter education policy in their careers, it is important that they graduate with a basic understanding of how and why policy is generated. By understanding how policy is generated educators may be able to contribute to ESD-compatible change in their school systems.

Policy by itself will not effect change. From years of observing change in policy brought about by elections and subsequent change in government administration, the public knows that policy often does not alter programs or practices, especially without funding or acceptance from those who would implement the policy.

In the cultural diversity program described previously, the school district cemented cultural diversity of the teaching staff as policy by including it in the official documents of the board (e.g., recruitment- and hiring-procedures manuals).

Innovative Policy Example

Florida Gulf Coast University, USA

Goal: Commit to environmental sustainability for the University's campus and beyond.

Goal Statement: Florida Gulf Coast University has identified a sustainable environment as a major center for excellence. The University will recognize its opportunities to serve as an academic and functional model of environmental sustainability. Located in the heart of rapidly-growing Southwest Florida, FGCU is uniquely representative of the balance achievable when the prevailing goal is sustainability. We will operate and manage University facilities and grounds as a model for ecological sustainability.

Objectives:

1. The University will seek to develop environmental programs of national distinction.
2. Environmental concepts and concerns will be integrated throughout FGCU curriculum.
3. FGCU will build and operate attractive facilities and grounds on ecologically-sustainable principles and practices, where economically feasible. The Environmental Management Systems project will be initiated to sustain ecologically sound institutional practices.
4. The University will establish an Environmental Stewardship Council which will develop a comprehensive plan for infusing ecological perspective and ecological responsibility into curriculum and research programs, as well as campus culture.

Source: Florida Gulf Coast University College of Business Handbook, Strategic Plan. Accessed 14 January 2001. http://www.fgcu.edu/cob/COBHandbook/documents/plan.pdf

Practice. For policy changes to become firmly entrenched, the changes must be supported in the standard practices of the system. In the previous example addressing cultural diversity, the program was solidified through changes in ongoing practices. For example, the university altered recruitment procedures of prospective teacher candidates and new faculty members and sent press releases to smaller ethnic newspapers in the city to spread the word regarding the changes. The university continued to send such press releases so ethnic communities would have ongoing access to news of university activities. Budgets for the cultural diversity programs were embedded in line items that were automatically renewed annually thereby removing the program from the yearly struggle for funding and the threat of possible cancellation. University reporting procedures made cultural diversity

activities automatic by including them as required components of year-end reports. Promotion procedures changed to include evidence of leadership or compliance in the area of cultural diversity.

Practices related to ESD on campuses should be pointed out to teacher candidates. Ideally, teacher candidates would have the opportunity to observe a building in which environmentally sustainable practices are the norm. Observing recycling efforts, purchasing and using environmentally sustainable cleaning products, reusing paper, conserving energy, and conserving water will help teacher candidates think about practices that contribute to more sustainable classrooms and school buildings.

Innovative Practice Example

The Griffith University EcoCentre, Brisbane, Australia
By Professor John Fien, Director

The EcoCentre is a key element of the community outreach and partnership program of Griffith University. Located on a 640-hectare forest campus in the tropical city of Brisbane, Australia, it is a 600-square-metre building that has been designed as a model of eco-design and environmental responsibility. It provides space for the Toohey Forest Environmental Education Centre which is staffed and operated by Education Queensland; a conference and training centre (seating up to 90 people); a 200-square-metre display and exhibition gallery; a suite of iMac computers linked to the Internet to facilitate environmental research via the Griffith EcoHOTline—a dedicated portal for the public and school students; and a postgraduate research students' office.

The EcoCentre opened in 2001 to provide environmental education and training programs for students, the general public, industry, business, and government. As such, the EcoCentre operates many programs. Teacher education is one of the most important and serves the needs of pre-service student teachers, experienced teachers who visit the EcoCentre with their classes or for a professional development workshop, and the university's large group of master's and doctoral students in environmental education. The EcoCentre contributes to these teacher education groups in two main ways.

The first is through the educational potential of the building itself. The EcoCentre has been designed and constructed according to strict "eco-design" principles, and features the use of recycled and recyclable construction materials, solar energy, ambient ventilation and lighting, rammed earth walls for temperature regulation, rainwater collection for "greywater" functions, and wet-composting toilets. Such features reflect domestic scale environmental technologies that can be used not only in the family home but also in school design. In addition, the EcoCentre manages a mobile Greenhouse Lab, a 5-metre-long caravan that may be borrowed for up to a week by schools. It contains resources for hands-on activities, displays, books and brochures, and audio-visual materials on the Greenhouse Effect and renewable energy. Teacher education students have access to the building and work-experience opportunities in the EcoCentre and in schools with the Greenhouse Lab.

The second way the EcoCentre contributes to teacher education is through the work of the teachers in the Toohey Forest Environmental Education Centre. Established as a partnership between the local Department of Education and the university, the school is staffed by two teachers and caters to classes of pre-school, elementary, and high school students who visit for daily programs. The themes of these programs include field studies of local history, indigenous studies, and forest and stream ecology. They also offer work in the teaching and research laboratories of university staff and in the university's environmental planning studios. Pre-service student teachers, teachers who accompany their classes, and the university's postgraduate students are integrated into the planning and facilitation of these activities with school students.

The following case study is an example of all three—program, practice, and policy—being carried out in conjunction to permanently change the nature of the teacher education program. Each of the three Ps played a key role in bringing about permanent change.

Case Study on Reorienting Teacher Education to Address Sustainability

York University, Canada
By Associate Dean Don Dippo

Remarks to the International Conference on Reorienting Teacher Education to Address Sustainability, Hockley Highlands, Ontario, Canada, October 2000.

York is Canada's third largest university with approximately 40,000 students. The Faculty of Education at York graduates just over 1000 students per year - 800 certified to teach at the elementary level, 200 certified to teach high school. For ten years, the Faculty has been involved in "re-orienting." In 1988, a group of faculty (under no particular authority) came together to ask how, as a Faculty, we could begin to address issues of racism in our schools and in our Faculty itself. In 1998, an external accreditation review panel recognized equity and social justice issues as constituting the core of our teacher education programmes. With respect to sustainability, we are probably just about where we were ten years ago with equity and social justice. This brief case study (in truth, one person's view) is about what we might learn from that experience in "re-orienting" and about how we might proceed in "re-orienting" again.

Since its inception in 1972, York's Faculty of Education could be described as "Progressive" in the Dewian sense of being committed to both individual growth and social development. The faculty distinguished itself from behaviourist approaches by embracing more liberal/humanist ideas about teaching and learning. Developmentalism was at the core of the curriculum. Students read Piaget, Kohlberg, and Vygotsky. We were child-centred, activity/inquiry based, and advocates of whole language. We were holistic, emphasizing the physical, intellectual, emotional, social, and spiritual development of children. This is the position, the vision of ourselves, we espoused, we proclaimed, and worked hard at.

In the mid-80s, there were certainly faculty members who had taken note of how schools systematically disadvantaged women, the poor, racial and linguistic minorities, and Aboriginal people. Individual faculty members addressed systemic discrimination in their courses. But the commitment to take on these issues was not programmatic. It was not infused in our teacher-education curriculum. Then in 1987-88, amidst mounting research evidence and media reports about racism in schools (and, indeed, in faculties of education) a group of faculty members came together to begin to strategize about how to effect change in our teacher education programme. The plan was to meet regularly, to sit on Faculty committees, and to make proposals for curricular and programmatic changes to our Faculty Council. The Admissions Committee began to look at systemic barriers. The Curriculum Committee looked at issues of representation. The Hiring Committee looked at ways to diversify the faculty complement. Interest in the work of these committees grew. A new dean was appointed who was very supportive of these initiatives. The scope of the project expanded to include discrimination based on race, ethnicity, language, social class, gender, sexuality, and disability. There were heated discussions and debates within committees and within the faculty at large. Should we adopt the multiculturalist position being advanced by American theorists or should we embrace the Anti-Racist position being put forward by scholars in the United Kingdom? Should we create a single compulsory course, which addresses discrimination in all its forms, or should we insist that systemic discrimination and disadvantage be addressed in all of the courses we taught? In the midst of these debates, there came a kind of watershed moment when the faculty concluded that it was not necessary to resolve these issues before being able to declare in print (that is, in the University Calendar, in the Faculty Handbook, on the Faculty Web site) that we were, as a Faculty, committed to addressing equity issues in all our programmes. After all, in the course of time and as a result of all the discussion and debate, we had changed our admissions policies and procedures. We had made our curriculum more inclusive. And our faculty complement had become more diverse.

It wasn't long, however, before the limitations of this particular vision became the subject of debate. While there was widespread agreement that equity issues ought to be addressed by all of us in ways appropriate to the different courses that we taught, there were questions raised about whether we could be as truly progressive as we wanted to be while remaining largely silent about issues related to poverty, violence, militarism, globalization, eco-racism, and environmental degradation. The Faculty now describes itself as being committed to addressing equity and social justice issues in all its programmes. It is fair to say that, at this point, the Faculty still addresses equity more directly than social justice. But we've committed ourselves to finding ways to more adequately address both.

In the view of several faculty members, myself included, sustainability now offers the Faculty an opportunity to make good on its commitments to address equity and social justice. The challenge ahead is not unlike the challenge that faced equity advocates in our Faculty ten years ago. The task is to find ways to engender understanding and build commitment and enthusiasm for the conceptual framework and pedagogical imperatives that sustainability education implies. The social context in Ontario is, in many respects, more hostile than the context that supported the development of multicultural/anti-racist education initiatives in the past. The curriculum has become decidedly more narrow, focussing on basic and employability skills. Standardized and high-stakes testing have further marginalised many highly important but undervalued aspects of the curriculum. Yet, day by day, the need becomes greater as the effects of social and environmental neglect become more and more apparent.

A conference like this one on reorienting teacher education to address sustainability bolsters our hope that something can be done, and strengthens our resolve to do it.

Management during Change

All organizations in transition go through three stages that need to be managed in different manners - the present state, the transition state, and the future state. Reorienting education for sustainability will follow the same path and require different management techniques for each stage. Major administrative challenges face those who are orchestrating change on a major scale. Some of those who are in leadership positions in the reorienting effort have years of administrative experience; others are new to educational change or are outsiders to the educational community. Even those who have been in educational administration for years will be new to ESD because it is an emerging field.

Charles Hopkins, who was involved in Toronto's green schools program and the Toronto Board of Education's effort to create an outcome-based curriculum, recommends the following seven-step process for bringing about change in a school system:

(1) Make the decision to act.

Education is trendy; new ideas are always passing through the educational community. With each new trend, administrators and teachers must decide to adopt a new idea or let it pass. If administrators decide to adopt a new trend, they must be ready to commit funding and resources (e.g., classroom materials, release time for teachers to help plan and implement the new effort, inservice training of teachers). Administrators know that for teachers to adopt a new trend or method, it must meet at least one, preferably more, of the following four criteria: (a) the new trend is of interest to them, (b) it makes their job easier, (c) it makes a difference in their program (e.g., it makes a positive difference in the achievement, attitude, or behavior or their students), and (d) they are held accountable and are evaluated on it. Unfortunately, ESD will not be readily adopted because sustainability is not interesting to the general public and the teaching faculty.

(2) Back up the decision with a rationale.

After a school adopts a new trend, the administration must announce the decision internally and externally. The announcement should be accompanied by a rationale that is easy to convey and understand. The rationale must convince teachers, parents, and administrators that the change is worth the investment of time and effort. A successful rationale might be "The new math program raises student achievement and is cost effective" or "The safe substitutes program (replacing harsh cleaners and school-yard chemicals with non-toxic compounds) saves money for the schools and protects children from toxic chemicals."

The rationale should include an explanation on how the reform is better for the students and good for the community. The challenge is to craft a rationale that is credible, repeatable, and understandable. Writing a rationale for ESD presents a major challenge; sustainability is not easily described in one or two sentences.

(3) Prepare a communication strategy to share your vision with the stakeholders and community.

After writing the rationale, a school must create a communication strategy to announce the new program. The communication strategy must include both telling and listening. The plan should address a variety of audiences, how each audience will be reached, and what type of forum will be used for listening to the reactions of the various audiences (e.g., a memorandum to all teachers explaining the change, followed by staff meetings with the superintendent of curriculum or a media release followed by a town meeting).

The opportunity to dialog after the announcement reduces the number of unfounded rumors. For example, as part of a green schools program, one school decided to replace incandescent light bulbs with fluorescent tubes. A teacher was upset, noting that there was money for light bulbs, but not new textbooks, not realizing that the savings in energy costs of the new lighting would pay for installation and new textbooks within a few years. Beyond the challenge of writing an easily communicated rationale, preparing a communication strategy for ESD will be complicated. Depending on their interests and needs, audiences respond better to some explanations of sustainability than to others. The diversity of stakeholders, the best message for each stakeholder, and the best methods to contact those stakeholders must be considered.

(4) Prepare goals and milestones.

After the new plan is revealed and the rationale announced, the work between the administration and the teaching staff should begin. Faculty and administrators must work together to figure out how to implement the overall goal within the settings of individual schools. Together, they decide what components to undertake and in what order. Using

the strengths model is an excellent way to begin setting goals and priorities for ESD programs.

The administration and faculty will also set milestones or targets to assess progress. The form for a milestone is simple - by a specific date a specific task will be accomplished or adopted by X percent of those involved. For example, "By January of next year, recycle bins will be in 90 percent of the classrooms," or "By the end of the academic year, all fifth grade teachers will have received anti-bullying inservice training."

Responsibility for each task in a new program should be assigned when setting goals and milestones, and a reporting method for those with responsibility should be created. People with political power and genuine interest should be assigned to the most important tasks; the success of the program depends on these.

With large, multi-faceted efforts like reorienting education to address sustainability, many projects are possible. The champions of each project all clamor for attention and are eager to implement their ideas. The temptation is to start all the projects for which staff show interest; however, experience shows that starting small with a few successes and not spreading too thin the efforts and energy of your staff is wise. From small successes come larger successes.

(5) Establish accountability and methods of programmatic evaluation.

To assure that the new program becomes ingrained into the school system, methods of evaluation must change correspondingly. If evaluation is not changed, there will be little progress. For example, if a principal asks a teacher to instruct using a new method, but evaluates and bases retention and promotion on criteria from the old way, the teacher may become confused and frustrated or refuse to change. End-of-the-year reporting from individual schools should reflect the changes. Because ESD encompasses social, economic, and environmental concerns, sustainability will be woven into many aspects of the end-of-the-year reports.

(6) Review and revise goals and milestones.

As new educational trends are implemented, teachers and administrators usually find they need to make mid-course corrections to the program. An opportunity for program revision should be built into a new program from the beginning. Designing a new program is based both on professional experience and imagination, which adds imprecision and uncertainty to the process. Sometimes programs simply do not turn out as planned. Specific dates should be set for program revision (e.g., feedback after three months, minor revisions at six months and major revision after one cycle of instruction to prepare for the next cycle). Not only will the program improve with review and revision, but the anxiety of the faculty implementing the program will decrease with the knowledge that if things are not

going well, there will be an opportunity to change. This opportunity for collaboration and change is especially important when implementing new pilot projects that have not been tested previously, as is the case with ESD.

(7) Rewards and celebrations.

Don't overlook the importance of saying thank you, rewarding effort, and celebrating successes during the busy academic year. In North American schools, athletic departments are excellent at rewards and celebration. At the end of each season, coaches and players are recognized with awards such as certificates, plaques, and patches for their participation and achievement. Unfortunately, teachers and students who run the school composting program or the community volunteer program most likely do not receive the same accolades. Academic departments and extra-curricular clubs should learn from athletics to reward and celebrate.

Hopkins recommends that school recognition programs (e.g., Earth Flag Schools, or Green Schools) reward all schools that meet or exceed previously set criteria - similar to the Boy Scouts and Girl Guides merit-badge programs - rather than selecting a few winners. He suggests that the awards be tangible, enduring past the moment of public recognition.

Success in Implementing Curricular Change

Toronto's former Superintendent for Curriculum and Instruction, Charles Hopkins, says that the interest and cooperation of teachers is essential to any curricular change. Therefore implementing curricular change, such as reorienting education to address sustainability, carries a price that cannot be paid simply with inkind contributions from teachers. Hopkins says, "To implement any new program I would have to take resources away from other programs. Those resources are money, time, and teacher goodwill. All three of these resources are in short supply." To assess the situation, Hopkins asked 10 questions of himself and other administrators. Do teachers:

(1) want this change? (E.g., Will it make their job easier?)
(2) have to change? (E.g., Will there be follow-up, supervision, and monitoring?)
(3) understand the change?
(4) have the time to learn and practice the change in a safe setting? (E.g., Is coaching available?)
(5) have the materials available? (E.g., Do they have to seek and read material in their spare time?)
(6) have support or pressure from parents?
(7) have support or pressure from fellow teachers?
(8) intuitively value the change? (E.g., Does it make sense and will it help my students or society? Am I doing the right thing?)
(9) see that everybody else has to do it too?
(10) get a sincere reward for doing it?

Hopkins says that if the answers to all ten questions are positive then the proposed curriculum reform has a good probability of success.

Other Considerations in Managing Change

The following sections on managing during change are for those who are new to educational administration and reform. The following sections contain major points for

consideration. For more detailed descriptions and strategies, search the educational administration and the business management literature.

Mission and Vision

Many management strategies begin with examining and, often, rewriting the mission of the organization. However, the mission of the formal education sector is well defined, and in many cases any efforts to redefine the mission of primary, secondary, or higher education would meet with major, overwhelming resistance. A much better strategy for reorienting education is to cast ESD as a major player in achieving formal education's mission and goals while helping to achieve community and national sustainability goals.

Readiness and Capability of Change

As with many educational reform movements, the success of reorienting education to address sustainability will in part depend on the capability of those who lead the effort and the readiness of those who must help implement it. Realistically, the participation of the national leaders in the Earth Summit and the signing of *Agenda 21* did not commit the participation of entire nations to implementing national sustainability plans, part of which should be reorienting education to address sustainability. One of the reasons that education has not already reoriented to address sustainability is that the need for change is not readily apparent. The central issue becomes *whether* to change rather than *how* to change. In the section on Challenges and Barriers to ESD, we state that the initial step in launching an ESD program is to develop awareness within the educational community and the public that reorienting education to achieve sustainability is essential. Without that awareness, those who lead the reorientation effort would have to work to prepare the educational community before moving into efforts to reorient.

Part of successfully involving others in any reform or change is to give them a sufficiently detailed description of the end point so that they will become involved in working to achieve it. When people can envision an agreeable future they can define a role for themselves in both the transition and future states. Uncertainty about the future can cause anxiety and result in behaviors that work against achieving the desired goal. A natural reaction to uncertainty is to talk with a small circle of other anxious and uninformed colleagues. Unfortunately, in such situations, speculation and rumors may grow, and erroneous assumptions and misinformation will slow or thwart the reform effort. Developing a scenario that allows people to see a role for themselves, while retaining sufficient flexibility for input from new converts, is vital to progress.

Analyzing the Nature of Change Required for Reorienting Education

Reorienting education to address sustainability is a huge project. It will require activity on the national, regional, state/provincial, and local levels. It will probably involve a long list of government officials, legislators, administrators, teachers, unions, and nonprofit

organizations. To begin the complexity of reorienting education to address sustainbility, analyze the nature of change needed. Of course, this analysis should be done at the level you work. If you work in a local high school, your analysis will be quite different than the analysis of the national minister of education. Start by asking: What must be changed? Will it require legislative action? Will it require amendment of the mandated national curriculum? Will it require the goodwill of teachers in your school? Planning for legislative change is very different than planning to cultivate the goodwill of a teaching faculty. Analyze the type of change necessary for your level of work. This type of analysis will help you clarify choices and alternative paths of action. The *ESD Toolkit* has several exercises on managing change (see Section XIV: Exercises on Managing Change) and several exercises on types of change involved in a reoriention effort (see Section XIII: Exercises to Reorient Education to Address Sustainability).

Reorienting education to address sustainability will involve identifying and dealing with barriers. Some barriers can be circumvented while others will require confrontation and change. Two tendencies for people who resist change are to invent barriers to new ideas or to identify barriers based on assumptions rather than fact. Statements like "The dean would never endorse that idea," or "The funding is not available," are typical barrier statements that may or may not have a legitimate basis. Rather than accepting that the dean will not endorse an idea, you can explore the reasoning behind the statement, or you personally can approach the dean. In addition, funding is always an issue and can be cited as a legitimate barrier. The nature of funding concerns are revealed by answering two questions: "Does this project require money or can it be accomplished with reallocation of staff time and other in-kind contributions? Is this project of higher priority than a currently funded project?"

Analyzing and Planning Commitment

Leaders of efforts to reorient education to address sustainability must determine who in the educational community must commit and implement the change for the reorienting process to actually take place. While many of us intuitively know who needs to "be brought on board," systematic analysis of individuals, groups, and institutions whose commitment to the effort (e.g., providing money, time, and human resources) to implement and persevere is essential. Systematic analysis by several people rather than the intuition of one person should result in a comprehensive picture of key change agents.

After analyzing the commitment necessary to succeed (see Section XIV: Commitment Charting exercise), leaders need to plan and strategize how to get the minimum commitment from the people who were identified as key to the success of the program.

Creating, Implementing, and Monitoring Plans

As with many multifaceted projects, a clear but revisable roadmap of how to move from the current state to the desired future state is necessary. Although some administrators can mentally depict the multiple steps involved in simultaneous tasks necessary to implement a major project, these talented administrators must be able to share the complexities with their colleagues and constituents. As a result, it is advisable to create a project plan. Simple tables that list tasks and milestones can quickly explain complex projects to a variety of audiences (see Section XIV: Sample Worksheet for Creating an Action Plan).

While planning, another thing to keep in mind is that it is difficult for stable organizations to change. Formal education is comprised of stable organizations. Lessons from business and industry show that rather than continuing to use the regular structure of the organization during the transition period, it is often necessary to create temporary systems and management structures to accomplish the desired change. This may mean temporarily hiring an expert in sustainability to advise a school system during the transition. The expert in sustainability would work with the administration to lay out a wide variety of potential sustainability projects and envision alternative pathways.

Summary Remarks on Managing Change

To become permanent, changes associated with reorienting education to address sustainability must occur throughout the programs, practices, and policies of a school system. Much of the success of reorienting education to address sustainability will hinge on the ability of the leadership to communicate. In fact, crafting and delivering clear messages that explain ESD, and then listening to the reactions and thoughts of those who have a vested interest in the educational system, are equally important components of communication associated with managing change.

Planning for change is an essential ingredient of success. Leadership that plans ahead to identify potential barriers, gain commitment, engage the public, prioritize projects, and implement tasks according to schedule will increase the chance of success. The investment in planning allows leaders to be reflective rather than reflexive to each new development or turn of events.

IX. PUBLIC PARTICIPATION

by Marianne Chrystalbridge

Throughout human history people have worked together to find solutions to challenges facing their communities. Tribal elders met to discuss problems and called on other community members to add their perspectives, knowledge, and wisdom. As societies became more complex, decision making became centered in seats of government. Often, decisions were imposed on communities by a powerful few residing in remote locations with different environmental, economic, or societal conditions. Recently, governments and organizations have returned to more inclusive decision-making processes. Such processes are inherent to sustainability and are designed to involve the public or their representatives in administrative decision making.

Public participation processes take many forms, including face-to-face deliberation, problem solving, consensus building, traditional public hearings, and public comment procedures. Public participation is a powerful tool for gaining insights from many sectors of the community. Since the Earth Summit in 1992, communities in many nations have used public participation processes to create civic priorities and sustainability goals.

Public participation serves the community in a number of ways. Civic involvement is essential to incorporating public values into decisions about important community issues. Public participation can not only improve the quality of these decisions, but also effectively resolve conflict among competing interests, build trust in institutions, and educate and inform the public.

A community must be comfortable with the word "sustainability" and its central concepts before attempting to identify community sustainability goals. Even a small group of people with a common vision of sustainability can initiate a public participation effort around sustainability. After forming a core group of like-minded individuals, one of the first steps leading to a public participation process is to find ways to approach civic leaders and present the central concepts of sustainability, and why sustainability would make sense for the community. After the leaders understand sustainability, the general citizenry is brought into a public participation process. (Section XI: Exercises to Introduce the Concept of Sustainable Development, and Section XII: Exercises to Create Community Sustainability Goals through Public Participation, can facilitate these communication and public processes.)

Another key factor for achieving success in creating and implementing community sustainability policies, programs, and practices is the buy-in from the early stages of the planning process of all those involved and affected, also called stakeholders. Creating and handing down plans or decisions decided upon by one group, to be imposed on other

groups, rarely works in democratic societies. In a successful process, each stakeholder group generates and then prioritizes ideas that are then shared with the larger group. This sharing gives all involved a sense of participation and consideration.

For public participation to be successful, it is essential to maintain stakeholder involvement over time. Some communities achieve this by employing one or more persons to carry on the work throughout the length of the project. Ongoing attention to the project from such individuals insures that the flow of information or two-way communication is maintained. Sustained attention from stakeholders can be achieved by asking stakeholders to volunteer for different aspects of the project through task forces, committees, etc. Volunteers strengthen the effort by keeping interested persons involved, and maintaining communication between stakeholders (e.g., by circulating committee schedules and reports). Another effective way to maintain stakeholder involvement is through regular progress reports, which, because they contain stakeholder input and opinions, acknowledges that they were heard. The time, energy, and opinions of stakeholders are further validated if these reports are made widely available to the public through newspapers, popular local publications, or the World Wide Web.

Project coordinators should also get stakeholders together for input at different stages of the project, and to recognize and reward achievement of milestones. Ongoing communication keeps interest in the project alive and encourages participants to continue their efforts. In addition, it is also important to create a calendar for the project. A calendar serves to clarify when milestones are achieved, and when the project has been completed.

Each situation in which public participation is used is unique. The public participation process must be tailored to local needs. No standard process exists that works for all scales and circumstances. For example, a different approach will be needed for a faculty considering changes in curriculum at their secondary school than for a community group considering ways to implement local sustainability goals. Also, good ideas and initial involvement of all stakeholders cannot lead to success if the process is inappropriate. For example, it would be ineffective to jump to a process for implementation of a project when a fact-finding process is needed first.

Figure 2, *Planning Public Participation*, can serve as a guide in determining the public participation needs of a community. The chart is based on five steps in which project planners determine the type of project and the reason for public participation, identify the goals of the process, answer questions about the process, select a process, and follow up with evaluation of the process. Figure 2 looks at the three main types of projects (fact finding, setting goals, and implementation), and describes the kinds of public participation that works well for each of the five steps.

Figure 2. Planning Public Participation

Type of Project	Step 1: Reason for public participation	Step 2: Identify goals of the process	Step 3: Answer questions about the process:				Step 4: Public participation processes	Step 5: Evaluate the process
			Q1: Who are participants?	Q2: What type of interaction is appropriate?	Q3: Amount of public influence?	Q4: What is government agency's role?		
Fact Finding - To gather the best information and ideas from many sources.	The public shares local knowledge and creative thinking with government agency.	Increase information and creativity related to a specific project.	Everyone. Take steps to ensure wide representation of socio-economic groups.	Information sharing. Emphasize two-way exchange: citizens hear what agencies are doing; agencies hear what citizens think of their plans, and listen to alternative plans.	Depends on quality of contributions.	High control. Agency defines what information is needed and how it will be used.	• Public comments. • Surveys. • Public meetings. • Informal consultations. • Public notice and comment procedures. • Public hearings.	• Did better information contribute to better decisions? • Did participation processes increase information and ideas on the issue?
Setting Goals - People reflect on what they want for the community.	The public represents a broad range of values.	Identify and incorporate public values into decisions.	Interested citzens.	Deliberation. Emphasize more intensive exchange, using well-reasoned agruments and group problem-solving.	Discuss and debate competing values; form collective vision; make recommendations to agency.	Moderate control. Agency allows deliberations to evolve without overt control.	• Small group discussions. • Series of workshops. • Citizen advisory committees. • Citizen juries. • Mediations. • Negotiations.	• Were goals created? • If there was conflict, was it resolved? • If there was a need for more trust, was trust increased?
Implementation - Implement the project and reduce the conflict and mistrust that could impede implementation.	Groups are directly affected by the project; groups will play a strong role in implementation.	Reduce conflict; build trust; implement decisions.	Interest groups.	Deliberation. Emphasize more intensive exchange, using well-reasoned agruments and group problem-solving.	High influence; forge agreements among themselves about implementation responsibilities.	Low control. Agency provides technical resources and assurance to back the participants' agreement.	• Small group discussions. • Series of workshops. • Citizen advisory committees. • Citizen juries. • Mediations. • Negotiations.	• Were decisions implemented? • If there was conflict, was it resolved? • If there was a need for more trust, was trust increased?

Adapted from: Beierle, Thomas C. and Jerry Cayford. *Democracy in Practice: Public Participation in Environmental Decisions*. Resources for the Future. Washington, D.C. pp. 63-73.

Public participation processes are effective in large communities as well as small groups. Section VII: Case Study: Toronto Board of Education Curriculum Revision and Reorientation describes a public participation process used to redesign the entire curriculum in a city with a population over two million. Public participation processes have also been used for years with small groups. For example, when a principal and teaching staff in a school work together on a project, they use public participation processes. The group pools relevant information and ideas, and each individual contributes to the discussion. The group prioritizes tasks, sets milestones, and figures out how to implement the overall project within the individual school setting. In both large- or small-scale settings, the final product comprises insights from the entire group.

X. CONCLUDING REMARKS

When I teach a course at a university, I always ask myself, "What do I want the students to remember at the end of today's class? a year from now? and 10 years from now?" I asked myself the same question about the *Education for Sustainability Toolkit*. The main themes that I would like you to remember are these:

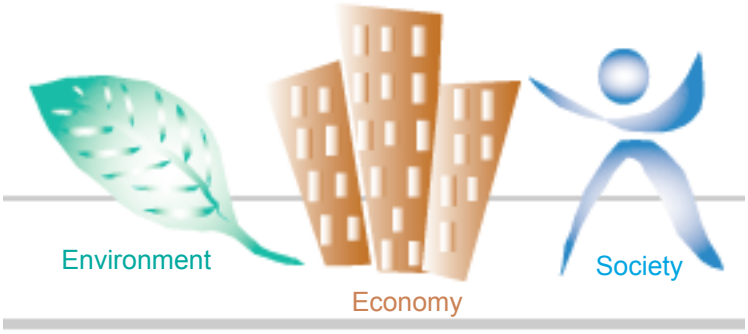
- ESD must be locally relevant and culturally appropriate, reflecting the environmental, economic, and social conditions of your community.

- ESD should be created through a process of public participation in which stakeholders from across the community can express their visions for a sustainable community and what an education reoriented to address sustainability should include.

- Each discipline, teacher, and administrator can contribute to ESD according to the strengths model.

- Communities and school systems should work together to achieve community sustainability goals.

Education is our great hope for a sustainable future. By contemplating and taking on the important task of implementing ESD you are bringing the possibility of a more sustainable future to your community and nation.



Education for Sustainable Development Toolkit

XI. EXERCISES TO INTRODUCE THE CONCEPT OF SUSTAINABLE DEVELOPMENT

by Regina Rizzi

The following exercises are designed to help introduce the concept of sustainability. Given that the term evokes confusion among educators, community members, policy makers, and government officials, we decided to include in the *Toolkit* three exercises to help you explain sustainable development to others. These exercises will only be effective if they accompany a solid description of sustainability and a few examples. In addition, the World Wide Web has many sites dedicated to explaining components of sustainability and city sustainability plans (see Section XVI, World Wide Web Resources.)

The exercises that introduce the concept of sustainability are:

1. Drain or Sustain?
2. Drain or Sustain II
3. S.E.E. the Links
   S.E.E. the Links Activity Sheet
   Die Pattern

ESD Toolkit

Drain or Sustain?

This hands-on exercise puts participants in the middle of an easy-to-understand sustainability dilemma.

Purpose: To introduce participants to the concept of sustainable development.

Comments: For a closer examination of the concept of sustainable development, see also the exercises *Seeing Your Community Through a Sustainability Lens* and *S.E.E. the Links*, found elsewhere in this *Toolkit*.

Group size: 4 to 36 participants.

Time Needed: 30 minutes.

Materials:
- A large number of small pebbles.
- Paper and pencils for keeping score.
- Extension: A chalkboard and chalk.

Directions:

1. Divide the group into communities of four.

2. Place 16 pebbles in a communal pile for each community.

3. Explain the rules of the game:
   - The pebble pile represents a **valuable** renewable resource. The resource is replenished after each round of play.
   - Each community member may take freely from the resource pile each round.
   - Each community member must take at least one pebble in each round to survive.

4. One person in each community must record the number of pieces taken by each community member in each round.

5. After each round, count how many pebbles each community has remaining in the pile, and add an equivalent number of pebbles to the pile.

6. Play three or four rounds, pausing after each round to find out if any community members did not survive.

7. Play one final round, then have community members share what happened in their communities:

   - In which communities did everyone survive?
   - Which community had the most pebbles in the resource pile at the end of the game?
   - Which communities are confident they will always have enough pebbles for everyone as long as the pile is renewed? How did these communities arrive at that point? What strategies were used?
   - Was there a leader in these communities? If so, why did the community listen to that person?

- Could these communities have reached “pebble sustainability” without communication?

8. Compare per capita pebble ownership around the room.

   - Out of the whole room, who had amassed the most pebbles? How did he or she accomplish this?
   - Did this keep others from surviving?
   - Where do we see this type of greed in the real world?

9. Start a discussion of the following:

   - What information is necessary to know how to manage a resource sustainably (e.g., community size, resource renewal rate, environmental carrying capacity, etc.)?
   - What is needed to actually put information into practice (e.g., leadership, communication, trust, legislation, understanding of consequences, examples of failure, etc.)?

Extension:

10. Propose that all communities are taking pebbles from one communal pile. Some communities are at war with one another, and some are unaware of the others.

    - Would the pebbles still need management? How would these factors affect the management of the pebbles?
    - Would these situations change how community members felt about adhering to their sustainable usage?
    - How might global pebble usage be managed? Write suggestions on the chalkboard.

11. Now explain that this scenario represents the current state of our common resource, the atmosphere. Automobile and factory carbon dioxide emissions are heating up the atmosphere, causing the “greenhouse effect” and changing the ecology of the planet. Each pebble taken represents one “share” of carbon dioxide emissions generated by that person.

    - How do the communities that reached sustained usage feel about the “greedy” communities’ usage?
    - How can the atmosphere be managed? Would the suggestions listed on the chalkboard be useful in this situation?
    - What are other “real life” examples of shared resource issues?

Note:

The pebbles represent a valuable renewable resource. In the United States, this game is often played with individually wrapped candies. The participants are told they can keep and eat the candies they have at the end of the game. Using candies or coins rather than pebbles helps participants understand the temptation and greed associated with this game and how it applies to the real world. The authors realize that playing with food is not culturally acceptable in many societies.

Adapted from “Greed vs. Need” in *Project Learning Tree: Pre-K-8 Activity Guide*, 3rd edition, American Forest Foundation, 1995, and “Why EE?” in *EE Toolbox – Workshop Resource Manual*, by J.F. Disinger and M.C. Monroe, Regents of the University of Michigan, 1994.

ESD Toolkit

Drain or Sustain II

This hands-on exercise puts participants in the middle of an easy-to-understand sustainability dilemma.

Purpose: To Introduce participants to the concept of sustainable development.

Comments: For a closer examination of the concept of sustainable development, see also the exercises *Seeing Your Community Through a Sustainability Lens* and *S.E.E. the Links*, found elsewhere in this *Toolkit*.

Group size: 4 to 36 participants.

Time Needed: 30 minutes.

Materials:
- A large number of white pebbles.
- A large number of red pebbles (or any contrasting color).
- An opaque bag for each community.

Directions:

1. Divide the group into communities of four.

2. Place 16 white pebbles in an opaque bag for each community.

3. Give each community member a large handful of red pebbles.

4. Choose the most culturally appropriate scenario from the following five scenarios. The scenario illustrates that by overusing a resource, that resource or another is damaged in some way. Share the scenario with the participants.

   - White pebbles represent one parcel of land farmed; red pebbles represent use of chemical fertilizer, herbicide, and pesticide.
   - White pebbles represent one parcel of land used to graze animals; red pebbles represent loss of grazing vegetation and over production of manure.
   - White pebbles represent one day's catch from a fishing vessel; red pebbles represent population growth of less-desirable species.
   - White pebbles represent travel by air; red pebbles represent exhaust pollution from airplanes.
   - White pebbles represent products made from a factory; red pebbles represent pollution to air and water by that factory.

5. Explain the rules of the game:

   - Participants draw one or more pebbles from the bag each turn.
   - Each community member must draw at least 1 white pebble from the bag per round to survive. It does not matter how many red pebbles are drawn.
   - If a participant does not draw a white pebble she/he "dies" and does not continue to play.
   - Each community member may take as many pebbles as desired from the bag.
   - At the end of each round, the white pebbles in each community's bag are counted; exactly that many white pebbles are added to the bag.

Observations on playing Drain or Sustain II

In the first two rounds, participants will have no trouble surviving, and may even show greed by taking four or more white pebbles. It becomes obvious that the community member who reaches into the bag first has an advantage over the other community members.

In rounds 3 and 4, participants will begin to take larger handfuls from the bag, especially at the end of Round 4. They will be concerned when someone gets a large number of white pebbles, as that means fewer white pebbles and many more red pebbles for the next participant.

In rounds 5 and 6, the participants begin to "die off" (be put out of business, be forced to leave the farm, etc.). Participants take huge handfuls of pebbles in fear that they might not survive. By now it becomes obvious that the common resource is so polluted/overused that everyone loses.

6. Rounds 1 and 2: First generation (the present). For each white pebble a participant takes, one red pebble is placed in the team's bag immediately.

7. Rounds 3 and 4: Second generation (your children). For each white pebble a participant takes, three red pebbles are placed in the bag immediately.

8. Rounds 5 and 6: Third generation (your grandchildren). For each white pebble a participant takes, three red pebbles must be placed in the bag immediately.

9. Discuss how the game progressed.

   - Who had the advantage? Why?
   - Why did participants take as many pebbles as they did?
   - How did the actions of the first generation impact the third generation? Is this fair?
   - During what round was the "fatal move" made (the act that caused the demise of the system?) How did this affect the rest of the game play?

10. Give the communities the chance to play again, without the bags, so that participants can monitor the communal resource and the pollution. The same rules apply.

11. Discuss how this game progressed.

    - Were communities able to sustain the resource so that the third generation had as little pollution/overuse as the first generation?
    - Did any communities opt to limit: use of chemicals/amount of grazing/catch size/air travel/pollutants created?
    - How much communication did it take to sustain the resource?

ESD Toolkit

S.E.E. the Links!

With the roll of the dice in this fast-paced game, participants race to verbalize the linkages between society, environment, and economy.

Purpose:

To reinforce the interrelation of the three realms of sustainable development.

Comments:

This exercise is good to acquaint participants with the concept of sustainable development. *Drain or Sustain* and *Drain or Sustain II* provide a good introduction to this exercise. For a closer examination of the concept of sustainable development, see the exercise *Seeing Your Community Through a Sustainability Lens*, also found in this *Toolkit.*

Group size:

4 to 36 participants.

Time Needed:

20 - 30 minutes.

Materials:

- Three 6-sided dice of different colors (paper die pattern included).
- S.E.E. Activity Sheets for all groups of participants.

Directions:

1. Ask participants to pick a partner, preferably a stranger.
2. Seat pairs of participants in a circle.
3. Three numbers are chosen by the roll of three dice, red, green and blue. The red die corresponds to the category Society, the green die corresponds to the category Environment, and the blue die corresponds to the category Economy. Each category contains six terms, as listed on the activity sheet, one for each number on the die.
4. One of the partners rolls the dice. The partners have 1 to 2 minutes to discuss, then state a sentence or two linking the three terms that correspond to the numbers shown on the dice. Terms may be used in any order.
5. If the partners cannot think of a linkage, the task of linking the terms is passed to the pair on their left. Play continues until the links are made or until each pair has had a try at making the linkage.
6. Encourage discussion of each linkage after each round of play.
7. Each pair should have a turn at rolling the dice.

Example Roll:
4 Society = "poverty"
3 Environment = "landuse/ soil"
6 Economy = "markets"

Example Linkage:
A young farmer inherits a garden plot. The previous owner had not cared for the plot; the soil had lost fertility and was eroded by rainwater. The young farmer kept most of the harvest from the garden plot to feed his family. The produce market in town suffered because many farmers did not have surpluses to sell, because their land was also eroded.

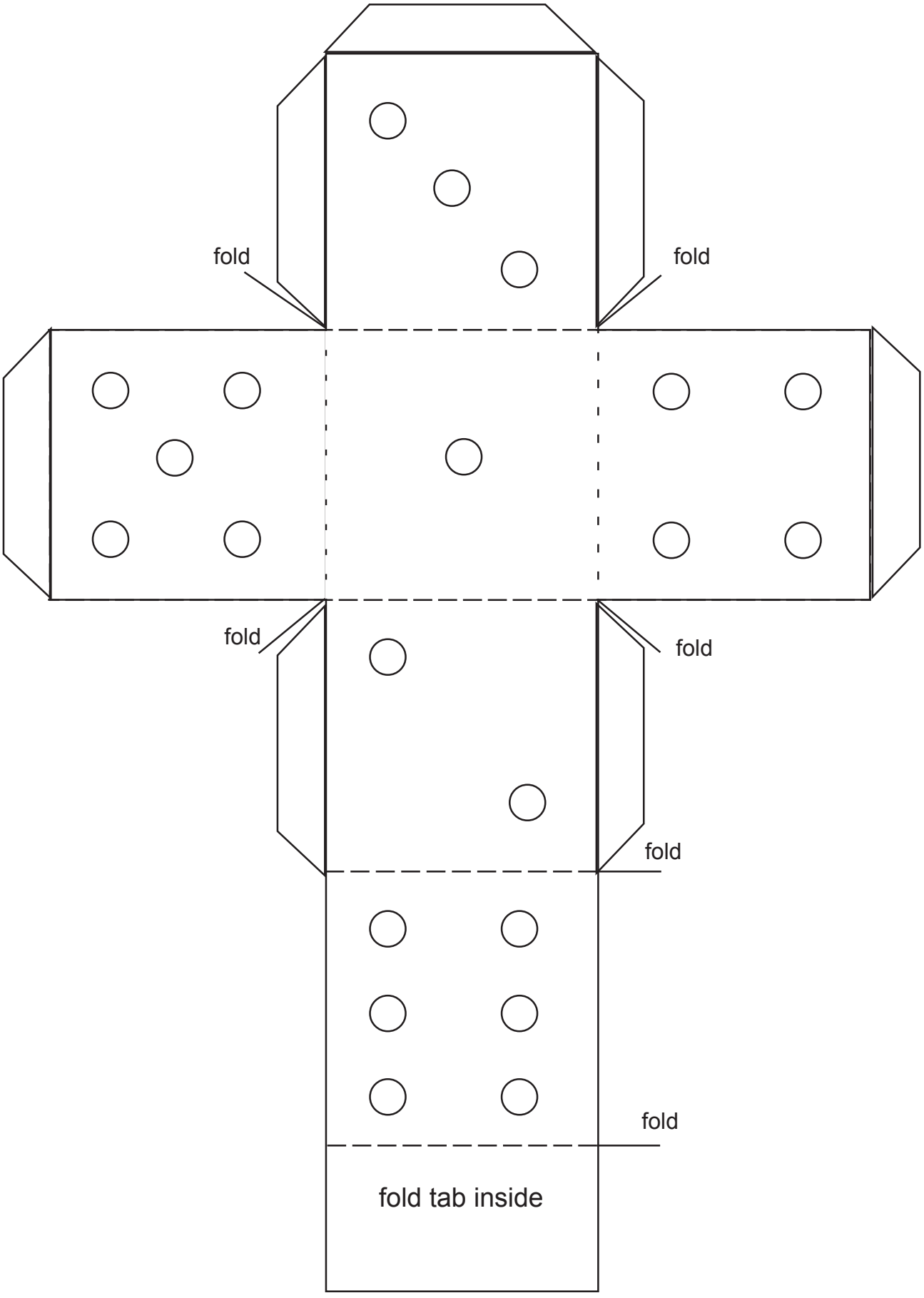
Adapted from “Brain Program #12: 666” in *Jump Start Your Brain* by Doug Hall. Warner Books:New York. 1995. pp. 254-258.

S.E.E. the Links!

Activity Sheet

SOCIETY	ENVIRONMENT	ECONOMY
1. conservation	1. water	1. food/fiber
2. housing	2. air	2. business/industry
3. medical care	3. landuse/soil	3. local economy
4. poverty	4. waste	4. global economy
5. culture	5. pollution	5. jobs/livelihoods
6. politics	6. habitat	6. markets

A product of the Center for Geography and Environmental Education, University of Tennessee, Knoxville, Tennessee.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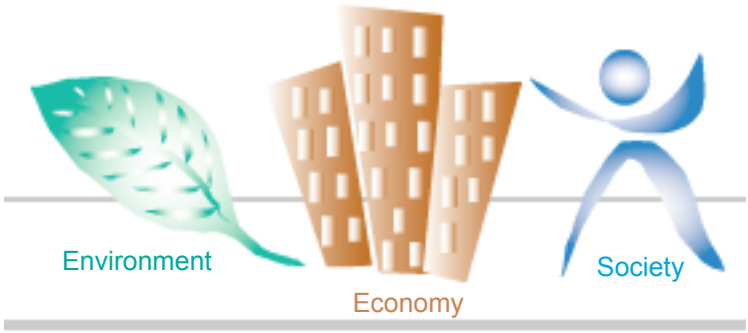


Education for Sustainable Development Toolkit

XII. EXERCISES TO CREATE COMMUNITY SUSTAINABILITY GOALS THROUGH PUBLIC PARTICIPATION

by Regina Rizzi

The following five exercises are designed to help communities begin the process of creating sustainability goals. Community members need to envision and communicate what they want their community to be like in the near and distant future. Of course, creating goals for a community is a lengthy and arduous process that involves compromise and, ideally, consensus. The following exercises will help communities start the process; however, other activities will be needed to complete the task of creating sustainability goals.

The exercises to create community sustainability goals are:

1. Meeting Your Neighbors
2. Building Consensus
3. Seeing Your Community Through a Sustainability Lens
4. Envisioning a Sustainable Future
   - Environment Strips
   - Economy Strips
   - Society Strips
5. Creating Community Sustainability Goals: Deciding What Is Important
   - Sample Questionnaire
   - Sample Cover Letter

ESD Toolkit

Meeting Your Neighbors

Participants learn about each other and their goals for the community.

Purpose: To encourage active listening. To build a sense of "team."

Group size: 12 to 36 participants.

Time Needed: 20 - 30 minutes.

Directions:

1. Ask your participants to select a partner with whom they are not well acquainted.
2. One partner introduces him/herself, telling important facts about him/herself to the other partner, including his/her role in the community and his/her goals or dreams for the community (2 minutes).

-

3. The listener repeats the information back to the teller (1 minute).
4. The teller corrects the listener if necessary (30 seconds).
5. Switch roles and repeat Steps 2 through 4.
6. Regroup two pairs of participants to create groups of 4.
7. Each partner should give a 1-minute introduction of the other to the 2 new listeners.
8. Scramble all participants, pairing each with someone from a different group of 4.
9. Repeat Steps 2 to 8 until all participants have heard or given introductions of the others.

ESD Toolkit

Building Consensus

Through role playing, participants work together to understand many perspectives on an issue.

Purpose: To practice listening to all voices and coming to a consensus.

Group size: 12 to 36 participants.

Time Needed: One hour.

Materials:

- Paper and pens for participant groups.

Directions:

1. Divide your participants into groups of 5-7 people, preferably strangers, with various backgrounds.

2. Assign each person a role in the game: parent, head of a local industry or business, teacher, banker, graduating teenager, elderly person, municipal service provider (e.g. policeman), medical professional.

3. Situation: Discuss what skills and knowledge children of today will need in order to be productive members of our society as adults.

   Situation: What is the largest sustainability problem in our community?

4. Start small group discussions of the situation, with each participant bringing up points appropriate to the role he/she is playing. For example, the "business owner" might complain that young adults do not have good enough language skills to work as salespeople. Groups should determine whether or not there is a problem.

5. Groups should strive to arrive at consensus (30 minutes).

6. Ask one person from each group to state the group's answer to the entire room.

7. Lead a discussion of the process by which each group arrived at consensus.

Note: Many issues are complex and cannot be defined in 30 minutes. In these cases, the desired learning outcome is understanding the complexity of an issue, not identifying a solution.

ESD Toolkit

Seeing Your Community Through a Sustainability Lens

A hands-on group activity that helps participants see the effects of a local activity on the economy, society, and environment.

Purpose: To help participants view a local activity with an eye toward the three components of sustainability - economy, society, and environment.

Group size: 12 to 36 participants.

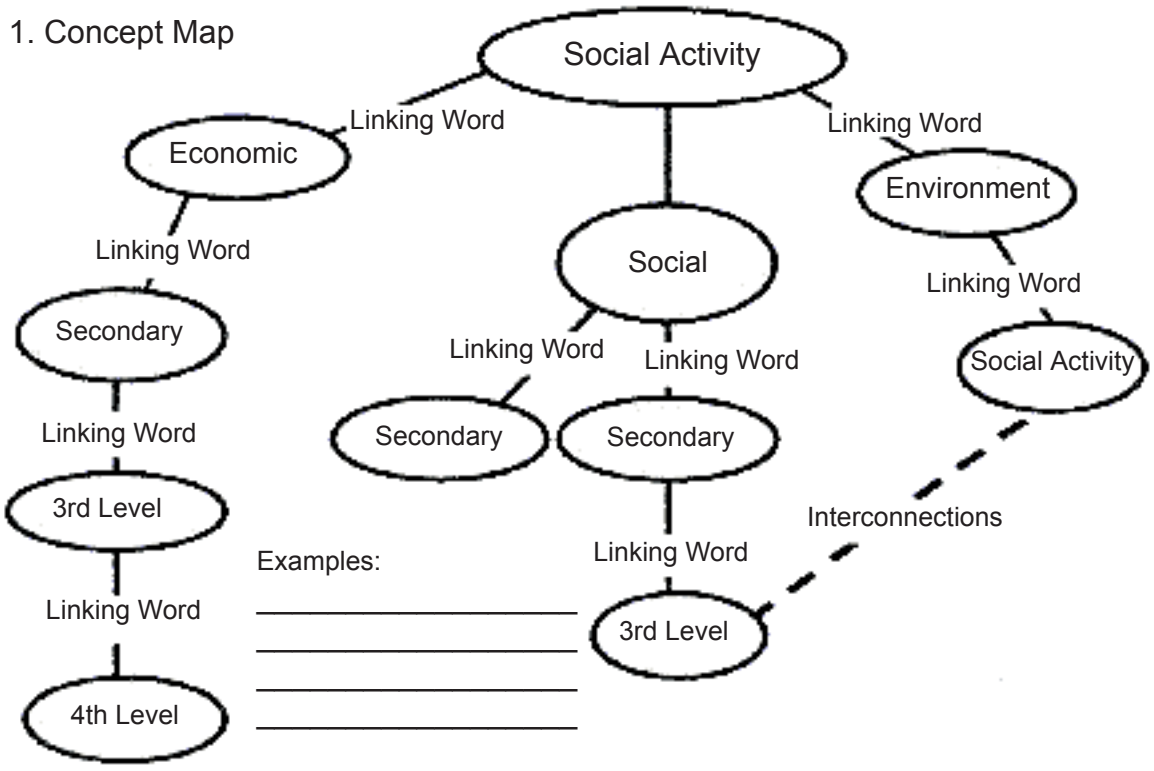
Time Needed: 1 to 1 1/2 hours.

Materials:
- Three large sheets of paper for each group.
- Tape.
- One marking pen per participant.
- Extension: chalkboard and chalk.

Directions:

1. Divide your participants into groups of 3 to 6 people.
2. Ask each group to identify a local, annual activity (e.g., festival, parade, or sporting event).
3. Construct a concept map using this activity as the focal point (see Figure 1).
4. Ask participants to think of ways the activity affects the local economy, the society, and the environment. Participants should write these primary factors on the paper and use connecting lines and words to show relationships (see Figure 2).

Figure 1. Concept Map

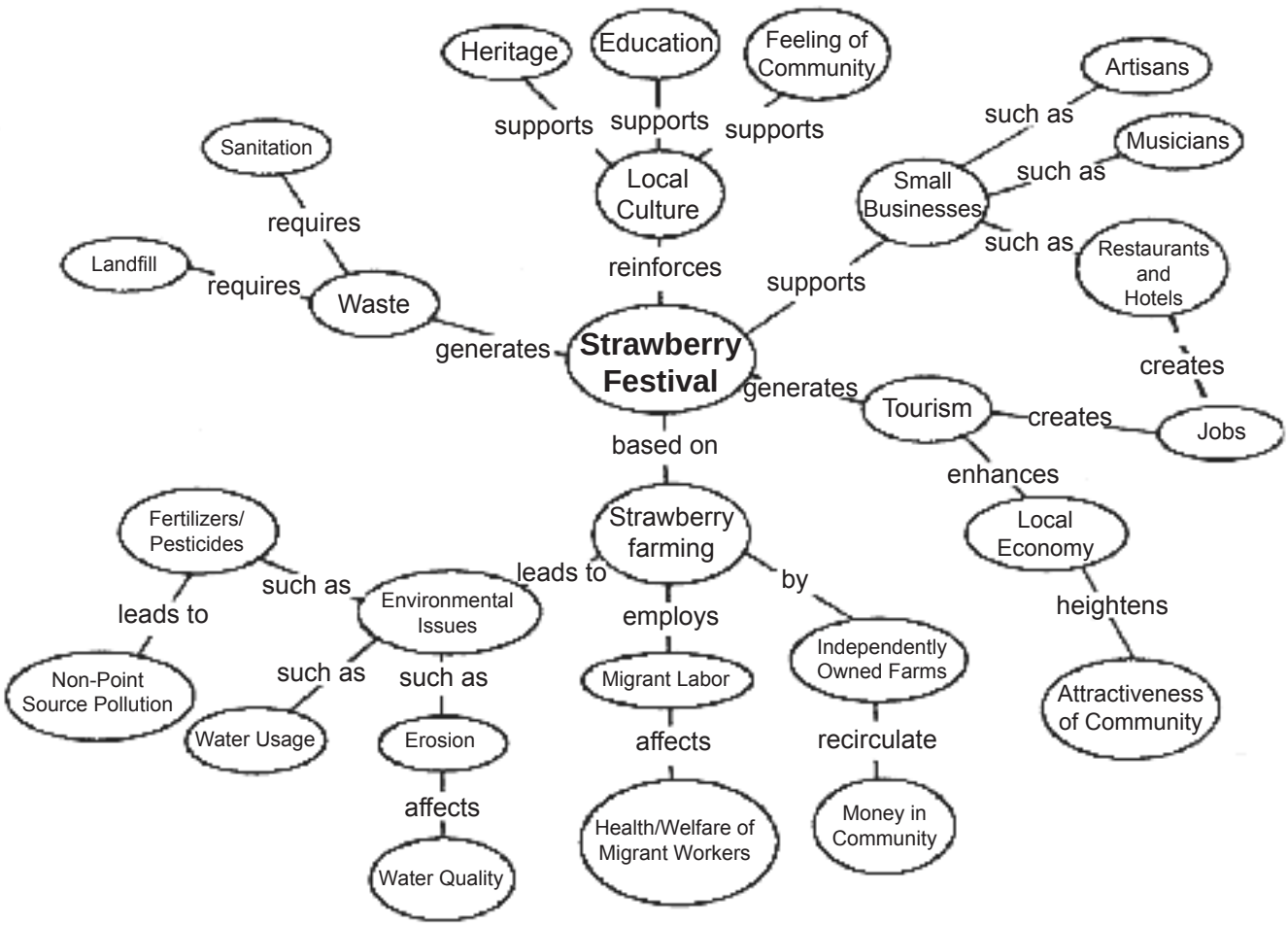


5. Ask participants to identify secondary factors that affect or are affected by the primary factors.

6. Identify third- and fourth-level factors and beyond, if possible.

7. Using another sheet of paper, repeat Steps 3 to 6 for global factors that affect or are affected by the local activity.

Figure 2. Example of Completed Concept Map



8. Prepare a chart on the remaining sheet of paper. Write the headings "Environment," "Economy," and "Society" across the top. Write "Local" and "Global" on the left side of the page (see Figure 3).

Figure 3.

	Environment	Society	Economy
Local	Fertilizer Use Pesticides Groundwater Landfill Reservoir Urban Sprawl Riverfront Park	Public Health Education Landmarks Heritage Culture Migrant Workers Events Values	Tourism Shipping Service Industry Government Subsidy Seasonal Jobs Private Support Taxes Property Values
Global	Acid Rain Ozone Depletion Logging Fishing Air	Source Community Workers Child Labor Disease Poverty Government	Big Business International Trade Agreements Farming Wages Cost of Living

9. Instruct participants to write factors from both concept maps on the chart where appropriate. The results should indicate that the factors reflect society, economy, and environment, both locally and globally.

   Our local actions can have global impacts. Sustainable development means balancing the environment, society, and economy now and in the future, beginning locally.

Extension:

10. Begin a discussion of the local concept map. Ask each group to identify a negative trend in the community (e.g., increased population, housing shortage, poorer living conditions). How many years can this trend continue before the situation becomes intolerable?

    Should action be taken now to counteract this trend so future generations enjoy the same quality of life found in the community today?

    Can the quality of life be improved now and for the future? How?

11. Ask the group to identify a local natural resource depleted by human activity and write it on the chalkboard. As a group, create a concept map of probable factors, *both local and global*, that a shortage of this resource may affect, create, or necessitate.

12. Discuss the concept map. What does it imply for your community?

Adapted from "Sustainability Snapshot." In *Community Sustainability: A Mini-Curriculum for Grades 9-12*, edited by Nick Bartolomeo and Laury Marshall. The Izzak Walton League of America, 1996.

A product of the Center for Geography and Environmental Education, University of Tennessee, Knoxville, Tennessee.

ESD Toolkit

Envisioning a Sustainable Future

Using principles of sustainability, participants envision their community in the future.

Purpose: To start participants thinking about ways to make their community more sustainable.

Group size: 12 to 36 participants.

Time Needed: 30 minutes to one hour.

Materials:
- "Sustainability Strips," cut apart (provided on subsequent pages).
- Paper and pencil for each group.

Directions:

1. Randomly divide participants into groups of 3.

2. Request each group to pick one sustainability strip from the pile.

3. Group members should read the sustainability strip and consider the meaning of the given principle of sustainability (2 minutes).

4. Each group member should think of one way the principle of sustainability could be implemented in the **community** AND one way it could be implemented in his/her own **home** (see following example). One person in each group should write down the statements.

Use of nonrenewable resources should be "paid for" through increased renewable resource replacement.

Sample answer:
"Our community will plant many more forested areas to make up for all the coal we burn to create electricity."

- **Community level:** Our community will purchase or reclaim rundown community acreage (brownfields) and replant with trees.

- **Home level:** My family will plant four native trees per family member per year to "pay for" the amount of carbon dioxide we expend each year traveling by automobile, airplane, and boat.

5. Ask the leader of each group to read aloud the group's principles of sustainability and report members ideas to the larger group.

6. Discuss the suggestions.

On the Community level:
- Which suggestions did participants like? Why?
- Which suggestions could be implemented this year?

On the Home level:
- Which suggestions were good? Why?
- If many people followed a suggestion, how would the community benefit?
- Which suggestions could be started today?

7. Collect the sustainability strips, if you want to use them again.

Extension: Repeat Steps 2 though 6 until each group has considered at least one environmental, one economic, and one societal sustainability strip.

Sources:

Meadows, Donella. et al. 1992. *Beyond the Limits*. Chelsea Green Publishing Co. Post Mills, Vermont.

Murcott, Susan. 1997. *Sustainable Development: A Meta Review of Definitions, Principles, Criteria, Indications, Conceptual Frameworks, Information Systems.* Massachusetts Institute of Technology.

The Natural Step. 1997. Curriculum Version 3.0

United Nations Educational, Scientific and Cultural Organization. 1997. *Educating for a Sustainable Future: A Transdisciplinary Vision for Concerted Action.*

A product of the Center for Geography and Environmental Education, University of Tennessee, Knoxville, Tennessee.

Environment

Use of nonrenewable resources should be "paid for" through increased renewable resource replacement.

Environment

Rates of use of renewable resources should not exceed the rate of their regeneration.

Environment

Rates of use of nonrenewable resources should not exceed the rate at which sustainable renewable substitutes are developed.

Environment

Rates of pollution emission should not exceed the environment's capacity to counteract it.

Environment

Substances (e.g., styrofoam, food waste) produced by society must not be produced at a rate faster than nature can break them down again.

Economy

Resource distribution MUST be fair and efficient WHILE meeting human needs.

Economy

Money should be circulated as long as possible within the community.

Economy

A living wage should be paid to all employees.

Economy

Business should give back to the community in proportion to its footprint on the community.

Economy

Markets should maximize efficiency, discourage the use of disposables, and greatly reduce waste.

Society

Cities should grow only within predetermined community boundaries (e.g., current city limits).

Society

Adequate food, housing, and medical care should be available to every family.

Society

Every girl and boy should receive education that teaches the knowledge, perspectives, values, issues, and skills for sustainable living in the community.

Society

The present generation should ensure that the next generation inherits a community at least as healthy, diverse, and productive as it is today.

Society

Communities should insist upon planned longevity and less conspicuous consumption of material goods.

ESD Toolkit

Creating Community Sustainability Goals: Deciding What is Important

This two-part exercise will help your community develop sustainability goals based on society, environment, and economy.

Purpose:

To discover and prioritize group objectives.

Comments:

This public participation activity is for use after a community has already decided to create sustainability goals. Other community participation processes must first take place to bring the community to the point where it is *ready* to create sustainability goals.

The questionnaire portion of this exercise may be distributed to residents of the community and to community businesses. Have personnel ready to analyze the data once questionnaires are returned.

Time Needed:

Questionnaire (20 minutes), stakeholder meeting (2 hours).

Materials:

- Self-adhesive labels/stickers (e.g., 1 to 2 cm. circles) in three colors.
- Pencils.
- A chalkboard and chalk.

Directions:

Seeking Public Participation

1. Prepare a questionnaire based on the sample provided with this exercise.

2. Choose a return deadline for completed questionnaires (e.g., two weeks after mailing), as well as a date for the stakeholder meeting. Be sure to give yourself ample time between mailing the questionnaire and holding the stakeholder meeting to analyze and prepare the data you have collected.

3. Write a cover letter based on the sample provided with this exercise. The cover letter should explain the purposes of the questionnaire and stakeholder meeting and encourage participation in both. Be sure to include information about the stakeholder meeting, including the date, place, and time, as well as the return deadline for the questionnaire.

4. Mail the questionnaire along with a self-addressed, postage-paid return envelope.

Before the Meeting

1. When the questionnaires have been returned, analyze the responses. Identify major topics of concern (e.g., conservation, education, public transportation) and place each topic in one of three categories: society, environment, or economy. List specific concerns under each major concern. Keep track of the number of duplicate concerns. Your participants may ask for this type of statistic.

2. One week prior to the stakeholder meeting, place a reminder of the date, time, and place in the local newspaper. Announce the meeting on local television and radio broadcasts. Encourage the media to run a “public interest” story on the process.

During the Meeting

1. In advance of the stakeholder meeting, write out all the vision statements in alphabetical order under the three headings *Society*, *Economy*, and *Environment*. [Note: Listing the statements alphabetically allow seach to be seen as equal to the others. Do not put the responses in order from most popular to least popular nor list the number of votes each received. However, you should have this information available in case it is requested.]

2. Arrange the seats in a semi-circle, in order to facilitate a conversational atmosphere.

3. At the appointed time, ask your participants to take seats. Thank them for their time and commitment to the community. Explain that the questionnaires drew many "vision statements" from the community, and that another term for "vision statements" is *sustainability goals*. Direct participants' attention to the lists of sustainability goals. Begin a discussion of each suggested sustainability goal, asking for explanations of the most unusual responses - some of these may give great insight (1 hour).

4. Ask if anyone has any new sustainability goals to add. Add them to the list and discuss these (15 minutes).

5. Revisit the list of sustainability goals. Combine similar goals; add new goals; delete those the group found not relevant.

6. Designate one color label/sticker for environment, one for economy, and one for society. Distribute 3 labels/stickers of each color to each participant. Each participant should have 9 "markers".

7. Instruct participants to place *one sticker each* next to three goals in each category (environment, economy, and society) that they view as most important (in other words, each participant should mark a total of nine goals, three in each category.)

8. Give your participants a 10-minute break while you tally the responses. Reorder the goals according to the number of votes received, listing them in descending order.

9. Review the results. Lead the group to discuss plans of action that might achieve the first 3 or 4 goals in each category. See the activity *Making Your Ideas Fly!* which is found elsewhere in this *Toolkit*.

Sample Questionnaire

Directions: Please share with us your vision of our community 20 years from now. Please give only one response per line, in no particular order. Continue on the back of this sheet if more space is needed. Thank you for your participation!

Example: Children will be taught to make smart decisions regarding the value and use of money.
Example: The river will be clean enough that we may eat fish caught from it.
Example: Our community will have more locally owned businesses.

Vision: _____

Vision: _____

Vision: _____

Vision: _____

Vision: _____

Vision: _____

Vision: _____

Vision: _____

Vision: _____

Vision: _____

Vision: _____

Vision: _____

Vision: _____

Please provide the following information about yourself to assist us in analyzing the responses.

__ Male __ Female

Age:
__ under 20 __ 21 - 30
__ 31 - 40 __ 41 - 50
__ 51 - 65 __ over 65

How many people live in your household?

__ 1 - 2 __ 3 - 4
__ 5 - 8 __ 9 - 12 __ over 12

Of what ethnicity are you? _____

What is your annual income?
__ under $20,000 __ $21,000 to $40,000
__ $41,000 - $60,000 __ $61, 000 to $80,000
__ over $80,000

Thank you for completing this questionnaire!

Please return by [insert deadline date] to:

[insert return address here]

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Sample Cover Letter

[Date]

Dear _____:

As you may be aware, sustainability is of local and global concern. In fact, communities around the world are seeing the need to create local sustainability plans. Cities and towns across the United Kingdom and small towns in Peru have created local environmental initiatives. Communities that are torn with social problems, even those in South Africa, have created sustainability plans. As we have become more aware of the world around us, many members of our community have expressed interest in creating a sustainability plan for our community.

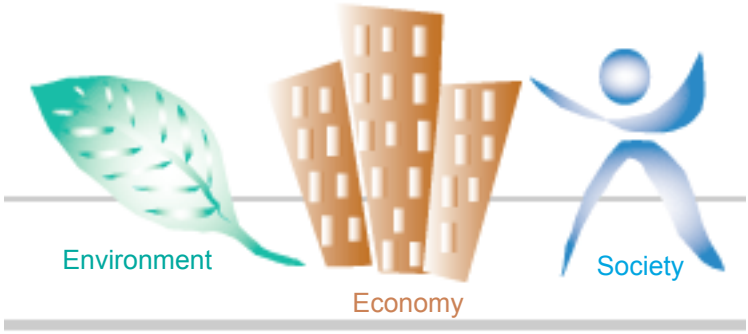
[Insert name of community] is taking initial steps to create a sustainability plan. Our first community meeting will be held on [insert date] at [insert place] at [insert time]. We hope you will join us at this important meeting.

In preparation for the meeting we would like your answers to the questions on the enclosed questionnaire. Please return it in the enclosed postage-paid envelope to [insert address] by [insert date, in bold lettering].

If you have any questions about the meeting or questionnaire, please contact [insert name] at [insert telephone number and address] or visit our Web site, [insert web address].

Sincerely,

[Insert Name]
[Insert Title]



Education for Sustainable Development Toolkit

XIII. EXERCISES TO REORIENT EDUCATION TO ADDRESS SUSTAINABILITY

by Regina Rizzi

One of the great challenges of embracing ESD will be to reorient current curriculums to address sustainability. Once a curriculum is written, it is difficult to change; tradition is a powerful force in keeping the status quo. To add or drop anything from the curriculum will probably require deliberate action. The following exercises will help educators, curriculum designers, and administrators to begin the process of reorienting education. These exercises are designed to help you answer the question what can or should I do differently? These exercises will not help you to completely redesign the curriculum; they will, however, help you to take initial steps.

The exercises to reorient education to address sustainability are:

1. Basic Components of ESD
   Worksheet: Basic Components of ESD
2. Project Y
   Worksheet: Project Y
3. Unity is Strength
   Worksheet: Unity is Strength
4. Weeding the Curriculum
   Worksheet: Curriculum Evaluation
5. Making your Ideas Fly!
   Airplane Template
6. Stoplight
   Worksheet: Stoplight Importance and ResourceAvailability
   Worksheet: Stoplight
7. Issues-based Education for Sustainability
   Worksheet: Issues-Based Education for Sustainability
8. Community Forum

ESD Toolkit

Basic Components of ESD

Teachers and curriculum planners take an initial look at components of Education for Sustainable Development.

Purpose: To identify the knowledge, skills, values, and perspectives that support teaching principles/goals of sustainability and/or issues relating to sustainability.

Comments: This exercise is for people who are beginning to think about what goes into Education for Sustainable Development. More complete curriculum development exercises and techniques should be used with people who are ready to plan curriculum.

Group size: 2 to 15 participants.

Time Needed: 1 to 3 hours.

Materials:
- *Basic Components of ESD* worksheet.
- Pencils.
- Copies of Section III, *Reorienting Education*, and Section IV, *Process for Localizing the Global Initiative*, from this *Toolkit*.

Directions:
1. Read *Reorienting Education* and *Process for Localizing the Global Initiative*.
2. Distribute *Basic Components of ESD* worksheet.
3. Participants may complete worksheets individually or in pairs.
4. Participants share ideas in a large group discussion. Encourage participants to add to their worksheets throughout the discussion.

Worksheet: Basic Components of ESD

What are the most pressing environmental, societal and economic issues facing your community?

	Environment	Society	Economy	Combined
Issues				

What *basic knowledge* is necessary to live sustainably in your community?

	Environment	Society	Economy	Combined
Knowledge				

What *skills* are necessary to live sustainably in your community?

	Environment	Society	Economy	Combined
Skills				

What *perspectives* are necessary to live sustainably in your community?

	Environment	Society	Economy	Combined
Perspectives				

What *values* are necessary to live sustainably in your community?

	Environment	Society	Economy	Combined
Values				

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ESD Toolkit

Project Y

Teachers reorient current curriculum units to address sustainability.

Purpose: To incorporate the five components of Education for Sustainable Development (knowledge, issues, skills, perspectives, and values) into the current curriculum.

Comments: For further explanation of the five components of ESD, please see Section III, *Reorienting Education* and Section IV, *Process for Localizing the Global Initiative*, elsewhere in this toolkit.

Group size: 1 to 36 participants.

Time Needed: 30 minutes to one hour per curriculum unit.

Materials:
- One *Project Y* worksheet for per curriculum unit for each participant.

Directions: See worksheet.

ESD Toolkit

Worksheet: Project Y

Directions: Identify a unit that you currently teach. Write the name of the unit in the circle. Categorize what you currently teach using the chart below. How can you add to this unit to include further consideration of society, economy, and environment using the five components of education for sustainable development?

Society

Knowledge
Already in my unit: _____
_____
I would like to add: _____
_____

Local Issues
Already in my unit: _____
_____
I would like to add: _____
_____

Skills
Already in my unit: _____
_____
I would like to add: _____
_____

Perspectives
Already in my unit: _____
_____
I would like to add: _____
_____

Values
Already in my unit: _____
_____
I would like to add: _____
_____

Economy

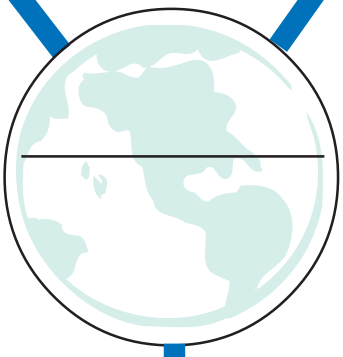
Knowledge
Already in my unit: _____
_____
I would like to add: _____
_____

Local Issues
Already in my unit: _____
_____
I would like to add: _____
_____

Skills
Already in my unit: _____
_____
I would like to add: _____
_____

Perspectives
Already in my unit: _____
_____
I would like to add: _____
_____

Values
Already in my unit: _____
_____
I would like to add: _____
_____



Environment

Knowledge	**Local Issues**	**Skills**	**Perspectives**	**Values**
Already in my unit:	Already in my unit:	Already in my unit:	Already in my unit:	Already in my unit:
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
I would like to add:	I would like to add:	I would like to add:	I would like to add:	I would like to add:
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

ESD Toolkit

Unity is Strength

Teachers use their personal academic and disciplinary strengths to develop a group plan.

Purpose:

To develop and support a multidisciplinary curriculum for Education for Sustainability

Comments:

Education for Sustainable Development should involve the formal, nonformal, and informal sectors of the education community . Participants may decide that a community goal may be better taught by another sector.

Group size:

2 to 9 participants per group.

The number of participants per group, and the composition of the group, depends upon the school's faculty. Where one individual teaches every subject to one age group, teachers from several grades should compose the group. Where specialized teachers teach one subject, the group should be multidisciplinary with one member each from mathematics, language arts, social sciences, environmental education, physical education/health, arts, and science.

Time Needed:

1 hour or more, depending on the number of sustainability goals your community identified. (Note: for more information on the development of these sustainability goals, please use the exercise*Creating Community Sustainability Goals: Deciding What is Important*, found elsewhere in this *Toolkit*.

Materials:

- *Unity is Strength* worksheets.
- A list of your community's sustainability goals, one copy per participant.
- Pencils.
- A chalkboard and chalk.
- A folder or binder for each participant.

Directions:

1. Assign participants to multidisciplinary or grade-level groups.

2. Distribute pencils, lists of community sustainability goals, and *Unity is Strength* worksheets.

3. Explain that education FOR sustainability differs from education ABOUT sustainability. The former teaches the issues, perspectives, values, knowledge, and skills children need to live sustainable lifestyles. The latter treats the topic theoretically.

4. Draw the diagrams in Figures 1 and 2 on the chalkboard. Explain that teaching issues, perspectives, values, knowledge, and skills needed for sustainable living is not as strong or as achievable if taught by only one person as when it is taught by many. Unity is strength. (See *Issue 6 - Engaging Traditional Disciplines in a Transdisciplinary Framework* elsewhere in this *Toolkit*.)

5. Write the first community sustainability goal in the center of the Unity diagram on the worksheet.

6. Using the worksheet, groups will identify which skills, perspectives, values, knowledge, and issues (from various disciplines) they can teach that will support the selected community sustainability goal.

Figure 1. Education for Sustainability as an Individual Discipline

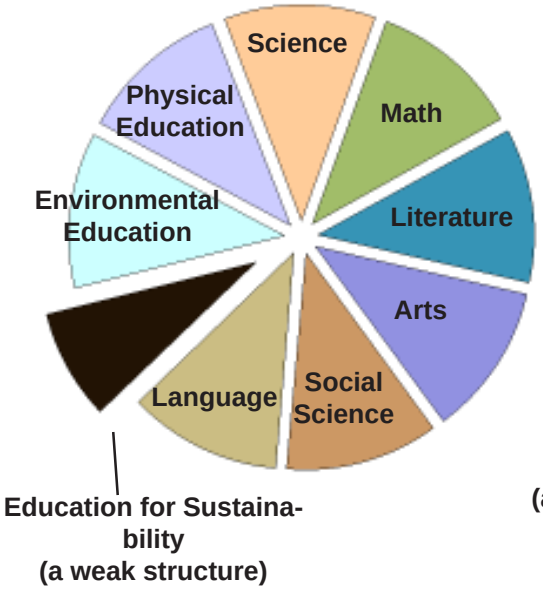
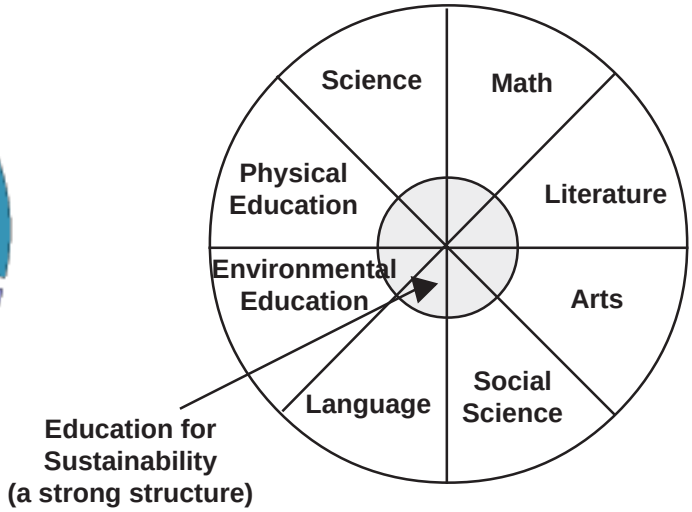


Figure 2. Education for Sustainability as a Multidisciplinary Subject



7. Groups should check their responses to ensure that gaps and overlaps are not present.

8. After completing the worksheets individually, participants share their ideas with one another in their small assigned groups. To lend structure to the discussions, each component of ESD (skills, perspectives, values, knowledge and issues) can be discussed in turn.

9. Participants should place the completed “Unity is Strength” worksheet in their folders or binders.

10. Each participant should take a new worksheet and repeat Steps 4 through 8 for each community sustainability goal.

ESD Toolkit

Worksheet: Unity is Strength

ESD Toolkit

Weeding the Curriculum

Reduce the number of units in the current curriculum to make room for education for sustainability.

Purpose:

To evaluate each unit in the current curriculum for relevance to daily life and community sustainability goals.

Comments:

This exercise is most effective if community sustainability goals have been defined. If your community does not have sustainability goals, omit the shaded portions of the worksheet. Exercises facilitating the development of community sustainability goals include *Envisioning a Sustainable Future* and *Creating Community Sustainability Goals: Deciding What is Important*, found elsewhere in this *Toolkit*.

Group size:

3 or more participants.

Time Needed:

2 to 3 hours, depending on the number of units to be reviewed.

Materials:

- Copies of unit descriptions, including a list of concepts found in the curriculum, one per participant
- Copies of your community's list of sustainability goals, one per participant.
- Copies of the *Curriculum Evaluation* worksheet.

Preparation:

In the spaces provided on the *Curriculum Evaluation* worksheet, write the unit titles. Use as many sheets as necessary . Make photocopies to distribute to participants.

Directions:

1. Distribute worksheets, unit descriptions, and community sustainability goal lists to your participants.

2. Ask your participants to read the first unit description and determine how often they use such concepts in daily life. Ask participants to assign a value to the unit, following the directions given on the worksheet. Explain that if a participant uses **X**, he/she must explain this choice in the area provided.

3. Ask participants to evaluate whether or not the unit reinforces one or more community sustainability goals.

4. Repeat Steps 2 and 3 for each unit under consideration.

5. Collect the worksheets and give your participants a 30-minute break while you tabulate the data.

6. Calculate the average score for each unit. If a unit received any **X**s, tally the number of **X**s and subtract this number from your total number of participants. Use this new number to calculate the average. Be sure to note the number of **X**s next to the score. (Examples of average scores include 1.75**XXXX** and 3**X**.)

7. While your participants are on break, list the units on the chalkboard in descending order by average score received, ranking scores with **X** higher than scores without (e.g., 3**X** is ranked higher than 3, which is ranked higher than 2**X**.)

8. Invite your participants to return; redistribute the worksheets.

9. Examine the rankings list on the chalkboard. As a group, determine the threshold above which units will be kept and below which units will no longer be taught.

10. Discuss each unit falling below the threshold as it pertains to your community's sustainability goals. If the group determines that a unit reinforces these goals, we recommend it be kept. If the group determines that a unit does not reinforce these goals, we recommend it be reserved for later discussion of ways it might be enhanced to reinforce the goals of your community. If a unit is determined to run counter to your community's sustainability goals, we recommend it be dropped from the curriculum.

Note: While discussing units that appear to be used regularly by only a few participants, bear in mind that the concepts and skills involved may still be important to teach to the next generation, as it cannot be foretold which students will need those skills and concepts as adults.

Concepts used infrequently (e.g., yearly) may not need to be taught as a unit. Consider engaging in a special classroom activity that utilizes the concept. The activity should present the concept in a realistic setting to help students to tie the concept to their parents' or communities' activities.

Worksheet: Curriculum Evaluation

Participant Name: _____

Read or listen to the description of each unit in the curriculum. Assign each unit one of the scores listed below. Take your time. Answer the questions as instructed.

4 = Nearly every day
3 = Approximately once a week
2 = Approximately once a month
1 = Approximately once a year
0 = Not used, not important
x = Not used, but still important

Unit title: _____

In your personal life, how often do you use the concepts taught in this unit? (This includes skills as well as knowledge you draw from to understand your world.) Score: _____ (If **x**, please explain this choice below.)

_____

_____

_____

Does this unit reinforce a sustainability goal for your community? If so, how and to what extent?

Unit title: _____

In your personal life, how often do you use the concepts taught in this unit? (This includes skills as well as knowledge you draw from to understand your world.) Score: _____ (If **x**, please explain this choice below.)

_____

_____

_____

Does this unit reinforce a sustainability goal for your community? If so, how and to what extent?

Unit title: _____

In your personal life, how often do you use the concepts taught in this unit? (This includes skills as well as knowledge you draw from to understand your world.) Score: _____ (If **x**, please explain this choice below.)

_____

_____

_____

Does this unit reinforce a sustainability goal for your community? If so, how and to what extent?

ESD Toolkit

Making Your Ideas Fly!

Participants fly paper airplanes and build on one another's ideas.

Purpose: To stimulate creativity in the initial steps of creating sustainability projects.

Comments: This exercise is meant for faculty and administrators in a school or district. Participants build on the ideas of others. Use a large room for this activity.

Group size: 12 to 36 participants.

Time Needed: 30 minutes.

Materials:

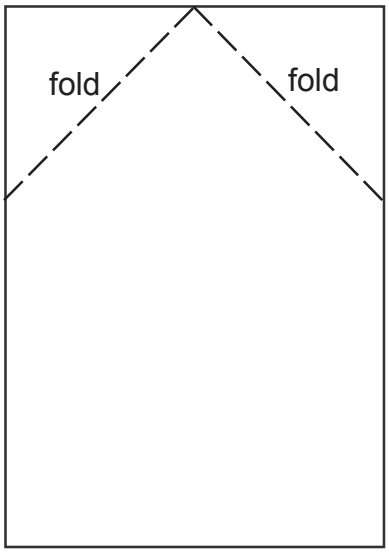
- List of community sustainability goals, if available.
- Prefolded paper airplanes (or have participants fold their own planes.)
- A pen for each participant.
- Lively music.

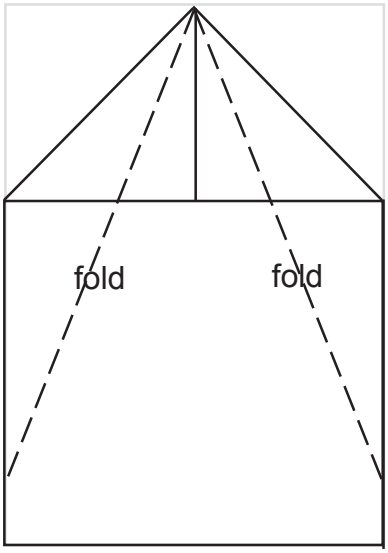
Directions:

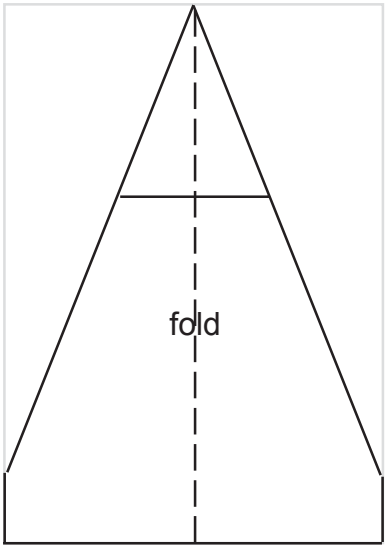
1. Construct many paper airplanes in advance of the meeting.
2. Distribute 1 pen and 1 airplane per participant.
3. Explain that the object of the activity is to come up with creative ways of implementing sustainability goals. Also explain that good ideas may well build on the ideas of others.
4. Begin with the first goal on the list.
5. Ask participants to write down an idea on their airplanes for actualizing the first goal. For example, for the goal that states "the rate of use of renewable resources should not exceed the rate of their regeneration", one idea would be to use both sides of writing paper; another would be to plant a school forest.
6. Announce: "We are about to launch these airplanes. When you catch a plane, read what is written on it and add to it. Don't stick to the mundane; you may write something creative or unusual. Then launch the airplane again!"
7. Count to three and launch the airplanes! Add to the festivity by playing some lively music.
8. After several launchings, turn off the music and request each participant retrieve an airplane. In turn, each participant reads aloud what is written on each airplane.
9. Create a list of potential projects.
10. Distribute a new set of airplanes. Repeat this activity for each community sustainability goal.

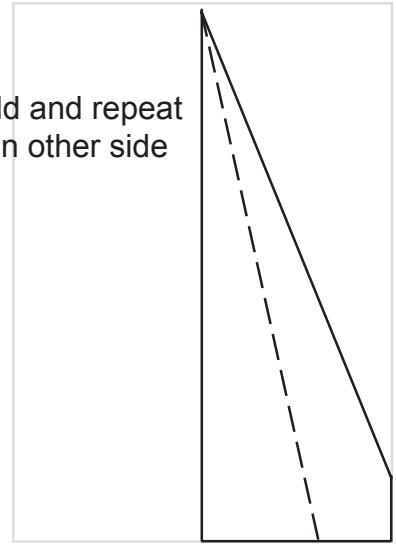
Adapted from "Brain Program #32: Out-of-the-Blue Lightning Bolt Cloud Buster" in *Jump Start Your Brain* by Doug Hall. Warner Books: New York. 1995. pp. 342-345.

Folding your paper airplane:









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ESD Toolkit

Stoplight

Participants prioritize projects based on importance and availability of resources. Green-colored stoplights represent projects that are "ready to go."

Purpose: To determine the order of implementation of sustainability projects according to project importance and resource availability.

Comments: This exercise may be completed by one individual (i.e., a teacher preparing curriculum) or by a group of people (i.e., a school district-level committee). It is helpful to have a list of possible sustainability projects before beginning this exercise. If a list is not available, participants should brainstorm possible and current projects prior to the start of this exercise. (See sidebar for examples of sustainability projects.) For an exercise to create a list of sustainability projects choose the exercise *Making Your Ideas Fly!* found elsewhere in this *Toolkit*.

Group size: 2 to 9 participants per group.

Time Needed: 30 minutes.

Materials:

- *Stoplight Importance and Resource Availability* worksheets - several per participant.
- *Stoplight* worksheet.
- Red, yellow, and green crayons or colored pencils.
- List of current and possible sustainability projects.

Directions:

Examples of Sustainability Projects

- Waste audit for entire school.
- Compost for cafeteria waste and yard waste.
- Litterless lunch program.
- Energy audit.
- Water conservation program.
- School garden or natural area.
- Reuse center for art materials.
- Peace garden or conflict resolution site.
- Recycling program.
- Purchase safe substitutes for hazardous cleaning products.
- Indoor air quality audit.
- Breakfast program for students in need.
- Social services site at the school.
- Free dental checkups for students.

1. On the *Stoplight Importance and Resource Availability* worksheet, list sustainability projects. For each project, circle one number describing the project's importance toward accomplishing community sustainability goals, and one number describing the availability of resources. Add importance and availability scores, and record it for each project.

2. Average the scores for each project.

3. On the *Stoplight* worksheet, list projects in descending order by combined score. Color stoplights green for projects you can begin now. Color stoplights yellow for projects the group wants to do later. Color stoplights red for projects that are neither important nor have resources available.

4. Begin planning for the projects with green lights. Discuss how to develop resource bases for yellow-light projects.

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ESD Toolkit

Worksheet: Stoplight Importance and Resource Availability

Project: _____

Combined Score: _____

IMPORTANCE
LOW 1 2 3 4 5 HIGH
AVAILABILITY OF RESOURCES
LOW 1 2 3 4 5 HIGH

Project: _____

Combined Score: _____

IMPORTANCE
LOW 1 2 3 4 5 HIGH
AVAILABILITY OF RESOURCES
LOW 1 2 3 4 5 HIGH

Project: _____

Combined Score: _____

IMPORTANCE
LOW 1 2 3 4 5 HIGH
AVAILABILITY OF RESOURCES
LOW 1 2 3 4 5 HIGH

Project: _____

Combined Score: _____

IMPORTANCE
LOW 1 2 3 4 5 HIGH
AVAILABILITY OF RESOURCES
LOW 1 2 3 4 5 HIGH

Project: _____

Combined Score: _____

IMPORTANCE
LOW 1 2 3 4 5 HIGH
AVAILABILITY OF RESOURCES
LOW 1 2 3 4 5 HIGH

Project: _____

Combined Score: _____

IMPORTANCE
LOW 1 2 3 4 5 HIGH
AVAILABILITY OF RESOURCES
LOW 1 2 3 4 5 HIGH

Project: _____

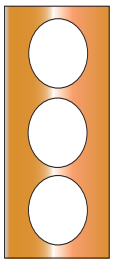
Combined Score: _____

IMPORTANCE
LOW 1 2 3 4 5 HIGH
AVAILABILITY OF RESOURCES
LOW 1 2 3 4 5 HIGH

ESD Toolkit

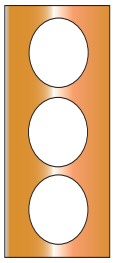
Worksheet: Stoplight

Project: **Recommendation**



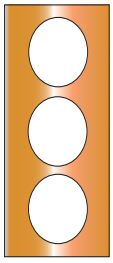
Total Score_____

Project: **Recommendation**



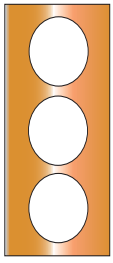
Total Score_____

Project: **Recommendation**



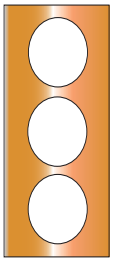
Total Score_____

Project: **Recommendation**



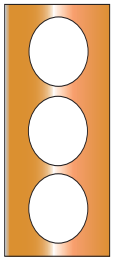
Total Score_____

Project: **Recommendation**



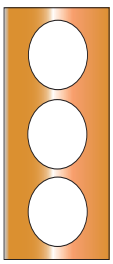
Total Score_____

Project: **Recommendation**



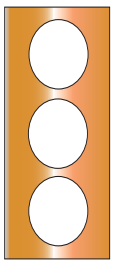
Total Score_____

Project: **Recommendation**



Total Score_____

Project: **Recommendation**



Total Score_____

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ESD Toolkit

Issues-Based Education for Sustainability

Teachers take an initial look at teaching issues.

Purpose: To identify knowledge, skills, values, and perspectives to support the teaching of environmental, societal, and economic issues.

Comments: Some sustainability curriculums are focused on issues that face the community , region, or globe.

Group size: 2 to 15 participants.

Time Needed: 1 to 2 hours.

Materials:
- *Issues-Based Education* worksheet.
- Pencils.

Directions:
1. Brainstorm a list of the most pressing environmental, societal, and economic issues that face your community.
2. Distribute the *Issues-Based Education* worksheet.
3. Each participant or pair of participants selects one of the issues and completes the worksheet.
4. In large group discussion, participants share their responses. Encourage participants to take notes on other participants' responses.

ESD Toolkit

Worksheet: Issues-Based Education for Sustainability

_____

Name of Issue

Definition of issue: _____

_____

_____

Most issues facing communities have environmental, societal, and economic impacts and implications. Complete the following matrix by selecting knowledge, skills, perspectives, and values to support the understanding of the selected issue.

	Environment	Society	Economy	Interrelationship between env., soc., & econ.
Knowledge				
Skills				
Perspectives				
Values				
Miscellaneous				

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ESD Toolkit

Community Forum

The formal education community solicits input from citizens.

Purpose: To learn what parents, business people, and other community members think is important to include in formal education.

Group size: 6 to 30 participants.

Time Needed: 2 to 3 hours.

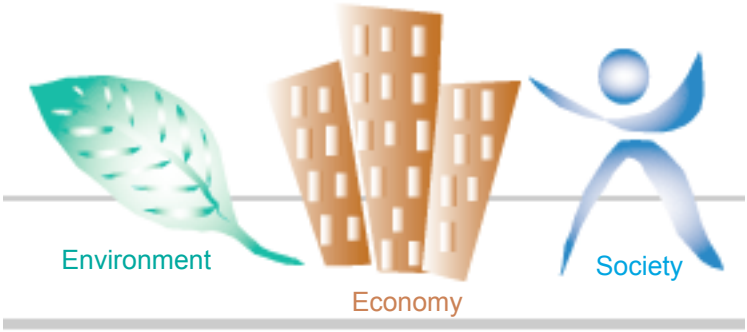
Materials:
- Flip charts and markers.

Directions: Hold a focus group to answer one of the following questions. To answer these questions you must predict the environmental, economic, and social conditions of the next decade.

"What do you want the students of today to know, do, and value when they graduate?"

or

"How would you modify today's schools and curriculums to prepare students to have sustainable livelihoods and lead sustainable lives in the next 50 years?"



Education for Sustainable Development Toolkit

XIV. EXERCISES FOR MANAGING CHANGE

by Marianne Chystalbridge

Change tends to meet with resistance. Planning, creating strategies to involve individuals and groups in the change, and using management techniques designed specifically for transition can make the process of change less problematic. The following seven exercises are designed to help people who desire to initiate change. These exercises examine some essential elements of change and help to organize ideas for projects into action plans. Exercises six and seven develop more advanced skills for understanding and analyzing the viewpoints, values, and patterns of communication and debate used in public forums.

The exercises for managing change are:

1. Examining Assumptions
   Worksheet: Examining Assumptions

2. Steering Around the Barriers
   Worksheet: Steering Around the Barriers

3. Inventory of Support and Resistance
   Worksheet: Inventory of Support and Resistance

4. Commitment Charting
   Sample Worksheet: Commitment Charting
   Worksheet: Commitment Charting

5. Creating an Action Plan
    Sample Worksheet: Action Plan
    Worksheet: Action Plan

6. Identifying Communication Strategies
    Descriptions of Communication Strategies
    Worksheet: Communication Strategies/Worksheet: Recognizing Values in Action

7. Recognizing Values in Action
    Description of Values
    Worksheet: Recognizing Values in Action/Worksheet: Communication Strategies

ESD Toolkit

Examining Assumptions

Participants use a questionnaire to examine their assumptions about barriers to success.

Purpose: To assess the validity of decisionmakers' assumptions about barriers to success on a particular project directed toward a larger goal.

Group size: 2 to 10 participants.

Time Needed: 30 minutes to 1 hour.

Materials:
- "Examining Assumptions" worksheet.
- Pencils.
- Optional: one extra sheet of paper per person.

Directions:

1. Distribute "Examining Assumptions" worksheet.

2. Participants decide on a specific project they are working toward, and agree on a short description of the project (e.g., greening the school building and yard; reorienting the pre-service teacher education to address sustainability).

3. Participants complete worksheet individually, writing in any concerns they have about people or circumstances that would prevent the accomplishment of this particular project, (e.g., the director won't like it, lack of funding, lack of vision, not a priority of the administration). Complete columns 2 through 4 to explore whether these concerns are assumptions or not.

4. Participants share their ideas from Columns 2, 3, and 4. Encourage participants to share information that verifies, invalidates, or gives insight into the assumptions about each perceived barrier to accomplishment of the project.

5. Participants discuss what steps need to be taken to accomplish the project (column 5). If the steps listed in column 5 seem inadequate, discuss alternative ways to accomplish the project and list them in column 6.

Worksheet: Examining Assumptions

Proposed Project:_____

1. Ways the project could be blocked:	2. Is this an assumption?	3. Basis for this assumption:	4. How to verify this assumption:	5. What steps can be taken to prevent this from becoming a barrier to progress?	6. Other ways to accomplish this project:
1)					
2)					
3)					
4)					
5)					

Use back of page for additional notes if necessary.

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ESD Toolkit

Steering Around the Barriers

Participants use a chart to examine barriers to change and envision solutions.

Purpose: To identify and prioritize barriers and brainstorm solutions.

Comments: This exercise is more effective if participants have completed *Examining Assumptions* and *Stoplight* exercises in this *Toolkit*.

Group size: 2 to 6 participants.

Time Needed: 30 minutes to 1 hour.

Materials:

- "Steering Around the Barriers" worksheet (one copy for each).
- Pens or pencils.
- 3 to 6 large sheets of paper.
- Marking pen (dark ink).
- Tape (to affix paper to wall).

Directions:

1. Select a project for reorienting education to address sustainability (e.g., creating a green campus, incorporating more social equity into campus policy, modifying primary school curriculum to include sustainability). Also, see *Stoplight* exercise in this *Toolkit* to prioritize which projects are ready for action.

2. Write the project name in the space provided at the top of the "Steering Around the Barriers" worksheet.

3. Participants brainstorm barriers to the project:

   - Each participant states one or two barriers he or she wants the group to discuss (2 minutes maximum per person). Each participant speaks in turn without comment or interruption from remaining participants.

   - Write each barrier mentioned on a large sheet of paper, summarizing each barrier with a keyword or short phrase. Affix paper to wall for all to see.

4. Prioritize barriers to the project:

   - Ask participants to select three barriers to be discussed in depth. Hint: Choose the three barriers which have the greatest potential to stymie the progress of the project.

5. Write the three selected barriers in the top row of the "Steering Around the Barriers" worksheet ("Barrier #1," etc.)

6. Ask participants to use their worksheets to analyze each barrier and classify its source (e.g., barrier: the geography curriculum does not include sustainability; source of the barrier: the nationally mandated curriculum). (10 minutes).

7. Ask each participant to share his or her ideas about the sources of these three barriers to change. Write down each person's ideas on a large sheet of paper for all to see.

8. Using these ideas, participants work together to fill in the section "Sources of barriers" on the left side of the worksheet. Participants discuss each of the three barriers in turn to gain a deeper understanding of each.

9. Write relevant details in the spaces under each column, and brainstorm solutions for each barrier (15 minutes). See sample worksheet.

10. Write ideas for solutions in the space labeled "Solutions" on the worksheet. (Numbers along the left side refer to Barriers #1, 2, and 3).

Note: If the barriers to your project seem too numerous, try the following before beginning step 4:

11. Participants brainstorm barriers and write down each barrier on a separate 3" x 5" card.

12. Spread out all cards on a table. Participants then group together cards with similar themes.

13. Ask the participants to identify a common theme for each group of cards (e.g., funding, human resources, lack of awareness/understanding).

14. Discuss the themes.

15. Have participants examine the barriers under each theme. Discuss the following questions:

- Can some barriers be combined into one theme?
- Can any barriers easily be overcome?
- Can some barriers be safely ignored?
- Are some barriers based on assumptions rather than facts? Use the exercise *Examining Assumptions* in this *Toolkit* to address this question.

16. Write a keyword or short phrase that describes the common theme for each group of cards.

17. Return to step 4.

Worksheet: Steering Around the Barriers

Proposed Project:

Source of Barriers:	Barrier #1	Barrier #2	Barrier #3	Solutions:
National				1. 2. 3.
Province/ State				1. 2. 3.
Local				1. 2. 3.
Institutional				1. 2. 3.
Legislative				1. 2. 3.
Regulatory				1. 2. 3.
Funding				1. 2. 3.
Human Resources				1. 2. 3.
Time				1. 2. 3.
Other				1. 2. 3.
Other				1. 2. 3.

A product of the Center for Geography and Environmental Education, University of Tennessee, Knoxville, Tennessee.

ESD Toolkit

Inventory of Support and Resistance

Participants use a matrix to gain an overview of the institutions and major groups involved in a proposed change, and the level of support or resistance to that proposed change.

Purpose: To determine sources and levels of support for or resistance to a proposed project or change by institutions or groups.

Comments: For an exercise to determine the amount of support needed from specific individuals for a proposed project or change, use the exercise *Commitment Charting* in this *Toolkit*.

Group size: 2 to 10 participants.

Time Needed: 10 to 20 minutes.

Materials:
- "Inventory of Support and Resistance" worksheet (one copy for each).
- Pens or pencils.

Directions:

1. Write the name of the proposed project or change in program, policy, or practice on the "Inventory of Support and Resistance" worksheet.

2. Ask participants to rate the level of support or resistance of the institutions and groups listed at the top of the column in the worksheet. Rate the support or resistance as high, medium, or low.

3. Ask each participant to explain the rationale behind his or her ratings of the institutions and groups on the worksheet.

4. Ask participants to discuss the overall picture of support or resistance to the proposed project or change.

5. Discuss other sources of support or resistance specific to your community.

Worksheet: Inventory of Support and Resistance

Proposed Project: _____

Sources of Support:									
	Legislation	Ministry	Administration	Teachers	Students	Unions	Community	Other	Other
Level of Support:									
High									
Medium									
Low									

Sources of Resistance:									
	Legislation	Ministry	Administration	Teachers	Students	Unions	Community	Other	Other
Level of Resistance:									
High									
Medium									
Low									

A product of the Center for Geography and Environmental Education, University of Tennessee, Knoxville, Tennessee.

ESD Toolkit

Commitment Charting

Participants use a chart to determine the level of commitment needed from key players in the implementation of a project.

Purpose: To compare current levels of commitment to minimum levels of commitment needed from key players for ef fective implementation of a proposed policy , program, or practice.

Comments: To determine areas of support and resistance to the project, use the exercise *Inventory of Support and Resistance* in this *Toolkit*.

Group size: 2 to 10 participants.

Time Needed: 30 minutes to 1 hour.

Materials:
- "Commitment Chart" worksheet (one copy for each).
- Pens or pencils.

Directions:

1. Ask participants to identify the key individuals or groups whose commitment is essential to facilitate the effectiveness of this project. Request participants write the names of each individual or group in the left-hand column labeled "Key Players" on their "Commitment Chart" worksheets.

2. Ask participants to review the simple rating system indicating levels of commitment provided on the column headings on the worksheet.

3. Ask participants to rate the minimum level of commitment needed by each key player or group for the project to be implemented. Place an O in the box that indicates a *minimum* level of commitment needed.

4. Ask participants to study the list of "Key Players" to consider current levels of commitment for the project. Using their best judgment, participants place an X in the box that represents the present level of commitment for each of the key players. See sample chart.

5. Discuss strategies (e.g., personal contact, letters, recommended readings) to attain the minimum level of commitment identified in the exercise.

Adapted from *Organizational Transitions: Managing Complex Change*, by Richard Beckhard and Reuben T. Harris. Second edition. Addison-Wesley Publishing Company. Reading, MA. 1987.

Sample Worksheet: Committment Charting

Proposed Project: To reorient the science curriculum to address sustainability.

Key Players	Strongly Opposes	Opposes	No Commitment	Let It Happen	Help It Happen	Make It Happen
1. The principal				X		O
2. Department chair				X	O	
3. Clumsy politician				O	X	
4. Teachers					XO	
5. Teachers' union			X	O		

X = Present position O = Minimum desired support

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Worksheet: Committment Charting

Proposed Project: _____

Key Players - Individuals:	Individual Strongly Opposes Project	Individual Opposes Project	Individual has No Commitment	Individual will Let It Happen	Individual will Help It Happen	Individual will Make It Happen
1.						
2.						
3.						
4.						
5.						
Key Players - Stakeholder Groups:	**Group Strongly Opposes Project**	**Group Opposes Project**	**Group has No Commitment**	**Group will Let It Happen**	**Group will Help It Happen**	**Group will Make It Happen**
6.						
7.						
8.						
9.						
10.						

- Where the X and the O are in the same box, participants circle the letters to indicate that no work is required to get the necessary commitment from these key players.
- Where the X and the O are not in the same box, participants draw an arrow pointing from the X to the O.

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ESD Toolkit

Creating an Action Plan

Participants use a checklist and outline to select and prioritize actions needed to implement a project.

Purpose: To design an action plan for a project related to education for sustainability.

Group size: 2 to 10 participants.

Time Needed: 30 minutes to 1 hour.

Materials:

- Results from *Stoplight*, *Inventory of Support and Resistance*, and *Commitment Charting* exercises in this *Toolkit*.
- "Action Plan" worksheet.
- "Sample Action Plan" worksheet.
- Pens or pencils.

Directions:

1. Write the name of the project in the space provided on the worksheet. Complete a short description of the project. Write the goal of the action plan. To complete the action plan, use the results from the following exercises:

   - *Stoplight*
   - *Inventory of Support and Resistance*
   - *Commitment Charting*

2. Complete the "Action Plan" worksheet. Consider the following questions and write your answers in the blanks provided on the "Action Plan" worksheet:

   - What are the main tasks necessary to accomplish this project?
   - Are some tasks complex enough to require sub-tasks? If so, what are they?
   - Who is responsible for each task?
   - How will we manage overall coordination among tasks and sub-tasks?
   - What will we use for milestones for each task and for the overall success of the project?
   - How will the project coordinator track progress?

3. Discuss the following questions to evaluate the action plan. If the answer is "No" for any of the questions, use the exercises Examining Assumptions and Steering Around the Barriers. Then revise the action plan, and repeat completion of the "Action Plan" worksheet.

   - Does the team understand the steps necessary for this project?
   - Does the team have the skills needed for this project?
   - Does the team have the courage to carry out this project?
   - Does the team have the time needed to carry out the action plan for this project?
   - Does the team have all the other resources needed to carry through this project effectively?
   - Does the team have the political clout to carry out the action plan for this project?
   - Does the team have the interest and enthusiasm necessary to carry out the action plan for this project?

4. Does this action plan need to go out for wider review? If “No,” then begin implementation of the action plan. If “Yes,” then discuss and consider the following questions:

   - Who is the audience for appraising your initial plan?
   - What methods will you use to check with the consituency and stakeholders about the progress on this project?
   - What methods will you use to check with the consituency and stakeholders about success on this project?
   - What plans do you have for revising the initial plan if feedback indicates a need for change?

Sources:

Gateway Center for Resource Efficiency – A Division of the Missouri Botanical Garden. *The 8-Step Action Plan*.
http://www.mobot.org/gatewaycenter/8step.html

Hungerford, Harold, and Trudi Volk, John Ramsey, Ralph Literland, and R. Ben Peyton. *Solid Thinking About Solid Waste: An Environmental Curriculum for Grades Six to Nine*. 1992. Kraft General Foods Environmental Institute. Northfield, Illinois.

Institute for Sustainable Communities (ISC), in cooperation with the Regional Environmental Center for Central and Eastern Europe (REC). February 2000. “Introduction: What is a Local Environmental Action Program?” In: *Guide to Implementing Local Environmental Action Programs*. LEAP – Local Environmental Action Programs in Central and Eastern Europe. Report financed by the United States Environmental Protection Agency, in cooperation with the United States Agency for International Development.
http://www.rec.org/REC/Publications/LEAP_Guide/LEAPIntro.pdf
http://www.rec.org/REC/Publications/LEAP_Guide/default.html

Sustainability Team of The Nottingham City Council, Roger Hawkins, Brian Parburr, et al. July 2001. “Changing Our City, Changing Ourselves, or What we can do to make a cleaner, greener, safer, healthier Nottingham.” In: *Changing Our City, Changing Ourselves: Nottingham’s Local Agenda 21 Plan*. Nottingham, UK.
http://www.nottinghamcity.gov.uk/ngp/downloads/LA21.pdf

Sample Worksheet: Action Plan

Name of Project: Reorienting the high school social studies curriculum. **Project Coordinator:** Social Studies Chair.

Short description: To use the strengths model to incorporate more sustainability themes and examples into the high school social studies curriculum.

Goal of action plan: To review and revise the curriculum to include sustainability themes in each social studies class in the school.

Task / Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Who is responsible?
1. Provide inservice training: "What is sustainability?"	■	■																	Mr. A from school system central office.
2. Provide inservice training on the strengths model.		■	■																Mr. A from school system central office.
2a. Evaluate inservice training.				■															Ms. B from school system.
3. Teachers meet to discuss doing a strengths-model inventory.				■															Social Studies Chair.
4. Teachers inventory their curricculum for sustainability themes and examples.				■	■														All teachers in Social Studies department.
5. Combine inventories.						■													Mr. C.
6. Gap analysis of inventories.							■												Mr. C and Ms. D.
7. Teachers meet to create and agree on plan for filling gaps.								■	■										All teachers in Social Studies department.
8. Teachers revise curriculums.										■	■								All Social Studies teachers.
9. Begin teaching new changes.												■							All Social Studies teachers.
10. Meet to discuss new changes and revise as necessary.														■		■		■	All teachers in Social Studies department.
11. Create inventory form.				■															Social Studies Chair.
12. Track progress of project.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Social Studies Chair.

Projects identified in *Stoplight* exercise:
1. Reorient social studies program.
2. Build a school compost bin.
3. Create an anti-violence campaign.

Barriers identified in *Steering Around the Barriers* exercise:
1. Mr. X does not understand sustainability.
2. The students are not socially aware.
3. Other departments are not interested.

Stakeholders identified in *Inventory of Support & Resistance* exercise:
1. Social studies teachers.
2. Principal.
3. School Board.

Task	Milestone for this task
1.	100% of social studies teachers trained.
2.	100% of social studies teachers trained.
3.	Meetings held with 90% attendance.
4.	Inventories completed.
5.	Summative report with matrix of sustainability.
6.	Graphic display of gaps.
7.	Written plan.
8.	Academic calendars revised.
9.	Lesson plans reflect changes.
10.	Meetings held with 80% attendance.

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Worksheet: Action Plan

Name of Project: _____ **Project Coordinator:** _____

Short description: _____

Goal of action plan: _____

Task / Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Who is responsible?

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Worksheet: Action Plan

Reminders from *ESD Toolkit* exercises:

Projects identified in *Stoplight* exercise:

1.

2.

3.

Barriers identified in *Steering Around the Barriers* exercise:

1.

2.

3.

Stakeholders identified in *Inventory of Support and Resistance* exercise:

1.

2.

3.

Task Milestone for this task (please refer to Page 1 of this worksheet)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____

ESD Toolkit

Identifying Communication Strategies

Participants learn about communication strategies that hinder effective group work.

Purpose:

To recognize communication patterns and strategies that prevent progress. Note: this exercise focuses on obstructive communication strategies.The authors realize that while this is a negative focus, it is a realistic one, because proposals for change often meet with resistance.

Comments:

For a closer examination of these and other barriers to change, use the exercises *Recognizing Values in Action*, *Steering Around the Barriers*, and *Examining Assumptions*, found in this *Toolkit*.

Group size:

1 or more participants - for attendance at town or community group meeting. Extension exercise: 2 or more participants.

Time Needed:

Length of town or community group meeting (typically 30 minutes to 1 hour).

Materials:

- Copies of “Description of Communication Strategies” sheet.
- Copies of “Recognizing Communication Strategies” worksheet.
- Pens or pencils.

Directions:

1. Read “Description of Communication Strategies” sheet to understand different types of communication strategies that can slow or prevent progress. These strategies are common at meetings, especially meetings about complex issues or issues for which solutions are difficult to find.

2. Read the “Recognizing Communication Strategies” worksheet to familiarize yourself with the terms and descriptions.

3. Attend a community meeting on a local sustainability issue.

4. When the first person begins to speak, listen for his or her name. Write the first speaker’s name at the top of the column labeled “Speaker 1.” Write the names of additional speakers at the top of the additional columns. Listen to each speaker carefully, analyze his or her remarks, and mark all “communication strategies” that you recognize. Repeat this procedure for each speaker until the meeting concludes.

5. After the meeting, review your worksheet notes. Consider the following questions:

   - Which strategies were used to impede progress on the issue being discussed?
   - Who used these strategies most often?
   - Discuss whether any of the following communication strategies were observed at this meeting:
     - The focus shifts from attending to the problem itself to alleviating the symptoms of stress.
     - Speaking up so often or for so long that other participants cannot talk to the group.

- Were the strategies used that facilitated progress on the issue (e.g. putting aside minor differences of opinion in order to foster cooperation on an important issue?
- What were they?

Extension:

6. These strategies may be subtle and the speaker may not be conscious of using them. Imagine different ways people could act out these strategies. To gain experience and skill in identifying the different strategies listedon the "Recognizing Communication Strategies" worksheet, practice acting out the different strategieswith another participant.

Note:

The worksheet for the exercise *Identifying Communication Strategies* is combined with the worksheet for the exercise *Recognizing Values in Action*. It can be useful to do both exercises simultaneously.

Sources:

Heifetz, Ronald A. 1994. *Leadership Without Easy Answers*. Belknap Press of Harvard University Press. Cambridge, Massachusetts.

Ramsey, John M., Harold R. Hungerford, and Trudi L. Volk. 1989. *A Science-Technology-Society Case Study: Municipal Solid Waste.* Stipes Publishing Company. Champaign, Illinois.

Worksheet: Communication Strategies

Exercise 1: Communication Strategies	Speaker #1	Speaker #2	Speaker #3	Speaker #4
Criticizing leaders				
Externalizing the Enemy				
Scapegoating				
Holding onto past assumptions				
Creating new assumptions				
Denying the problem				
Jumping to conclusions				
Finding a distracting issue				
Following standard operating procedures				
Distancing				
Voting for “good news” candidates				
Applying “quick fixes”				
Other				
Other				

Worksheet: Recognizing Values in Action

Exercise 2: Underlying Values	Speaker #1	Speaker #2	Speaker #3	Speaker #4
Political				
Economic				
Ecological				
Religious				
Ethical/Moral				
Scientific				
Cultural				
Educational				
Aesthetic				
Social				
Recreational				
Egocentric				
Ethnocentric				
Health				
Human Well-being				

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Description of Communication Strategies

These “communication strategies” are communication behaviors done either consciously or unconsciously to avoid the discomfort of dealing with a complex or difficult problem. These behaviors can be interrelated, and can impede effective progress on a project. For example, “denying the problem” can take the form of “quick fixes” if it is assumed that a problem does not actually exist and a quick fix will satisfy those who are asking for change.

These behaviors can include:

• **Criticizing leaders** - Finding fault with leaders (e.g., group leaders, project directors, people in charge at different levels of government or business/industry, or blaming others for problems, rather than looking at the ways responsibility is shared in dealing locally with a complex situation.

• **Externalizing the enemy** - Placing the blame for a problem or mistake on an outside group or individual.

• **Scapegoating** - Placing the blame for a problem or mistake on an individual or group, especially one with little power.

• **Holding on to past assumptions** - Clinging to old assumptions without proof of the validity of these assumptions.

• **Creating new assumptions** - Deciding something is true, with no proof of its validity.

• **Denying the problem** - Refusing to see a problem or to acknowledge a problem exists.

• **Jumping to conclusions** - Forming an opinion or judgment in haste, without considering all issues involved.

• **Finding a distracting issue** - Substituting an issue of lesser importance, or pursuing an unrelated goal, for the purpose of drawing attention away from the issue being discussed. [Meeting participants may be creating a distracting issue by suddenly taking the main subject of discussion off the table, or by shifting the focus from the main issue to the symptoms of stress caused by the main issue.]

• **Following standard operating procedures** - Following established procedures even when they are not appropriate to the issue under discussion. This strategy is sometimes used to avoid designing new, more applicable approaches to the problem.

• **Distancing** - Sitting back and watching two group members engage in an angry exchange that diverts attention from the issues under discussion. Distancing can diminish a sense of shared responsibility.

• **“Good news” leaders** - Soothing followers by shifting the focus from tough issues to less challenging ones. These leaders avoid mobilizing people to tackle difficult issues. [This is done most often when people suspect that progress on crucial problems will require tough adjustments on their part.]

• **Applying “quick fixes”** - Substituting a simple solution to avoid examining the complexities of an issue. [One indication of a quick fix is that a sudden drop occurs in the level of stress associated with an issue.]

ESD Toolkit

Recognizing Values in Action

Participants gain insight into the influence of values on community decisionmaking.

Purpose: To identify values, underlying opinions, or positions expressed at a community meeting.

Group size: 1 or more participants - for attendance at town or community group meeting. Extension exercise: 2 to 4 participants.

Time Needed: Length of town or community group meeting (typically 30 minutes to 1 hour).

Materials:
- Copies of "Descriptions of Values" sheet.
- Copies of "Recognizing Values in Action" worksheet.
- Pens or pencils.
- Extension: colored pencils.

Directions:

1. Read "Descriptions of Values" sheet before attending a community meeting.

2. Bring the "Recognizing Values in Action" worksheet to a community meeting.

3. Listen to each speaker carefully. Analyze each speaker's words for meaning and strategy. Determine which values are being expressed either directly or indirectly. Check all boxes on the worksheet that apply.

Extension:

4. In small groups of 2 to 4, discuss the underlying values observed at the meeting you attended.

5. On your worksheet use one color to draw lines connecting underlying values that conflict with one another. In a different color, draw lines between underlying values that can coexist peacefully.

6. Analyze the connecting lines. Does this analysis reveal opportunities for progress?

Note: The worksheet for the exercise Recognizing Values in Action is combined with the worksheet for the exercise Communication Strategies. The exercises can be done simultaneously.

Sources for this exercise and "Descriptions of Values" sheet:

Heifetz, Ronald A. 1994. *Leadership Without Easy Answers*. Belknap Press of Harvard University Press. Cambridge, Massachusetts.

Ramsey, John M., Harold R. Hungerford, and Trudi L. Volk. 1989. *A Science-Technology-Society Case Study: Municipal Solid Waste.* Stipes Publishing Company. Champaign, Illinois.

World Health Organization. <http://www.who.int/m/topicgroups/who_organization/en/index.html>

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Descriptions of Values

Political - The structure or affairs of government, politics, or the state; activities or affairs of politicians or political parties; methods or tactics used in managing a political body such as the state; having a definite or organized policy or structure of government.

Dominance - The desire to have more power than others.

Economic - The use and exchange of money and/or materials; the development, production, and management of material wealth, as of a country, household, or business enterprise; the necessities of life.

Ecological - The relationships between organisms and their environments.

Religious - A specific unified system based on faith or dogma.

Ethical/Moral - Ethical standards of what is right or just in behavior, arising from conscience or the sense of right and wrong in relation to human action on present and future responsibilities.

Scientific - Knowledge gained by systematic study; the observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena.

Cultural - Pertaining to the continuation or preservation of human knowledge, beliefs, values, arts, customs, behavior patterns, institutions, and all other products of human work and thought typical of a population or community at a given time.

Educational - Pertaining to the accumulation, use, and communication of knowledge; the provision of training or knowledge, especially via formal schooling.

Aesthetic - The appreciation of form, composition, and color through the senses.

Social - Shared human empathy, feelings, and status.

Recreational - Pertaining to leisure activities.

Egocentric - A focus on individual self-satisfaction and fulfillment.

Ethnocentric - A focus on the fulfillment of ethnic/cultural goals.

Well-being - The state of being happy, healthy, or prosperous.

Health - A state of complete physical, mental, emotional, and social well-being and not merely the absence of disease or infirmity.

A product of the Center for Geography and Environmental Education, University of Tennessee, Knoxville, Tennessee.

XV. REFERENCES

Agyeman, Julian. 2001. “Human Equality and Environmental Quality.” Annual meeting of the North American Association for Environmental Education. Little Rock Arkansas.

Beckhard, Richard and Rueben T. Harris. 1987. *Organizational Transitions: Managing Complex Change,* second edition. Reading, Massachusetts: Addison-Wesley Publishing Company.

Beierle, Thomas C., and Jerry Cayford. 2002. *Democracy in Practice: Public Participation in Environmental Decisions.* Washington, DC: Resources for the Future.

Bernard, AK 2000. *Education for All 2000 Assessment, Thematic Studies: Education for All and Children who are Excluded*. World Education Forum. Dakar, Senegal. April 2000.

English, Mary R., and Jean H. Peretz, Melissa J. Manderschied. 1999. *Smart Growth for Tennessee Towns and Counties: A Process Guide*. Waste Management Research & Education Institute. Energy, Environment and Resources Center, University of Tennessee.

Fien, John, and Rupert Maclean. 2000. “Teacher Education for Sustainability: Two Teacher Education Projects from Asia and the Pacific,” in *Education for a Sustainable Future: A Paradigm of Home for the 21st Century*. Eds. Keith A. Wheeler and Anne Perraca Bijur. New York: Kluwer Academic / Plenum Publishers.

Hall, Doug. 1995. *Jump Start Your Brain*. New York: Warner Books.

Heyn, Michael; Katrina Lythgoe; and Charles Myers, 1997. “Education and Economic Development: Sustainability, Threshold, and Equity.” *Proceedings of the Third UNESCO-ACEID International Conference Educational Innovation for Sustainable Development*. UNESCO: Bangkok, Thailand.

Hopkins, C.; J. Damlamian; and G. Lopez Ospina. 1996. “Evolving towards Education for Sustainable Development: An International Perspective.” *Nature and Resources,* Volume 32, n 3.

Hopkins, Charles, and Rosalyn McKeown. 2002. “Education for Sustainable Development: An International Perspective” in *Environmental Education for Sustainability: Responding to the Global Challenge*, Eds. D. Tilbury, RB Stevenson, J. Fein, and D. Schreuder. Gland, Switzerland and Cambridge, UK: IUCN Commission on Education and Communication.

Hopkins, Charles and Rosalyn McKeown. 1999. "Education for Sustainable Development." *Forum for Applied Research and Public Policy*. Vol 14, n 4; pp 25 - 28.

Huckle, John. 1996. "Teacher Education." *Education for Sustainability*. John Huckle and Stephen Sterling (eds.). London: Earthscan Publications Ltd.

Hyde, Karin A.L. and Shirley Miske. 2000. *Education for All 2000 Assessment, Thematic Studies: Girls' Education*. World Education Forum. Dakar, Senegal. April 2000.

International Literacy Institute. 2000. *Education for All 2000 Assessment, Thematic Studies: Literacy and Adult Education.* World Education Forum. Dakar, Senegal. April 2000.

Jickling, Robert. 1992. "Why I Don't Want my Children to be Educated for Sustainable Development." *Journal of Environmental Education*. Vol 24, n 4; pp 5 - 8.

Keating, Michael, 1993. *The Earth Summit's Agenda for Change - A Plain Language Version of Agenda 21 and the Other Rio Agreements*. Geneva: Center for Our Common Future.

King, Elizabeth M and M. Anne Hill. 1993. *Women's Education in Developing Countries: Barriers, Benefits, and Policies*. Baltimore: John Hopkins University Press, for the World Bank.

McClaren, M. 1989. "Environmental Literacy. A Critical Element of a Liberal Education for the 21st Century." *Education Manitoba*, Vol 17 n 1; January - February.

McClaren, Milton. 1993. "Education, not ideology." *Green Teacher Magazine*. Vol 35; pp 17-18.

McKenzie-Mohr, Doug, and William Smith. 1999. *Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing*. Gabriola Island, British Columbia: New Society Publishers.

McKeown, Rosalyn, and Roger Dendinger. Submitted. "A Framework for Teaching and Studying Environmental Issues." *Journal of Geography*.

Meadows, Donella, et al. 1974. *Limits to Growth: a Report for the Club of Rome's Project on the Predicament of Mankind*. New York: Universe Books.

Meadows, Donella. 1991 *The Global Citizen*. Washington, DC: Island Press.

Meadows, Donnella H.; Dennis L Meadows; and Jorgen Randers. 1992. *Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future*. London: Earthscan.

Siniscalco, Maria Teresa 2000. *Education for All 2000 Assessment, Thematic Studies: Achieving Education for All; Demographic Challenges*. World Education Forum. Dakar, Senegal. April 2000.

Smock, Audrey Chapman. 1981. *Women's Education in Developing Countries: Opportunities and Outcomes*. New York: Praeger.

United Nations Department of Public Information, DPI/1344/Rev.1-97-01888-February 1997-5m, EARTH SUMMIT AGENDA 21 *The United Nations Programme of Action From Rio*.

UNESCO. 1997. *Educating for a Sustainable Future: A Transdisciplinary Vision for Concerted Action*. EPD-97/Conf.401/CLD.1.

UNESCO. 1999. *Statistical Yearbook*. Paris and Lanham, MD: UNESCO and Bernam Press.

UNESCO. 2000. *Women as Educators, and Women's Education in E-9 Countries*. Paris: UNESCO.

UNESCO. 2000b. *World Education Report The Right to Education: towards Education for All through Life*. Paris: UNESCO Publishing.

UNESCO. 2002 *Education, Public Awareness and Training for Sustainability: Input to the Report of the Secretary General to the Second Preparatory Session for the World Summit on Sustainable Development*. UNESCO, Paris.

World Commission on Environment and Development. 1987. *Our Common Future*. Oxford: Oxford University Press.

Internet References

Earth Charter. Accessed 28 May 2002.
http://www.earthcharter.org

Paris21. 2000 *A Better World for All*. accessed 26 April 2001.
http://www.paris21.org/betterworld/home.htm

Smart Growth for Tennessee Towns and Counties: A Process Guide. Accessed 30 May 2002. http://eerc.ra.utk.edu/smart.htm

UNESCO. *Teaching and Learning for a Sustainable Future*. Accessed 10 January 2002. http://www.unesco.org/education/tlsf

US Department of Energy. Energy Information Administration. Accessed 31 January 2002. http://www.eia.doe.gov/emeu/international/contents.html

XVI. World Wide Web Resources

Searching for informative Web sites on education for sustainable development can involve plowing through over 3,000 sites. Many of these Web sites simply mention ESD as a reference, or contain only limited information on ESD. After an extensive but not exhaustive search (limited to the English language Web), we found the following sites to be most useful.

The Web sites are categorized as follows: general information for understanding sustainability concepts; education for sustainable development; historical United Nations documents relevant to ESD; and community action. (We do not endorse any workshops, books, or programs mentioned in the Web sites listed below.)

Contents

I Information on Sustainability

1) The International Institute for Sustainable Development (IISD)
   http://iisd1.iisd.ca/sd/
2) World Bank - Home Page for Environmentally and Socially Sustainable Development Network (ESSD)
   http://www-esd.worldbank.org/
3) Organization of American States (OAS)
   http://www.oas.org/
4) World Resources Institute (WRI)
   http://www.wri.org/
5) Jetzt und Morgen
   http://www.sbjum.de/
6) Environmental Defense Fund, Indicators of Progress
   http://www.pepps.fsu.edu/EM_Internet.html
7) The Natural Step
   http://www.detnaturligasteget.se/

II Education for Sustainable Development

1) Teaching and Learning for a Sustainable Future (A UNESCO site)
   http://www.unesco.org/education/tlsf/
2) Second Nature
   http://www.secondnature.org
3) Learning for a Sustainable Future
   http://www.schoolnet.ca/future
4) Campus Ecology
   http://www.nwf.org/campusecology/index.cfm

5) Greening the Campus: Sustainability and Higher Education
http://www.islandpress.org/economics/energy/greencamp.html
6) University Leaders for a Sustainable Future (ULSF)
http://www.ulsf.org/
7) Sustainable Development on Campus: Tools for Campus Decision Makers
http://iisd1.iisd.ca/educate/
8) Sustainability Education
http://www.Urbanoptions.Org/sustainedhandbook/TheApproach.htm
9) Green Teacher
http://www.greenteacher.com
10) Global Learning, Inc.
http://www.globallearningnj.org/
11) The Sustainability Education Center
http://www.sustainabilityed.org/
12) Southwestern Ecoliteracy Project
http://www.ecoliteracyproject.org/
13) World Resources Institute (WRI) Education Center
http://www.wri.org/wri/enved/

III Historical United Nations Documents

1) Agenda for Change: A Plain Language Version of Agenda 21 and Other Rio Agreements, by Michael Keating, 1993 [International Institute for Sustainable Development (IISD)]
http://www.iisd.org/rio+5/agenda/default.htm
2) Chapter 36, Agenda 21: Promoting Education, Public Awareness and Training
http://www.un.org/esa/sustdev/agenda21chapter36.htm
3) International Environmental Policy Reference Guide
http://environment.harvard.edu/eic/guides.html

IV Community Action: Sites for creating local sustainability plans

1) The International Council for Local Environmental Initiatives (ICLEI)
http://www.iclei.org/
2) The Izaak Walton League
http://www.iwla.org
3) Local Agenda 21
http://www.gdrc.org/uem/la21/la21.html
4) Fondazione Eni Enrico Mattei (FEEM)
http://www.feem.it/

DESCRIPTIONS of the above sites:

I Information on Sustainability

1) The International Institute for Sustainable Development (IISD) has developed an interactive toolkit to introduce some of the basic concepts of sustainable development and ways these concepts are put into practice in institutions. This Toolkit was developed primarily for the higher education community, but the learning modules will be of interest to many. The set of learning modules is aimed at providing a more complete understanding of the concept of sustainable development and its relevance to personal lives as well as institutions. These modules help identify direct application of this concept to the community and to jobs and professions. The modules then suggest next steps, contacts, and networks to keep users involved and informed in their efforts to create a sustainable society.

The site also features a chronology of the concept of sustainable development. Its timeline tracks key events, from the publication of Rachel Carson's *Silent Spring* in 1962 to the Earth Summit in 1992 and beyond. The site links to a data bank of Sustainable Development Principles, which illustrates the evolution and ownership of the concepts of Sustainable Development.

This site provides the definition of sustainable development prepared by the World Commission on Environment and Development (the Brundtland Commission), taken from the report *Our Common Future* (Oxford University Press, 1987). A section on indicators and measurement shows how to track progress to sustainability.

http://iisd1.iisd.ca/sd/

2) World Bank - Home Page for Environmentally and Socially Sustainable Development Network (ESSD)

This site has three main sections:

(a) **Social Development** focuses on development that is equitable, socially inclusive, and therefore sustainable. This section promotes local, national and global institutions that are responsive, accountable, and inclusive; it empowers poor and vulnerable people to participate effectively in development processes. The Web page features links to such key topics as conflict prevention, indigenous peoples, participation, and poverty. Links are also provided to resources, projects and policies, news and events, related partnerships, and information on sustainable development issues in different world regions.

(b) **Environment** describes how the World Bank is focusing on finding ways to ensure that economic growth does not come at the expense of the world's physical and economic systems, or the world's poor. This section features links to learning and knowledge resources, projects, publications, data, related partnerships, information on world regions, and such key topics as biodiversity, climate change, environmental economics, and pollution management.

(c) **Rural Development and Agriculture** links to such key issues as gender and rural development, information and communication, water resource management, agriculture, and the WTO negotiations. Also included are features on key topics (e.g., reducing poverty in villages), policies, reports, projects, and links to the development community (conferences, discussions, and partnerships).

http://www-esd.worldbank.org/

3) Organization of American States (OAS) [click on Sustainable Development in the pull-down "Search" menu at top of page]

The Unit for Sustainable Development and Environment (USDE) responds to the needs of member states on issues relating to sustainable development within an economic development context. Technical issues addressed by the USDE include management of water resources, biodiversity, reduction of vulnerability to natural hazards, public participation in decision making, climate change/sea-level rise, coastal-zone management, and renewable energy planning. Each category contains links to groups working on related initiatives.

Among the various goals of the USDE is the facilitation of exchanges of information related to sustainable development in the region, to build a basis for the participation of civil society in environmental management decision processes.

http://www.oas.org/

4) World Resources Institute (WRI) provides information and ideas about global environmental problems for the purpose of catalyzing public and private action to meet global challenges. WRI aims to move human society to live in ways that protect Earth's environment for current and future generations, by "tying together the threads of natural resource use and conservation, economic development, and social equity through research, capacity building, and institutional change." The Spanish/English site features:

- Global topics;
- A "Newsroom" which offers useful resources for the media [media kits, etc.] and timely information on global environmental issues;
- A calendar of events focused on sustainability;
- Review of books and other resources about sustainability;
- **The Environmental Information Portal (Earth Trends),** which provides up-to-date information on 10 key environmental issues, including Coastal and Marine Ecosystems; Water Resources and Freshwater Ecosystems; Climate and Atmosphere; Population, Health, and Human Well-being; Energy and Resources; Biodiversity and Protected Areas; Agriculture and Food; Forests and Grasslands; Environmental Governance and Institutions.

  http://www.wri.org/

5) Jetzt und Morgen is an independent research group focusing on the transformation of social and economic systems at the structural level. Their Web site provides brief descriptions and definitions of major concepts associated with sustainability. The Jetzt und Morgen group is committed to the concepts of sustainability and intergenerational equity as well as to holistic approaches. Their studies aim to illustrate problems of economic as well as ecological indebtedness. They also work on developing ways to preserve natural and economical resources for future generations. Ecological, economical, and social aspects are consistently brought together with this approach.

[To reach the English version, click on "Homepage in English." To reach basic sustainability principles, click on "Studies." Then click on "Principles for Sustainable Policy and Behavior: Ecological, Economical, Social, Global" [from the study on "Sustainable Policy"]; click on "go to principles" [at "Principles for Sustainability: Summary"] for details of "Principles for Sustainable Policy and Sustainable Behavior."

http://www.sbjum.de/

6) Environmental Defense Fund, Indicators of Progress (2000) is a quick and useful guide to understanding basic concepts of environmental sustainability indicators and benchmarks and why and how they can be applied. Includes a Community Assessment Worksheet.

http://www.pepps.fsu.edu/EM_Internet.html

7) The Natural Step is an international organization that uses a science-based systems framework to help organizations and communities understand and move toward sustainability. The Natural Step engages in training and consulting, research and development, and community outreach. Its purpose is to develop and share a common framework of easily understood scientific principles that act as a compass to guide society to a just and sustainable future. The site links to nine countries. Australia's Natural Step Web site is informative, with links to the Australian framework, including "back casting," the four system conditions, strategy for action, and basic science. The U.S. site also offers information on the U.S. framework, including the "funnel" and systems conditions. The U.S. site's "Strategy for action" discusses ways to implement the "system conditions" in an organization's everyday operations.

http://www.detnaturligasteget.se/

II Education for Sustainable Development

1) Teaching and Learning for a Sustainable Future (A UNESCO site) is a multimedia, interactive professional development program with materials, exercises, and links that help educators deepen their understanding of education for sustainability and its importance in addressing the economic, social, and environmental issues of the world.

This site presents key educational issues that form the rationale for Education for a Sustainable Future (ESF), including:

- A basic understanding of sustainable development;
- Help in understanding the range of social, economic, and environmental issues facing the world today; the interrelationships among these different types of issues; and the ways that education is key to the empowerment of people working for a sustainable future;
- "Future studies," which explore different ideas and perspectives about the future and include exercises designed to examine personal views as well as writings by futurists, consider probably versus preferable future scenarios, and incorporate these ideas into the curriculum;
- Various strategies for the education community to reorient education toward the broader process of building a sustainable future.

The exercises help develop an appreciation of the range of ESF objectives regarding knowledge, values, and skills, as well as an understanding of the broad scope of actions needed to reorient education. Key themes include the evolving nature of interdependence, citizenship/stewardship, rights of future generations, diversity; quality of life, uncertainty; and sustainability.

http://www.unesco.org/education/tlsf/

2) Second Nature offers guidance and assistance to institutions of higher education in their efforts to make sustainability an integral part of the institution and expand sustainability into personal and community life. The site is designed for a range of audiences and includes resource guides for faculty, administration, and students. These resource guides foster an understanding of sustainability issues and provide examples of how others are working together across traditional boundaries in both campus and community. Each guide includes on-line databases of bibliographies, contacts, calendars of workshops and other events, and links to descriptions of case studies of sustainability efforts at various higher education institutions. The site's Resource Center section, originally known as Starfish, provides an extensive database of syllabi for courses that address environmental themes. The Alliance for Sustainability Through Higher Education is a multi-institution effort to foster awareness and initiatives related to education for sustainability.

- **The Faculty Guide** highlights faculty who are engaged in including the principles of sustainability in their teaching, learning, research, and practices. It also provides resources related to curriculum change and design, interdisciplinary course syllabi, innovative course projects, faculty development, and collaborative efforts for institutional change.
- **The Student Guide** is designed for college and university students who are actively promoting Education for Sustainability. It provides links to resources that can bolster

efforts to initiate or continue effective and collaborative change for sustainability on campus, in the curriculum, in research, and in surrounding communities.

- **The Administrator Guide** provides tools and resources to help institutions reflect on their role in the future of the planet, learn more about incorporating sustainability into the institution's agenda, and link to other institutions and administrators who are implementing sustainability goals.
  http://www.secondnature.org

3) Learning for a Sustainable Future is a non-profit organization in Canada that helps educators and students integrate concepts of sustainability into the curriculum. This multi-lingual site includes:

- **Teacher Documentation Center**, which provides dozens of classroom and on-line activities for educators, including a pedagogical guide for activities, a calendar of related workshops, and a resource list of books and organizations focused on such sustainability issues as energy efficiency, international understanding, international development, and science education;
- **Hurley Island**, which teaches sustainability concepts to grade 12 students via the Internet, for two hours credit;
- **Top of the World**, which links to organizations working on sustainable development issues in arctic countries;
- **International Youth Magazine**, which helps students understand economic, environmental, and social issues in the world; provides links to organizations working on these issues; and features an interactive "youth exchange" for learning with others through various on-line activities.
  http://www.schoolnet.ca/future

4) Campus Ecology, a National Wildlife Federation (NWF) program, is a conservation initiative in higher education that aims to transform the nation's college campuses into living models of an ecologically sustainable society. The Campus Ecology program is working to train a new generation of environmental leaders and ensure a strong future for America's environmental movement.

The resources of this NWF program include Campus Ecology fellowships, technical assistance, publications, conference information, and a "Campus Ecology Action Toolkit."

http://www.nwf.org/campusecology/index.cfm

5) Greening the Campus: Sustainability and Higher Education is another site supporting the nationwide movement to incorporate environmental principles into curricula and facility operations. "Greening the Campus" looks beyond the creation of new academic departments and programs for campus greening to include information on efforts aimed at ensuring that every student - regardless of major - graduates with a greater awareness of environmental issues and their importance. These initiatives often include "environmental

audits" that examine the use of resources and the environmental impacts of university operations in solid waste, water, energy, and transportation. Similar inventories also inform curriculum development, in which groups of faculty systematically review courses and their content to identify areas in which concepts of sustainability can be introduced.

http://www.islandpress.org/economics/energy/greencamp.html

The Greening the Campus site also includes examples of "campus greening" programs:

- **Brown University:** The Brown Is Green program combines student research, education, and administrative efforts to reduce the environmental impacts of specific operations, including water and electrical consumption, and solid waste management. The site's Campus Environmental Stewardship Resources makes current information on Brown's and other university campus environmental programs freely available over the Internet through links to discussion groups, listservs, and other resources.

  http://www.brown.edu/Departments/Brown_Is_Green/
- **California State Polytechnic University, Pomona:** The Center for Regenerative Studies employs solar energy and natural sewage treatment to support housing, classroom, and research facilities for 90 students, faculty, and staff.

  http://www.csupomona.edu/~crs/
- **Georgia Institute of Technology:** The Institute for Sustainable Technology and Development is introducing ecological principles into the design of new buildings and existing operations, in addition to reviewing existing courses and creating new curricula that address and incorporate environmental themes.

  http://www.istd.gatech.edu/
- **South Carolina's three research universities:** Clemson University, the University of South Carolina, and the Medical University of South Carolina - the country's first statewide partnership - are creating the collaborative Sustainable University Initiative that will also involve representatives from state agencies and other participants.

  http://www.sc.edu/sustainableu/

6) University Leaders for a Sustainable Future (ULSF) provides information and resource referrals, facilitates communication, offers technical assistance, and conducts training workshops that support institutional initiatives to engender environmentally responsible decision making and action through education. ULSF works in partnership with over 275 signatories of the Talloires Declaration and other colleges and universities pursuing sustainability. ULSF fosters institutional capacity to develop ecologically sound policies and practices and strives to make sustainability a major focus of curriculum, research, operations, and outreach at higher education institutions worldwide."

http://www.ulsf.org/

7) Sustainable Development on Campus: Tools for Campus Decision Makers includes learning modules, case studies, action plans, environmental policies, resources, forums, and contacts - all designed to help administration, students, or faculty implement sustainable development on campus - and also includes links to a “bookshelf” of key reports and guides covering university leadership, green campus administration, curriculum issues, and student actions.

http://iisd1.iisd.ca/educate/

8) Sustainability Education Handbook offers the “Multi-strand Approach,” which gives teachers a way to customize current curricula to include sustainability concepts. This approach involves changing one’s teaching structure from teaching discreet individual topics to choosing a theme and teaching all subjects from within this theme. “Mining a topic from all angles” is a standard style of teaching for K-5 enclosed classrooms, but can be adopted for all grade levels.

To customize current curricula, visitors to the site can link to a list of Sample Activities or consult the Criteria Evaluation to quickly interject varied concerns not included directly within the curriculum. The Criteria Evaluation provides basic guidelines to help teachers evaluate whether or not their curriculum embraces sustainability concepts. This tool is designed to simplify the complex process of incorporating sustainability content into the curricula by breaking down sustainability into its essential, but not inseparable, components.

http://www.urbanoptions.org/sustainedhandbook/TheApproach.htm

9) Green Teacher is a magazine by and for educators to enhance environmental and global education across the curriculum at all grade levels. Each issue contains:

- Perspective articles - ideas for rethinking education in light of environmental and global problems;
- Practical articles - reports of what successful teachers, parents, and schools are doing;
- Ready-to-use activities - cross-curricular activities for various grade levels;
- Resource listings and reviews - evaluations of dozens of new books, kits, games, and other resources;
- School news, announcements of all kinds

http://www.greenteacher.com

10) Global Learning, Inc. is a non-profit educational organization that translates the world’s growing interdependence into educational activities for teachers, students, librarians, and educational systems, from elementary school through college and in community settings.

Its Sustainable Development Program is actively engaged in two major projects. **Libraries Build Sustainable Communities** is a second national partnership with the American Library Association, with support from the US Agency for International

Development. **The New Jersey Sustainable Schools Network** is a growing consortium of schools and a wide variety of organizations committed to promoting education for a sustainable future in all schools in New Jersey.

Global Learning's approach to multicultural education is based on a commitment to increasing equity within the pluralistic society of the United States and on a vision of a healthy, inclusive human community. It stresses the development of cross-cultural attitudes and skills that help students and teachers interact positively with people who may appear different from themselves. Global Learning's services for schools, colleges, and professional associations include program presentations, in-service workshops, curriculum development consultations, conference planning, and professional networking. Global Learning also provides affirmative action workshops on cross-cultural awareness and conflict resolution for corporations.

Global Learning has developed several teacher resources (including sample lessons and more) focusing on the interrelated concepts of the environment, development, and equity, including:

- *Sustaining the Future: Activities for Environmental Education in US History*, for high schools;
- *A Sustainable Development Curriculum Framework for World History & Cultures*, for high schools;
- *Making Global Connections in the Middle School: Lessons on the Environment, Development & Equity*.

These books are available for a fee but are approved by New York City Board of Education for textbook purchase and have received favorable reviews from *Green Teacher* and *Teachers Clearinghouse for Science and Society Education Newsletter*.

- Also offered: **The Conflict Mediators Program**, which trains teachers and students in nonviolent conflict resolution and mediation skills. This program helps teachers incorporate these concepts and skills within their existing curriculum and also helps set up student peer mediation programs in elementary, middle, and high schools. The Conflict Mediators Program is an approved program provider in the New Jersey Department of Education's Character Education Partnership Initiative.
  http://www.globallearningnj.org/

11) The Sustainability Education Center of the American Forum for Global Education offers educational materials, professional development, and community education focused on sustainability. The Center builds on the American Forum's 28 years of program expertise in global and environmental education, technical assistance, and curriculum and professional development.

The Sustainability Education Center explores the relationships among economic systems, ecological systems, and justice in contexts ranging from local communities to

global institutions. The goal of these explorations, and sustainability education in general, is to provide young people and citizens with the knowledge, skills, and attitudes that will enable them to meet their own needs without compromising the ability of future generations to meet their own. The Center pilots its programs and materials in the schools of its hometown of New York City before taking them on the road nationally and internationally.

The professional development programs and educational materials developed by the Center help community groups, educators, and young people understand the connections necessary for sustainability and provide them with the skills to find integrated solutions to environmental challenges.

The Center's overall goal is to increase knowledge and understanding of the concept and process of sustainability among pre-collegiate teachers, their students, administrators, teacher educators, and community members. The Center aims to achieve this goal by helping to improve and facilitate school and community relationships and collaborations using sustainability as the integrating force, while encouraging the schools themselves to become communities of learners. The Center also serves as an educational resource for the collection and dissemination of information about sustainability materials as well as about organizations, institutions, and individuals that are active in sustainability education initiatives.

http://www.sustainabilityed.org/

12) Southwestern Ecoliteracy Project takes the position that radical change is needed in our cultural relationship to the natural world. The Project seeks to advance an ecoliterate citizenry capable of perceiving and responding intelligently to the complexities and potential crises involved in this inter-relationship. The Project invites collaboration with interested individuals and other organizations toward this purpose. The Project offers educational programs to professionals, including professional development for college faculty and teachers, as well as public workshops and talks.

http://www.ecoliteracyproject.org/

13) World Resources Institute (WRI) Education Center is an unusual Web site in that it offers programs designed for environmental stewardship for business, with links to:

- **"Business-Environment Learning and Leadership Program"** - a WRI program offering curriculum resources aimed at filling in the gaps that exist in the business and environment teaching literature. To make management education "green," professors must address environmental issues across the entire spectrum of the curriculum's core courses. Furthermore, students and faculty must form partnerships with business leaders and surrounding communities to share knowledge and gain practical experience in creatively addressing environmental challenges.
- **"Beyond Gray Pinstripes: Preparing MBAs for Social and Environmental Stewardship"** - a joint report of WRI and the Initiative for Social Innovation through Business (ISIB), a program of the Aspen Institute. As a rapidly growing number of

businesses discover sources of competitive advantage in social and environmental stewardship, the report identifies the pioneering U.S. business schools and faculty dedicated to educating future managers to handle complex social issues and provide stewardship of fragile environmental resources.

- **"Exploring Sustainable Communities."**
- **Powerpoint slide shows** - WRI's powerpoint presentations are designed to make technical ideas and concepts tangible to a variety of audiences. Topics include climate and atmosphere; economics, business, and the environment; coastal and marine ecosystems; forests and grasslands; pilot analysis of global ecosystems (including maps and population statistics); and global trends.
- **Biodiversity Education** - "Building Biodiversity Awareness in Primary and Secondary Schools" (teaching activities, and links to related sites).

  http://www.wri.org/wri/enved/

III Historical United Nations Documents

1) Agenda for Change: A Plain Language Version of Agenda 21 and Other Rio Agreements, by Michael Keating, 1993 [International Institute for Sustainable Development (IISD)], from the Earth Summit, explains in clear terms what was decided in Rio de Janeiro, Brazil, in June 1992, at the largest-ever meeting of world leaders. At this Earth Summit, 179 countries agreed on a blueprint for ways to make the future development of our world economically, socially, and environmentally sound and sustainable. With links to *The Road to Rio*, *The Five Rio Documents*, and *The Road from Rio*.

http://www.iisd.org/rio+5/agenda/default.htm

2) Chapter 36, Agenda 21: Promoting Education, Public Awareness and Training contains descriptions of the three program areas addressed in Chapter 36, Agenda 21, including:

- Reorienting education toward sustainable development;
- Increasing public awareness;
- Promoting training.

Fundamental principles for the proposals in this document are from The Declaration and Recommendations of the Tbilisi Intergovernmental Conference on Environmental Education 1, organized by UNESCO and UNEP and held in 1977.

http://www.un.org/esa/sustdev/agenda21chapter36.htm

3) International Environmental Policy Reference Guide is a guide to selected international environmental policy references available in Harvard University libraries and on the Internet. [Click on International Environmental Policy]

http://environment.harvard.edu/eic/guides.html

IV Community Action: Sites for creating local sustainability plans

1) The International Council for Local Environmental Initiatives (ICLEI) is the international environmental agency for local governments. ICLEI's mission is to build and serve a worldwide movement of local governments to achieve tangible improvements in global environmental and sustainable development conditions through cumulative local actions. ICLEI functions as a democratic, international association of local governments and operates as an international environmental agency for local governments. The home page features links to an Information Clearinghouse; regional Web sites; information on campaigns, projects, conferences, and events; and a variety of news and documents, including documents related to Agenda 21.
http://www.iclei.org/

2) The Izaak Walton League is one of the oldest conservation organizations in the United States and has chapters throughout the nation. The League has over 50,000 members who are dedicated to protecting the nation's soil, air, woods, waters, and wildlife. The League's mission is to protect and use America's rich resources in a sustainable manner to ensure a high quality of life for all people, now and in the future. Its strength lies in its grassroots, common sense approach to solving local, regional, and national conservation issues. The interests of its members span the spectrum of outdoor recreation and conservation activities, from angling and birding to stream monitoring, wildlife photography, and hunting. The site features information on legislative action on conservation issues (including action alerts), environmental news and information, and education and outreach programs.
http://www.iwla.org/

3) Local Agenda 21 is a local-government-led, community-wide, and participatory effort to establish a comprehensive action strategy for environmental protection, economic prosperity, and community well-being at the local level. This requires the integration of planning and action across economic, social, and environmental spheres. Key elements include full community participation, assessment of current conditions, target setting for achieving specific goals, monitoring, and reporting. Local Agenda 21 (LA21) is focused on implementing the key objective of sustainable development of Agenda 21, which must be achieved primarily through local governments and their constituent communities.

A link to **UEMRI Research** provides a section on "Localizing Agenda 21," which outlines a four-step process by which a LA21 plan can be developed or improved:

- **Data Collection** gathers pertinent baseline information, on which future actions are based and evaluated. This information is used to develop a comprehensive environmental profile.
- **Planning and Development** is the formative stage where the information gathered is

used to develop an environmental vision, state the goals and objectives, and produce an environmental strategy.
- **Plan Management** includes a wide range of activities that involve various stakeholders and the community at large.
- **Monitoring and Evaluation** takes a critical view of the actions being taken, evaluates them against a set of indicators, and monitors the implementation of the LA21 Plan. Each step is briefly explained, its goals and outputs indicated, and additional on-line resources included to better understand the issues and processes involved. The four steps are not mutually exclusive, and there are overlapping and cyclical activities involved.

The site also contains:
- Documents and Information Repositories on the Local Agenda 21;
- Tools and strategies for preparing a LA21 Plan;
- Description of LA21 in 20 individual cities around the world.

http://www.gdrc.org/uem/la21/la21.html

4) Fondazione Eni Enrico Mattei (**FEEM)** is a non-profit, non-partisan research institution established to carry out research in the field of sustainable development. One of its principal aims as a leading international research center is to promote interaction among academic, industrial, and public-policy spheres to comprehensively address concerns about economic development and environmental degradation.

The Fondazione's activities are guided by four fundamental goals:
- To analyze relevant and innovative research areas;
- To focus on real world issues;
- To integrate multi-disciplinary approaches;
- To create and foster international research networks.

FEEM supplies technical support and advice for the public and private decision-making processes in the economic and environmental field, at the national as well as international level. This is done through the Ministry of Finance; the Ministry of the Environment; the Treasury; and expert groups under the umbrellas of the EU, the OECD, the United Nations, the UN Commission of Sustainable Development, the IPCC, etc.

FEEM sponsors the "European Awareness Scenario Workshops" (EASW), which is linked to their Web page. The EASW is part of the European Commission's Innovation Program, which works in collaboration with the European Sustainable Cities and Towns Campaign on two main goals:
- Assessing the transferability of best practices between different cultural and political contexts, including identification of conditions for success;
- Identification and further development of instruments and tools to support know-how transfer processes.

FEEM's multi-lingual Web page also includes a link to the **Global Network of Environmental Economists (GNEE)**, a virtual network whose aim is to assist researchers,

policymakers, academics, and environmentalists from all countries exchange views and information for the purpose of sharing and increasing knowledge, promoting co-operation, and improving quality and effectiveness of research in environmental economics.

Through GNEE, information is offered on current research programs; conferences, workshops, and seminars; research funds; web sites with interesting information on environmental economics; and links to research centers and public institutions. Working papers, reference lists, and databases can be downloaded from the Web site.

http://www.feem.it/