Methodologies for the future
— a guide to develop education for sustainable development
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WWF is one of the world's largest and most experienced independent organizations, with over 5 million supporters and a global Network active in more than 100 countries.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by: conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

Sida

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The UN summit on sustainable development at Johannesburg in 2002 asserted that ‘... education is the primary agent of transformation towards sustainable development, increasing people’s capacities to transform their visions for society into reality...’ Education for Sustainable Development includes processes that cultivate knowledge, skills, values and attitudes that affect the individual’s, the school’s and the community’s work in creating a fair and just society, economic security, ecological capacity and democracy. We have been striving to build capacity in Education for Sustainable Development and mentoring schools to become models of sustainability. Our work in West Bengal, Madhya Pradesh, Chhattisgarh and Assam has succeeded in orienting the State Education departments in Education for Sustainable Development and also in establishing 12 Model schools across these states which uphold the approach. It is through the reorientation of formal, non-formal and informal education towards Education for Sustainable Development that students and participants can be empowered to think creatively, make informed decisions and act towards a more desirable future for their own lives and their societies.

The ‘Methodologies for the Future’ is intended as a source of inspiration and support for teachers and trainers, it lays down concepts and equips them with forms, tools and methodologies that will develop action competence for sustainability in students. It provides in-depth examples of sustainable development, illustrates what needs to be taught and how, and paves the way for schools and communities to develop together. This handbook has also been done in 5 regional languages (Hindi, Axomiya, Bangla, Kannada and Malayalam) and I am sure will be of great service to teachers who play such a critical role in shaping the future of India.

Ravi Singh
Secretary General & CEO
WWF India
I’m doing what I can!

One day a huge and terrible fire broke out in the forest and all the animals ran to escape. As they came to the edge of a stream they stopped to watch the fire, feeling very discouraged and powerless. They watched their homes being destroyed and complained. They all thought there was nothing they could do about the fire, except for one little sparrow.

This particular sparrow decided to do something. It swooped into the stream, picked up a few drops of water and flew into the forest and put them on the fire. Then it went back to the stream and did this again, and kept going back, again and again and again.

All the other animals watched in disbelief and some tried to discourage the sparrow with comments such as, ‘Don’t bother, it’s too much’, ‘The fire is so big, you can’t do anything’, ‘You are too little, your wings will burn’, ‘Your beak is too tiny, it’s only a drop’, ‘You can’t put out this fire’.

Finally, an elephant asked, ‘What do you think you are doing?’ The mynah, without wasting any time looked back and said, ‘I’m doing what I can!’
Dare to be different

Sustainable development is one of the biggest challenges mankind has ever faced. If we are to achieve sustainable development everyone must participate. This will require lots of learning. We need knowledge, values and skills to participate and contribute to reach a more sustainable future. Education has an important role to play in building this capacity. Kofi Annan, a former general secretary of United Nations (UN), once said that our biggest challenge is to ‘put sustainability into the very heart of education’. When world leaders gathered in Rio in 1992 and agreed on Agenda 21, education was given a dedicated chapter due to its importance. In the meeting in Johannesburg 2002, education was reaffirmed as a foundation of sustainable development ‘making the abstract real, and developing the capacities of individuals and societies to work for a sustainable future is, essentially, an educational enterprise...’ It was also stated that ‘...education is the primary agent of transformation towards sustainable development, increasing people’s capacities to transform their visions for society into reality...’ To promote this it was also agreed to dedicate a special decade for ESD, the United Nations Decade of Education for Sustainable Development (DESD), between 2005 and 2014, for which UNESCO is the lead agency.

This calls for a reorientation of policies, curriculums, teacher training all the way to the learning and practice in local schools, communities and workplaces.

But what is ESD? This needs to be critically analysed and defined by each and every one of us. ESD has many aspects and WWF has tried to merge these into six cornerstones which are presented in this chapter.

UNESCO’s regional office in Bangkok has defined ESD in another way:

- Envisioning – being able to imagine a better future. The premise is that if we know where we want to go, we will be better able to work out how to get there.
- Critical thinking and reflection – learning to question our current belief systems and to recognize the assumptions underlying our knowledge, perspective and opinions. Critical thinking skills help people learn to examine the economic, environmental, social or cultural structures in the context of sustainable development.
- Systemic thinking – acknowledging complexities and looking for links and synergies when trying to find solutions to problems.
- Building partnerships – promoting dialogue and negotiation, learning to work together.
- Participation in decision-making – empowering people.

ESD involves us in an important and exciting process in which we are all compelled to learn and share our ideas on the best way to help people around the world develop their skills and move forward.

Six cornerstones

In the following we will describe ESD using three questions and six cornerstones. This is an overview of one way of describing ESD. Read more about this in Learning Sustainable Ways, a booklet in which WWF elaborates its position on ESD.

Why ESD?

When you develop and extend knowledge you get a palette of personal skills, which are useful both in individual and collective situations and enable you make more conscious and considered decisions in an increasingly complex and changing world. A social process we call sustainable development and which does not have a well-defined destination set up in advance.

How is ESD done?

Holistic approach
This approach teaches skills to connect issues of ecological carrying capacity to issues of social justice and economical sustainability.

Key question: How can you link environmental, social and economic aspects when you are educating?

Lifelong learning
- Paves the way for the ability to rethink and think anew, and to be innovative.
- Working process oriented and values both process and results.
- Develops a progression in ESD.

Key question: In what way can you as a facilitator support your students/participants to rethink and to be innovative?

Leaders in focus
Puts learners in focus and uses their own questions and expertise as starting points.

Based on an approach in which the learner builds knowledge in interaction with others.

Key question: Of what importance is a learners preknowledge, questions and knowledge in the learning process?

Democratic work methods
Lets learners influence their schools and the surrounding community – making them the active creators of their own education and their efforts in society.

Key question: Do the students/participants have any possibility to influence their education, the learning process and the surrounding society?

Different perspectives
- Supports critical analysis from different perspectives, e.g., ethical, historic/present/future, and takes a stand in when interests come into conflict.

Key question: How do you manage your students to look at the world from different perspectives?
Reflection

- Develops skills for a critical analysis of where we are heading, and for developing visions and strategies for a more sustainable society.
- Encourages a continuous inner reflection, and a more concrete form of listening, expressing, writing and artistic creation.

Key question: In what way do you encourage the learners to think in a critical way?

Where is ESD done?

Oriented towards the local environment
Uses the school and the surrounding community and nature as learning arenas, and develops participation and cooperation.

Action competence

- With the six cornerstones of ESD as a foundation for education, participants will develop important skills that will enable them to take a stand and act for a better future. However, it is not enough merely to teach people how to discuss sustainability - you must also get them to act. For this reason it is a good idea to take a closer look at the key challenge of ESD - building action competence! What makes people go from words to action? These is no simple recipe for this, it is a very complex process with many interacting factors which may differ greatly in different contexts and situations. However, research has found the following aspects to be important:
  - Will, courage and the desire to get involved and act
  - Knowledge of problems, their causes and possible solutions
  - Knowledge of the sphere of influence
  - Reflective attitude towards different options

Drivers of environmental actions

It is important for the educator to enable students and participants to develop action competence by providing situations in which they are encouraged to experience action themselves. For example collaborative projects with the local community are excellent learning opportunities in the school. Role-models are also important for developing action competence. These can be teachers, parents, community members or whole schools that demonstrate good practice in acting for sustainability.

Why do some people act while others don’t when they run up against environmental problems? The Swedish researcher Ellen Almers has examined this question and lists four reasons and driving forces behind environmental action:
- Desire for change and willingness to act
- Desire for meaningfulness
- Desire to feel competent
- Longing for community with others

To elaborate on the above:
- The desire for change is experienced, for example, when you share the burdens and sufferings of others, or when you see an entire rainforest being devastated.
- The desire for meaningfulness occurs when your own values harmonize with your own actions.
- The desire to feel competent is about carrying out a task for which you feel qualified. This imparts energy, strength and joy.
- The longing for community is about sharing experiences, feelings of participation and belonging.

ESD methods

There are no special “ESD methods” that have been specifically designed or created for teaching and learning sustainable development. But some methods are much better suited to ESD than others. Typical for many ESD methods is a focus on the learning process. The method chosen must suit the specific teaching or learning situation. The learning environment must also be tailored by each professional educator to suit each particular case.

A checklist of ESD methods and activities

- To summarize the discussion above, here is a checklist of things that are important to take into account when choosing methods and activities in both the short and long term:
  - Pre-knowledge. What do the participants already know and what attitudes do they have?
  - Aims. What are the aims of the teaching or project in question?
  - Purpose. Start with the purpose. From this, construct a what and a how.
  - Skills & knowledge. What skills and knowledge do you intend to impart and improve, and what attitudes do you intend to develop?
  - Methods. Which methods and activities will best support the aims?
  - Learning styles. Try to have all the four learning styles in your mind.
  - Emotions. Don’t forget emotions!
  - Evaluation. How will you assess and evaluate what has been learned?
  - Participation. How will the participants be involved in the planning and progress of activities?
  - Visibility. How will you make your work visible to others?
FOUR THOUGHTS ABOUT LEARNING

A journey full of questions
Imagine you are on a journey towards an unknown future. The final destination is very, very far away. Nor do you know what will happen to you and your travelling companions along the way. What do we need to equip ourselves with in order to face an uncertain future? What skills and competence do you need to develop? In this book we present a large number of exercises that can be used to develop skills for a sustainable future.

Why do some things stay in your mind?
Your baby’s birth, a colourful flower, an adventure in a rainforest, a breathless sunset ... Some moments in life are never forgotten. ’It was a memory for life’ you might say. Why do some things stay in your mind?
Think of something you will always remember. Tell anyone you wish to. Now, think about what made it so unforgettable.
Think also of something you know how to do, in practice or in theory, something you are good at. Ask yourself this question, ’Why are you good at that particular thing?’

Two things affect on learning
I remember when I sprained my ankle during a football match, it hurt so badly! I also remember this one time when I met some friends and we laughed until we cried. Both these incidents happened a long time ago but I remember them so vividly. How?
A brain scientist has pointed out that there are two things that have a marked effect on learning. These are negative, unpleasant and positive, happy experiences.

The French philosopher Rene Descartes emphasized the importance of the brain, ’I think, therefore I am’. But is it not also true that the brain and body are irrevocably bound together? Chemical substances in the blood and the electrical nerve impulses connect the body and the brain. We need both to become full, social individuals. And to achieve this, emotions show us the way!
We have already pointed out that ESD is built on six cornerstones. We must remember that we are all unique individuals and learn and teach in different ways. Out of the six cornerstones, two of them dealt with reflection and learners in focus. In the discussion that follows you will read about four philosophies of learning that have been described openly and impartially. Please read and reflect upon them carefully.

But first let us think about what makes learning a fun exercise.
1. Active and engaging learning

Think about a learning situation that engaged you. You can take your time with this. Now ask yourself two questions related to that: What was it that you found enjoyable? When is learning active and engaging?

To reflect on your own teaching and your way of learning things are important ingredients in the art of learning. When you listen to a lecture you are mostly passive and unengaged. However, if you participate in real projects, play games, debate and solve problems you are both active and committed. Do you agree? Look at the diagram below and judge whether it matches your own experiences. We can conclude that the more active we are the better we learn!

![Teaching-Learning Mode Diagram]

2. Four educational philosophies

Humans are learning beings. How a school is designed and constructed today is no coincidence; it belongs to a historical context. During the period of evolution in our understanding of learning and teaching methodologies, some educational philosophies have developed. These philosophies include some fundamental ways of thinking in education and hence share a common root. However, their take on the process of learning and teaching are different. What we should remember is that the old ways of thinking about education carry important experiences that can be challenged, but at the same time, the new can be reflected in the old.

Do you think that subjects have an inner core that defines them, or do you favour a critical approach instead? Do you teach principles or do you think that society should be changed? If you have these thoughts, this chapter may attract you.

It is possible to identify four different philosophies developed during the 1900s that have provided us with interesting explanations about the nature of education. We are all different. We present four educational philosophies. Which of these four educational philosophies would rapidly lead to the solution of immediate needs?

**Essentialism**

This philosophy argues that there is an inner core to a subject, a topic-specific knowledge. Participants should therefore be given facts and taught relevant skills in different school subjects. It understands the process of learning and teaching wherein the instructors have knowledge and the participants can be seen as empty vessels to be filled. This approach can be called Banking Education.

**Progressivism**

In Progressivism, the goal is to place the individual, the student, at the centre. Therefore the thrust is about developing the learners themselves. This approach stresses the practical side of teaching (‘learning by doing’), through real-world experience and activities that centre on the students’ actual situation. The instructor organizes and guides the student in learning situations.

**Social reconstruction**

The age-old society is changing, and it’s for the good! Social Reconstruction provides the participants with tools so that they both can and want to change society. The learner/student has social change and the future in his/her focus. The instructors do not need to be neutral. The learners develop critical thinking.

**Perennialism**

Some things are eternal and schools must take this into account. Schools must pass on these eternal principles; some knowledge of which is part of a broad education. Since factual details change constantly, these are less important. Therefore, one should teach principles. What it means to be human, major life issues, ethical issues and so on. A perennialist focuses primarily on personal development. It is an instructor-centred method.
3. Four learning styles

Let us now move on to the issue of learning styles. When you have bought a new radio, do you read the manual or do you press the various buttons to see what happens? We all do things differently and it is possible to identify four distinct ways of learning or so-called learning styles.

1. The Diverger relies on concrete experience and reflective observations and stands for curiosity, imagination and emotion. The diverger combines practical experience with reflection and observation. Different people may interpret things differently and come to different conclusions.

2. The Accommodator relies on concrete experience and active experimentation. The accommodator solves problems intuitively – by trial and error.

3. The Assimilator wants to have abstract conceptualization and reflective observation and is not interested in concrete experiences and people. Knowledge is incorporated into the inner world without changing the internal structure of that world.

4. The Converger thinks first and acts afterwards and is fond of logical thinking. He/she wants first to establish a theoretical background and then put it to the test in a practical situation. Questions that are asked by the converger have answers that are either right or wrong, for example, the type of questions often posed in mathematics and in certain aspects of language, in the sense that there is often only one correct answer and not a variety of different interpretations.

Which of these learning styles should you adopt? It is probably a good idea to use parts from all four adapted to the particular requirements of each teaching situation. The emotional aspect is very important. Human beings are essentially creatures of emotion and are not interested in concrete experiences and people. Knowledge is incorporated into the inner world without changing the internal structure of that world.

The reflection phase is also important in order to bring order to things – to draw a map. When we interpret the world we do so through different filters, goggles. It is inspiring to think together with others. In dialogue with others we benefit from fresh perspectives on things differently and it is possible to identify four distinct ways of learning or so-called learning styles.

The reflection phase is also important in order to bring order to things – to draw a map. When we interpret the world we do so through different filters, goggles. It is inspiring to think together with others. In dialogue with others we benefit from fresh perspectives which give us a more nuanced view of reality. Your mind is liberated.

Four Learning Styles

<table>
<thead>
<tr>
<th>The Accommodator</th>
<th>The Diverger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where are you in this chart?</td>
<td></td>
</tr>
<tr>
<td>How will you act if you are going to teach a group of 20 participants, 5 are convergers and 15 are divergers?</td>
<td></td>
</tr>
<tr>
<td>The Converger</td>
<td>The Assimilator</td>
</tr>
</tbody>
</table>

3. Concrete experience

This can for example be role play or a case study.

2. First we find out about the situation through observation.

We talk in a general way about what we experience. The basic idea is to create a common, shared experience.

3. Then we evaluate and analyze what we have observed. Is it good or bad? We organize our personal experiences using words and concepts and we reflect on and interpret our own and others’ experiences.

4. We design a way of thinking based on the results of the analysis. This result in an “action”, we act. From the reflected and observed we try to sort out things and then arrive at general rules or theories. Through reflection we form strategies for action.

4. Action learning

Background

ESD means travelling on a winding path towards an unknown future. We need constantly to reflect, reconsider and rethink. A pedagogical approach that is useful in ESD is called Action Learning.

Despite increasingly advanced instruction in school and at university the environment is suffering more and more. Are we learning about the wrong things or are we using inadequate methods? Personal learning should not just mean acquiring old, established knowledge. Your own personal experiences should be used as a basis for problem solving and the creation of new knowledge and should be innovative. Action Learning is a process that reinforces this. Your own and others’ daily experiences form a platform for learning – an experience-based learning in a learn-to-the-mind-self-culture. When experience leads to action, this action can truly be called learning.

How to teach

Start with a purpose. From this starting point, construct a what and then a how. You should be able to answer the following: What is the purpose of the exercise? How is it related to the overall purpose of the subject?

Three questions are important to ask when teaching:

- What should we teach?
- Why should I teach just that?
- How should the teaching be carried out?

Start with what and why. Then consider how.

How to learn

Action learning is an ongoing learning and reflection process. Goals and the process of achieving them are equally important. Reflection is the main tool, to reflect with others and learn from them and then act. If your goal is to get a person to understand a concept at a level that they can generalize, and thus apply this understanding in new situations, or combine this understanding with other concepts they have learned. Experience-based learning is probably the best way to develop this level of mastery.

1. Concrete experience

This can for example be role play or a case study.

2. First we find out about the situation through observation.

We talk in a general way about what we experience. The basic idea is to create a common, shared experience.

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What we have observed. Is it good or bad? We organize our personal experiences using words and concepts and we reflect on and interpret our own and others’ experiences.

4. We design a way of thinking.

Based on the results of the analysis. This result in an “action”, we act. From the reflected and observed we try to sort out things and then arrive at general rules or theories. Through reflection we form strategies for action.
At its simplest, action learning consists of two stages: action and reflection, in an ongoing series of cycles.

**Action ► Reflection**

Concepts can easily be seen as empty words. What do poverty, wealth, happiness, sadness, drought, crop failures, floods, climate change etc. mean for you if you have not experienced them? The personal experiences are extremely important. Your first-hand experience where you use all your senses gives powerful experiences that are stored in your mind. When you are reflecting and analyzing learning is taken place. However, reflection leads to learning, which leads to changed behaviour in the future:

**Action ► Reflection ► Action**

Learning it is made more effective by expanding the reflection component in this cyclic process. We can therefore expand the reflection component we want to take into account.
Gather the participants in a circle. They should show each other what they have found and discuss the sustainability of natural objects. Start a free discussion and try to agree on a definition of what sustainable development can be.

There is an official definition of sustainable development that comes from the United Nations:

Let us immerse ourselves in this definition by confronting small bugs in nature.

b) Bugs in a jar
Take a jar. Go outdoors and look for small bugs. These may, for example, be worms, beetles or similar creatures. Put them in a jar and ask them some questions.

- What kind of food does the creature eat?
- Where does it live?
- How does the creature spend its life?
- What do you think is a good life for the creature?
- How will the future be for the creature?

Ask the same questions of yourself:

- What kind of food do you eat?
- Where do you live?
- How do you spend your life?
- When are you sad/ happy?
- What are your most important needs?
- How do you see the future of humans in the short and long term?
- What do you think about the UN definition above about sustainable development?
- Which way do you wish that your children will go when they meet the coming days?

Sustainable development
- what does it mean to a 12-year-old?

Purpose
To make an abstract concept simple and easy to understand.

Background
In 1992 there was a conference held in Rio de Janeiro about environment and development. This was the biggest meeting ever held within the UN. At this time the concept of Sustainable Development became well known all over the world. Everybody agreed that sustainable development was a superior goal for development. There was even a plan developed on how to reach a sustainable way of living within the next 100 years. Most people agreed, but when it comes to daily political issues most politicians have conflicting opinions. Sustainable development is a development that ensures the well-being of humans by integrating social development, economic development, and environmental conservation and protection.

What to do
The concept of sustainable development is often seen as complex and nebulous. Ask the participants to explain the concept with the following constraints:

You are a teacher in class six:

A young girl comes to you and says: "Yesterday I heard a radio program. They said it will be nice when I grow up because we will have sustainable development, but I do not understand what that means".

Form small groups and try to explain the concept of sustainable development in such a concrete way that a 12-year-old child will understand your explanation.

The participants then present their explanations. Reflect together and discuss the different versions.

Some other examples of how to explain sustainable development:

If an individual person fully embraces and applies the precepts of sustainable development then gradually the entire society will be positively changed.

If you dig terraces in the sloping part of the farm, then the soil will not be washed away. This means your farm will remain fertile and produce more crops to continue feeding your family in the future.

If you cut trees to get firewood you cannot cut more trees than there are new trees growing up.

If you use water without wasting it then there will be more water available in the future.

If you catch fish you cannot catch more fish than there are new fish being born.

We all want to keep our homes clean and in good order and we are economical with the family resources. Let’s treat the planet as we do our homes.

If the children in a family are given an equal amount of presents by their parents they will live in peace. The same must apply when economic resources are distributed between people in different countries if we are going to live in peace.

We should explain why it is better to live in a sustainable way so that children will experience it and learn.

If we behave towards others the way we want them to behave towards us, we will have sustainable development.
S.E.E. the links

Purpose
To explore the linkages between Society, Environment, and Economy (= S.E.E.)

Before you begin
Get hold of three sets of dice in three different colours for each group.

What to do
1. Let the participants sit in small groups.
2. Three numbers are chosen by rolling three sets of dice, red, green and blue. The red dice correspond to the category Society, the green dice correspond to the category Environment, and the blue dice correspond to the category Economy. Each category contains six terms, as listed on the activity sheet, one for each number on the dice.
3. One of the partners rolls the dice. The group is given a few minutes to discuss, and then compose a short story which links the three terms that correspond to the numbers shown on the dice. Terms may be used in any order. The group writes down the story.
4. When one story is finished, roll the dice again to create a new story.
5. When all groups have completed at least one story, ask a few groups to share and then discuss the stories.

Example Roll
1. Society = “poverty”
2. Environment = “land use/soil”
3. Economy = “markets”

Example linkage in words
A young farmer inherits a garden plot. The previous owner had not cared especially well for the plot; the soil had become less fertile and had been eroded by rainwater. The young farmer kept most of the harvest from the garden plot to feed his family. The market in town suffered because many farmers did not have surpluses to sell, because their land had also been eroded. Poverty in the area increased.

Comments
You can go further by adding an additional set of dice; personal dice. These dice will show emotions. The dots on the dice can stand for: joy, sadness, happiness, disappointment, satisfaction and excitement.

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Sustainable development in the local environment

Purpose
To identify different aspects of sustainable development in the local environment and to discuss important skills connected to this.

Before you begin
a) Collect some pictures of your local community. Try to get a good mix of pictures showing landscapes, buildings, culture, history, jobs and people. Postcards and pictures in magazines work well, or you can use the images contained in Resource 2 at the end of this book.
b) Prepare four postcard-sized pieces of paper in different colours (for example red, yellow, green and blue) for each group. Each card/colour corresponds to an aspect of the picture:
   - A social aspect (red)
   - An economic aspect (blue)
   - One about democracy (yellow)
   - One about ecological responsibility (green)

What to do
Part 1 - Our complex communities
1. Choose a picture
Put the pictures up on a wall or something similar and ask the participants to choose a picture that interests them. The picture may make them think of a memorable occasion, remind them of a spot near their home or a place they either want to change or preserve exactly as it is. If someone ends up by themselves with a picture he/she can bring it to another group and this group can choose to work with one of the pictures or both. Ask the groups to take the pictures away with them, and to sit together for a while and discuss them.

2. Four pieces of coloured paper
Distribute the four postcard-sized pieces of paper to each group. Explain that each card / colour corresponds to one aspect of the picture:
   - A social aspect (red)
   - An economic aspect (blue)
   - One about democracy (yellow)
   - One about ecological responsibility (green)

These four aspects form the framework for both our potential and our limitations.
3. Identify four aspects
Now, the participants look closely at the picture of their choice and identify four dimensions mentioned in the instructions above.

Ask the participants to write down the aspects they have identified, one aspect per piece of paper. If the picture they have chosen shows a playground and they have identified “child care” as the social aspect, writes the “nursery” on the piece of paper whose colour represents the social aspect.

4. A large sheet of paper
Set up a large sheet of paper at the front of the room and write the heading “Our society” at the top. Start with a social aspect, ask a person or group to give their response. Attach it to the large sheet of paper.

Then select another aspect (from any of the four areas), that relates to the first. Place it next to the first factor and draw a line connecting the two. Continue this process until there is no more related factors and no more lines can be plotted.

When the group is unable to find more related aspects, ask someone to begin with a new starting point. Continue this process until all issues have been presented.

5. Explain ideas
Ask the participants to look at this interwoven web of issues and consider how they are affected by, or influence, external aspects – regional or global. Ask them to explain their ideas for the group and write them on a blank area of the large sheet of paper.

Part 2 - Important skills
6. Important skills
Ask the participants to describe the skills they need to deal with the complex relationships that exist between the many aspects identified during the first part of the exercise, which is represented by the conceptual map “Our society”. For example, “be flexible”, “listening”, and so on. Write down the participants’ responses on a large sheet of paper.

7. Developing skills
Knowledge can be summed up in four words facts, understanding, skill and familiarity. But we also need values and attitudes to expand and develop knowledge. Now discuss briefly the skills you identified under number 6. Write down the answers on a flip chart.

Part 3 - Personal reflection
In Part 1 you gained an insight into the complex relationship between social, economic, ecological factors and the manner in which democracy and decision-making have a bearing on how we organize our society now and in the future.

Part 2 involved getting an understanding of what is implied by learning for sustainable development and you have identified the skills you think are important for the participants to develop in this area. Use this as a guide for further discussions.

Now, you shall briefly discuss the skills you identified in number 6. Discuss also from the list below:

| Investigative | Ability to be investigating starting a curiosity in existence. Being investigative means constantly trying to learn new things and make the world meaningfully through a creative exploration. |
| Analytical | Being analytical will be able to take many different aspects when to make a decision or solve a problem. With an analytical perspective, nothing is only black or white, but can always be viewed from a new perspective. |
| Communicating | By communicating skills one will achieve the ideas and different types of information in several ways. To possess this ability means that you have developed verbal and linguistic skills. |
| Risk-taking | To develop into a risk-taker means that ones believes in himself and feel free to explore new and unfamiliar areas, ideas and strategies. |
| Literacy | Being knowledgeable means that by exploring the world on a variety of ways has gained a large and varied knowledge. |
| Rigor | People who become principled are sure what they think is right and wrong. They have built up a solid moral platform to start from. |
| Carefulness | Caring people have developed an empathic ability and feel a personal commitment to act on different societal issues. |
| Openness | Persons with a capacity for openness shows respect for differences among people and cultures. They weigh in both human rights as it is good for the environment when shall make its decisions. |
| Rational | People with a balanced view of life considers such that it is important that we feel good both physically and mentally. |
| Inquiring mind | To have the ability of inquiring mind will be able to reflect upon their own learning and to recognize their own strengths and weaknesses. |
| Global thinking | People with a global thinking to understand how development can be made both in the neighbourhood of the earth as a whole. They support and defend human rights and are prepared to learn from different cultures. |
| Active participation | To have an ability to citizenship involves can participate actively in the debate on various social issues. |

Write down the answers that come up on a flip chart.

Comments
The exercise has been inspired by Pathways, a development framework for schools sustainability, WWF UK, 2004.
An EE and ESD puzzle

**Purpose**
To understand different traditions in environmental education.

**Before you begin**
Copy the resource below and cut out the sentences so that they look like pieces of a jigsaw puzzle.

**What to do**
Divide up into groups. Hand out one set of the puzzle to each group. Ask the groups to sort the sentences under each headline. When the groups have finished sorting, hand out the resource sheet with the sentences. Let the groups compare their results with the sheet.

Discuss in plenary: Were there any doubts or difficulties? Has their understanding increased?

**A summary**
On the left you can read a summary of three different environmental education traditions.

### Fact-based

<table>
<thead>
<tr>
<th>1. Environmental problems are: Scientific knowledge-based in character and are resolved by means of research and gathering information</th>
<th>1. Environmental problems are: Value questions which can be resolved by exerting an influence on people’s attitudes and behaviour</th>
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<tbody>
<tr>
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<td>2. The Cause of Environmental Problems is: A conflict between society and the laws of nature</td>
<td>2. The Cause of Environmental Problems is: Conflicts between humans’ wide range of achievement goals</td>
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<td>3. The goal of environmental education is: Students receive knowledge of environmental problems by learning scientific facts</td>
<td>3. The goal of environmental education is: Students actively develop environmentally friendly values, primarily based on knowledge of ecology</td>
<td>3. The goal of environmental education is: Students develop their ability to critically evaluate various alternative perspectives on issues.</td>
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<td>4. The most central subjects and areas of knowledge is: Natural sciences, biology, chemistry, physics, and ecology.</td>
<td>4. The most central subjects and areas of knowledge is: Natural science and aspects of social science</td>
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<td>5. The main Method of Teaching is: Integrated teaching where the students have an active role in the learning process.</td>
<td>5. The main Method of Teaching is: Integrated teaching where various aspects and critical discussions is at focus. Students are active.</td>
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### Normative

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### Pluralistic

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**Planting trees in an ESD way**

**Background**
Trees are important for nature as a whole but also for humans. Lots of insects and birds live in trees and use them for food. Humans use wood for furniture, as fuel for the oven and use trees for shade on sunny days. Much more can be said about the importance of trees for the climate and in the future.

What is the role of trees in a sustainable society? How can learning about trees follow the principles of ESD? The following exercise is one way of ensuring that teaching methods really do adhere to the precepts of ESD. See this exercise as a model which can be applied to many other areas.

- Read the section on page 6 of the six cornerstones:
- Different perspectives
- Democratic work methods
- Holistic approach
- Lifelong learning
- Learners in focus
- Reflection

**Purpose**
To determine whether an activity is characterized by ESD.
What to do
A school has decided to implement a greening initiative and plant an area the size of a football field with trees. The area is now covered with bare soil and a few shrubs. As a starting point for the project to be developed for ESD, the leader adopts teaching methods based on the six cornerstones. Or, the participants can develop their own questions. Treat the following as a suggestion:

Different perspectives
- Try to describe the area that will be planted – what did it look like 100 years ago?
- How do you think it will be 100 years from now?
- Who owns the land today? Who owned it 100 years ago? Who will own it in the future?
- Planting trees is good for food, and as protection against wind and sun. Can you think of a different or better way to use the land?
- Does it make sense to plant trees that may take 20 years to grow really big? Is there no quicker way to cultivate the land?

Democratic work methods
- Who should decide what to do with the land if we are to develop democracy?
- What are the advantages and disadvantages of planting trees?
- Should we have a debate where those who are for and those against discuss the issue?
- Should we have a role-play in which we adopt different roles connected with afforestation, for example, landowners, forest workers, banks, municipalities, schools, etc?
- What strategy should we adopt when we choose afforestation? Which trees should be planted? What is the state of our economy today and how will it be in about 10 years?
- Who should manage the forest?
- How can we collaborate in the local community?

Holistic approach
- Think about ecological issues related to the tree species suitable for planting, the insects/pests that may affect them, how we are to protect them from animals, how much water will be needed... What will happen to the environment in a local and global perspective if we do not plant new trees?
- Is it possible to save the world with the help of trees?
- Discuss social issues about who is to use the forest, and who should reap the benefits. Can planting forests reduce poverty in a society? Can both men and women work in the forest?
- How will the economy develop after afforestation? What will the plants cost? What expenses will we incur today, tomorrow?
- What revenues can we get from the forest?
- Are there any correlations between ecological, social and economic issues?

Lifelong learning
- How can wood be used for young people? What can the young learn from the forest? How can it be used by older people? What knowledge may older people have that could be valuable for a younger generation?
- How can education be structured to guarantee that it will evolve? How can learning about the forest follow a staircase of knowledge? What personal experiences do we have? Are they useful for others to know about?

Learners in focus
- What knowledge do we have today about trees and forest management? What do we want to learn?
- How can learners share their knowledge with others?

Reflection
- Are there alternatives to forest plantation? Can we do otherwise? Do we have enough skills?
- Let the participants reflect by themselves and/or in a group.
- Develop a vision for the forest and its importance in society and for the environment in the future.
- What strategies can we develop so that we move towards a sustainable society?
THE ROLE OF THE INSTRUCTOR

Sustainable development is a complex challenge where many opinions meet and diverge. It is a good thing to use methods that promote participation and cooperation among those taking part. The role of the instructor is to supervise learning and to help structure and organise the work. The leader should be passive-active, i.e., pay close attention to how the process of learning advances and step in and provide support only when needed.

Individuals become a group

You meet a nice and interesting person A at a meeting. A few days later you review how things are going along with others in the group. Individuals have coalesced into a team. You now think and feel differently. You might have been stimulated by the group or lost self-confidence. Person A turns out to be a completely different person than you first thought and so on.

Something strange goes on when we get together in a group. Sometimes members of the team can encourage each other to achieve great things, sometimes the opposite can occur. It is very important to influence the mood of the group so that it moves in a positive direction. It is the leader’s responsibility to create a group dynamic that delivers more energy than it consumes.

Football team

Look at what can happen in a football team. At beginning the team is just a bunch of individualists who only think about their own needs, but as things progress they start to cooperate.

Examine the following about the football team as a metaphor for a class or group. What is the role of the coach and what are the roles of the players? This discussion could be held in the group that you supervise.

The leader in a football team or in every other group has different roles and so is it for the players and participants too. Below we have listed various roles that you may have. Perhaps there are even more roles that you can suggest and add?
Responsibilities

Leader’s Role

• Best on the field
• Police, judge
• Materials manager
• Team official and coach

Participant roles

• Spectator
• Ball boy
• Reserve
• Player

Comments

If each individual player does not take the trouble to learn how to play football properly, the team will lose. The leader can only support, coach, challenge and stimulate the team.

Three questions

Spend some time discussing following questions:

• How can our team get better?
• What should the individual player do?
• What should the coach do?

How can our team get better?

Fear and poor management do not make people perform any better. It is security, a supportive attitude, encouragement, clear objectives, individual responsibility and dynamic teamwork that play important roles in this regard.

What should the individual player do?

Be well prepared for the match and then do his/her very best according to his/her own ability.

What should the coach do?

The team manager should pay attention to all the players and encourage them. He/she must also provide security, facilitate teamwork and positive attitudes and instil courage when necessary.

Knowledge to act

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

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

Knowledge is all about dealing with problems in a changing situation and how to get the best out of life and progress. Despite living in a so-called enlightened and educated society we are witnessing the results of an increased environmental pressure on Earth. New ways of thinking must be therefore reflected in educational policy documents.
A development-oriented education

Look at the chart. There you can find two different types of education: Traditional education and development-oriented education. How does such a view of knowledge affect teaching and the learning situation and the role of the teacher?

Behaving as a leader

It is important that you clarify for yourself how you should behave as leader. Either you take part in the exercises and take a stand just like the participants or you remain totally neutral.

Young children

When working with younger children it is sometimes wiser not to take part, since children are easily influenced by what the leader thinks. In this case it is especially important to be neutral when discussing the children’s opinions in order to underline that there is no absolute right or wrong answer. Small children can misinterpret an almost imperceptible nod from the leader as a confirmation of somebody’s answer.

<table>
<thead>
<tr>
<th></th>
<th>Traditional education</th>
<th>Development-oriented education</th>
</tr>
</thead>
<tbody>
<tr>
<td>View of knowledge</td>
<td>Knowledge is a product.</td>
<td>Knowledge is a process in which the quality and value of knowledge is emphasised.</td>
</tr>
<tr>
<td></td>
<td>Objective and quantitative aspects are important.</td>
<td>Theory and practice are interlinked.</td>
</tr>
<tr>
<td>Learning teaching process</td>
<td>Education is characterized by superficiality, texts having to be memorized and a motivation that is created from sources other than one’s own experience.</td>
<td>An in-depth education with an emphasis on understanding and reflection. Motivation usually comes from within. Previous knowledge and experience are valuable and participants are involved in active cooperation. A focus on knowledge in action.</td>
</tr>
<tr>
<td>Role of the teacher</td>
<td>The instructor has responsibility for the teaching content and conduct.</td>
<td>The instructor is more like a supervisor or mentor offering varied ways of working. Encourages participants to take responsibility for their own learning.</td>
</tr>
</tbody>
</table>

Values exercises

In the context of ESD values exercises are very useful. But they presuppose that the leader can create a climate of trust and openness. Perhaps you can start the activity with some exercises that force listening and train a respectful attitude. If the group feel safe the values exercises will work very well. Read more about this in the chapter “Competence in democracy”.
COMPETENCE IN DEMOCRACY

Values exercises from a general point of view
Values exercises are used to explore people’s attitudes and values. Every day we all encounter different situations that force us to reflect and make decisions. Everything we do is based on conscious or unconscious convictions. These may be about clothes, friends, recreational activities, work-related issues, politics, etc.

Many factors form our attitudes and values
In today’s society we are compelled to form our own opinions much more actively than before. In the past, church, school and family dictated and shared many of the same attitudes and values. Today there are many other factors that influence us, e.g., the media, music, globalisation etc. Many of our attitudes to our lives and futures reflect fundamental values, which are often based on experiences from childhood and adolescence. We are not always aware of the attitudes and values we have, much less of how they control our actions, or where they come from. When it comes to sustainability we often have not yet formed any values at all as we lack the in-depth dialogue which might help us to do this.

Open attitudes and respect
Working in areas that engender lots of attitudes and values calls for a climate of trust in the group – and a good relationship between it and the leader. The value exercises are not going to function if the group is not open-minded and each individual in the group is not respected. If the group feels safe, the values exercises will become good working tools for the individual as well as the group and increase the individual’s awareness of their own and others values. If you feel that the group does not have the openness you might wish it might be a good idea to begin with exercises that teach listening skills and instil mutual respect.

Put it in a context
Another important requirement is that the value exercises are continually put into a context. If this is not done they will merely seem to be odd features of everyday life – things you do not really need to take seriously. Your goal should be to create values exercises that are relevant in your own particular teaching scenario.

It takes a long time
The objective of working with values methodology is to enable each individual to achieve an active, ethical norm. It may take a long time to develop attitudes and values and it is only by an individual person’s shift of opinions or actions that you are able to see when changes take place. The first step is often to become aware of your own opinions and actions and how they are formed. Here values exercises may be of help by making it clear to you how you think and feel about certain questions.

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Values exercises - a way of developing democracy
• a climate full of openness and respect
• put the questions in a context
• it takes a long time

ESD is to make sure that the learners have a voice. ESD is everything!
Changing the whole human being as a whole.
Bernard Bakobi, Tanzania
The right to express attitudes and values

There is a pedagogical value in not going any further than attempts to increase self-awareness. An overt attempt to influence or change values will easily awaken defence mechanisms and may cause blockages. A fundamental rule for those working with value methodology is therefore to regard answers as being neither right nor wrong. Everybody must have a right to express attitudes or values without being afraid that they will be looked upon as being “wrong”. Besides, participation is voluntary. The next step is to communicate, to express one’s thoughts to other people, to share them – maybe with one person at a time rather than with the whole group at once.

Background

These exercises will teach the participants the noble arts of thinking, expressing, listening and arguing. These are the basic skills needed to participate in development of democracy.

Various types of values exercises

There are various types of values exercises that can be used in different steps. Sometimes the participants should take a stand by reflecting and maybe writing a comment. Other values exercises require that they show their standpoints using their whole body, for example by walking to a certain spot which indicates a choice. This choice is thus shown openly to the whole group.

The following exercises are to be regarded as an introduction to values methodology. You should not just focus on the actual subject field but instead treat it as part of a greater whole. The objective is to try to prevent blockages that will put a stopper on debate. Your aim is to open things up, and to make people want to communicate their thoughts on the issues that may arise. Most examples are equally suitable for people of all ages. However, we still recommend that you as instructor make adjustments and changes to suit the group you are currently working with.

All exercises follow these three steps:

1. Individual reflection

It takes time to develop an opinion. Everybody is to start thinking individually. Discussions are to be saved for later and opinions noted down on pieces of paper.

2. Discussion in small groups

Form small groups of those who have come to the same conclusions. Now the participant is to listen to the opinions of his/her friends. In these small groups the participants will hear arguments similar to their own. Perhaps the participants will be given new arguments and grow in confidence.

3. Discussion in the whole group

Give the small groups an extra task – let each group select a spokesperson. The spokesperson is to initiate a discussion in the whole group. For example, the group should to find out who has the shortest name, or which people have most red colour in their clothes. This means that everyone will get a chance to talk. The spokesperson is to summarize the discussion in the group.

Further aspects

1. Value exercises mean that everybody answers the question. You answer with your body by standing on the spot corresponding for your choice. After hearing the arguments of your friends you can change your opinion and move to a new position.
2. The participants are trained in the noble art of listening. If you did not listen – you cannot provide a summary.
3. In these exercises there are no rights and no wrongs. There are only different opinions.
4. Respect the different opinions. Do not correct facts given by participants during the exercise. Wait until later.
5. Be careful if participants ask you about your own opinion as leader. If you immediately reveal what you yourself think there is a risk that participants will assume your opinion is the right one. Participants may also try to guess the standpoint of the instructor instead of forming their own values and opinions.

Clarification of values

Purpose

To help the participants to develop values and train them in the noble art of communication.

What to do

The leader describes an important issue. The choice of issue is unimportant but in this presentation we have chosen the problems connected with a sudden increase in road traffic as an example. The leader describes the issue and provides some background.

The methodology builds upon three steps. Here is the first of these in the relevant exercise.

Step 1: Think by yourself

The leader continues:

- Here is a statement about some solutions that I want you to judge. Draw a line in your notebook and place numbers from 1 to 6 along it.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
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- If you totally agree with what I say, I want you to check number 6. If you totally disagree, I want you check number 1, or you can check any of the numbers in between.

This is the statement:

“The problems brought about by road traffic can be solved by technical development.”

- Please, think on your own. Wait with any discussions till later. I want you to work in silence.

- Check the appropriate number clearly on the page in your notebook when you have made up your mind.

It is important that the participants do not talk at this stage of the exercise. They must come to a standpoint on their own. If they talk to each other the most dominant participant
will influence the others. When everybody has taken a standpoint and checked a number on their line it is time for the next step.

**Step 2: Discussion in small groups**

Put pieces of paper with the numbers 1, 2, 3, 4, 5 and 6 on the floor, one number on each piece of paper. Ask the participants to stand by the number they have checked on their line.

— Dear participants. Compare your arguments with those of the people standing beside the same number as you are.

As a participant you might perhaps find it a bit scary to walk up to your number. Your best friend, who is very knowledgeable, may have chosen a different one. You might be worried whether or not you have made the right choice, since your friend has come to a different conclusion.

When the participants discuss in small groups they will find that their friends usually have pretty much the same arguments as they have. They may even find new arguments. They grow in confidence.

**Step 3: Discussion in the entire group**

— Dear participants, I have a little extra task for each group, who in your group has the shortest given name?

The group is given time to find this out.

— Dear participants I want that person to give a summary of the discussion in your group.

Groups report one by one. Make sure that the person with the shortest given name gives the report. It often happens that the oldest, biggest and most influential person tries to report, instead of a younger not so confident person. Do not let anyone other than the person with the shortest given name, whoever that is, who give the report. Do not let anybody comment or add anything at this stage.

When all groups have given the summaries of their discussions the word is free. Everybody shall be given the opportunity to speak and be encouraged to do this.

**Comments**

Thinking takes time. It takes time to develop an opinion. Make sure you give participants enough time to come to a standpoint.

It is important that the participants check their opinion on the line in their notebook. When they have a clear checkmark besides a particular number in their notebook it is likely that they will stand by that number on the floor. If they have not made a checkmark in their notebook, they may choose to stand besides some other number, where some knowledgeable person is already standing. This will probably feel safer to them.

**Distribute the voice**

The reason that you ask the person with the shortest name to report from each group is to make sure that the selection of spokesperson is random. Other alternatives are to ask for the person with the youngest sister or brother, the shortest little finger or maybe the person wearing clothes of the lightest color. Usually 20% of the participants in a class give 80% of the answers. By this method everybody is given an equal chance to report.

The task of the spokesperson should always be to give a summary of the discussion in the group. When the participants get used to the methodology they will realize that they have to listen to each other if they may be be picked at random to report for the group. In this way they learn to listen to each other.

**Do not be too obvious!**

When talking about exercise do not be too clear. If you explain all details very thoroughly you will probably end up with all participants standing by the same alternative and you will have no discussion. In the example above it is not absolutely evident what the problems are and what is meant by technical development. Let the discussion clarify the details.

Be careful if the participants ask you about your own opinion. If you immediately state this there is a risk that the participants that have chosen different standpoint will regard your opinion as the right one and their own as wrong. There is a risk that the participants will try to guess the opinion of the leader instead of thinking of their own. Wait until next lesson to relate your standpoint if the participants ask you.

In these exercises there are no rights or wrongs, only different opinions. Make it clear to the participants, that all standpoints have equal value and teach them to respect the views of others.

**Why use this methodology?**

- The objective of this methodology is to help the participants develop values and standpoints. It is not to transfer the standpoint of the leader to the student.
- In this exercise everybody answers. They answer using with their entire body by standing next to the alternative they have chosen. After hearing the arguments of their friends they can change opinion and move to a new position.
- Participants are trained to listen and to communicate with each other.
- Participants are trained in critical thinking and in taking a standpoint.
- This methodology might be called a basic course in democracy!

The exercise described above is just one example of an exercise according to the methodology for clarification of values. There are many varieties: for example four corners, listing, ranking exercises and uncompleted sentences. Even if these exercises seem to be a bit different they all follow the same methodology and they all have the same objective.
Incomplete sentences

**Background**
This exercise uses incomplete sentences as baselines in order to find out what the participants already know and the views they hold on certain issues.

**Purpose**
To find out more about what the participants think about certain issues before starting a new task or topic.

**What to do**
Incomplete sentences, like the examples given below, are written on a piece of paper or on the blackboard. The participants are asked to complete the sentences according to their own beliefs and opinions.

**Examples of sentences:**
- An animal that I would like as a pet is...
- The number of children I would like to have is...
- The natural surroundings where I feel most happy are...
- The most important things for me to learn in school are...
- I want a car because...
- 25 years from now I will live in... and work with...

**Cars are very useful because...**
- I think we can solve the problems of climate change because...
- Solar light energy is better than generator-based electricity because...
- The ecological aspect forms an outer framework for all human activities because...
- I/we can bring climate change to an end...
- I/we can reduce waste accumulation by...

---

**Ranking**

**Purpose**
To introduce a topic or to get to know each other in a group.

**What to do**
The idea is to rank alternatives from 1 to 3, where 1 has the highest priority. Ask the participants to write down their answers on paper first and then discuss the rankings with other participants. Ask some of the participants to explain their opinions to the whole group.

Prioritizing from a number of different alternatives is also a model that can be used for individual reflection and group discussion. It is possible to vary the degree of difficulty by having alternatives that are not quite so clear cut and that depend on a variety of circumstances.

The questions and ranking examples can be adapted to suit the particular topic you are working with.

**Examples of ranking questions:**

- **What would scare you most of all to meet in the wild?**
  - A buffalo
  - A tiger
  - An unknown person

- **What needs to be prioritized in your home community?**
  - Wastewater treatment
  - Bicycle paths
  - A football arena

- **What would you prefer to do on your school Saturday outing?**
  - Visit a National Park
  - Watch a game tournament
  - Visit a historical site

- **Which organization would you rather be a member of?**
  - WWF
  - The Red Cross
  - I would prefer to start a new organization

Try to rank the following questions when thinking of how a good consumer should act, start with the most urgent:

- Is your purchase certified as a product or service of quality?
• Do these products meet the minimum environmental standards as indicated on the labels?
• Do you read and understand the instructions on the product labels before you buy or use them?
• Do you question the provider about anything you do not understand?
• Do you pay attention to the safety symbols and regulations displayed on the product for your own safety and safety of others?
• Do you buy tools, machines and appliances that protect natural resources and biodiversity such as water-saving taps, water-harvesting systems, wood-saving stoves, solar-power torches and energy-saving bulbs?
• Do you dump your garbage in the assigned community container?
• Do you recycle?

Which is the best way of reducing poverty in India?
• Through education to create knowledge and skills
• Through scientific research
• Through providing financial assistance
• Through conserving the environment

Which is the cause of climate change?
• Natural occurrences
• Human activities

Comment
As a consumer, it is your responsibility to make informed choices about the products and services you purchase and use. What we buy, how we spend our money and our investments all impact the environment and biodiversity. An important tool for being a good and environmentally friendly consumer is to know your rights and responsibilities.

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

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

Change circles
Purpose
To get participants to take a position on simple statements straight away and indicate their standpoints in relative anonymity.

Background
This is a quick and silent exercise. The nature of the exercise is such that participants can indicate their standpoints in relative anonymity. There just isn’t time to observe how others are responding. Begin the exercise with basic and neutral questions so that the participants get some idea of how it works.

You can also use change circles as a warm-up exercise to get people’s ideas flowing and to get an overview of what your participants already know about a subject and how they position themselves with regard to certain issues.

Instructions
The group or class forms two circles, an outer circle and an inner circle. The circles then move slowly in opposite directions. The instructor reads out statements and if you agree you change circle and direction. If you do not agree with the question you stay in your existing circle and continue moving in the same direction.

Examples of questions that can be used:
Do you...
• understand the instructions?
• like to sleep late in the morning?
• think it is important for you to hear that you are doing your job very well
• enjoy your job very much?
• like to read commercial advertisements?
• like rainy days?
• smoke?
• sometimes throw plastic bags or bottles on the ground?
• always close the water tap carefully?
• feel that nuclear power is a good way of producing electricity?
• feel that ecological issues are important in political elections?
• feel that the next generation of children will have a better life than we have?
• learn important things in school?
• think that we all are responsible for the future?
• you think that politicians are responsible for sustainable development?
• like meat?
• pollute soil or water?
• think that we all are fighters?
• create jobs?
• promote poverty in the society?
• support universal education in primary, secondary schools?
• care about HIV/AIDS affected households?
• think that population growth is leading to massive deforestation?
• learn about the environment in all subjects in school?
• actively conserve the environment?
• use natural resources effectively?
• consistently plant trees in your school?
• promote sustainable development?
• love nature?

Stand on a line

Purpose
To explore people’s attitudes and values, and clarify different perspectives to the whole group. To enable people to challenge positions, and encourage them to communicate their opinions.

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

What to do
The leader reads a statement such as “I am responsible for how the future will be”. Participants will determine for themselves whether they totally agree (no. 1) or totally disagree (no. 6) or any number in between and indicate this on the paper. After thinking about this on your own, without any contact with anybody else, you go to the number you have selected which is placed on a line on the floor or ground. Those who end up next to each other, tell each other how they reason. Then it’s time for a discussion in the whole group. See the three steps on page 37-38.

After hearing the arguments advanced by others some people may want to change groups. They can be invited to do this if they so wish. Before starting the exercise explain that everyone can freely show their feelings and express their opinions about the different topics without restraint.

Statement:
• Who has precedence, nature or man?

Nature
1 2 3 4 5 6

Man

Statements:
• Everybody should cut down on their use of energy!
• Everyone is accountable for environmental conservation
• Climate change effects can be reduced by planting trees
• We must not cut down trees
• Native commonsense helped conserve our environment better than those things we learn at school today
• Our traditional foods are better than the foods we eat today

Agree
1 2 3 4 5 6

Disagree

Are the following observations not sustainable or are they sustainable?

Observations:
• Teachers and pupils washing their hands after visiting the bathroom and before eating.
• Pupils, teachers, parents planting seedlings of trees or doing handicrafts
• Cutting down trees and cultivating in wetlands
• Accumulating garbage in the household and by the roadside
• Dumping garbage in water bodies
• Buying products that you can recycle, reuse and repair

Not sustainable
1 2 3 4 5 6

Sustainable

Pictures
Use pictures from newspapers or look in the Resources 2-5 chapter at the end of this book.
Every participant is given a picture. He/she identifies an activity that is ecological, social or economic. Then he/she goes to the appropriate position on the line (all this being done in silence).

<table>
<thead>
<tr>
<th>Not sustainable</th>
<th>Sustainable</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
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<tr>
<td>3</td>
<td>4</td>
</tr>
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<td>5</td>
<td>6</td>
</tr>
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Those who end up next to each other tell each other how they think.

Discuss the different views together.

Those who are located on the non-sustainable half of the line, how can we move them so that their activities will be more sustainable?

**Comments**

Note that in both of the above values clarification versions the participants are asked to communicate their views. It is important to explain at the beginning that everyone has the right to express an opinion and that no one will be judged or corrected for having a belief or opinion that is different to those of the others. Tell everyone that if they want they can change their standpoint on any particular value at any time. When the exercise is over, ask everyone to return to their seats. As a follow-up at a later date you can ask the same questions again and see whether the views originally held have changed and if so in what way.

**Four corners**

**Purpose**

To help the participants to form values and opinions based upon a broad understanding of their own and others feelings, opinions and values and to train them up in the noble arts of listening, speaking and arguing.

**What to do**

This exercise is suitable for more complex questions. Three alternatives and one open question are always included in the exercise. There must always be an open question for those having answers or responses that are not covered by the other alternatives. Each corner of the room is assigned a specific answer.

The instructor reads out the question and indicates which corner of the room has been allocated to which alternative. Each person is encouraged to silently reflect on which alternative to choose before moving to the relevant corner. If somebody immediately goes to a corner there is a risk that others will simply follow and choose the same alternative without first reflecting on why they are making that particular choice.

When people have assembled in their various corners ask them to discuss, as a group, why they have chosen that particular alternative. The participants are allowed to change corners if they change their minds. Encourage the participants to think independently and make their own decisions.

**Three examples related to the environment:**

- **What is most important to you when you buy a new sweater?**
  - Corner A: The price
  - Corner B: The style – whether it is in fashion
  - Corner C: Where it comes from and how it has been produced
  - Corner D: Open for alternative responses

- **Who is responsible for the destruction of the wetlands?**
  - Corner A: The farmers
  - Corner B: The government
  - Corner C: The banks
  - Corner D: Open for alternative responses

- **Who is responsible for climate change?**
  - Corner A: Ordinary people
  - Corner B: The industrialized countries
  - Corner C: The government
  - Corner D: Open for alternative responses
Four visions of the future

Follow the procedure in the “Clarification of Values” exercises.

Purpose

To help participants form values and opinions based upon a broad understanding of their own and others feelings, opinions and values concerning visions of the future.

What to do

The exercise is built mainly upon four alternative scenarios related to climate change.

1. Let us think about the future one generation (30 years) from now. Read the four visions and make your own judgement. How do you think the future will be and how do you want it to be?

2. Ask participants to read all four alternatives on their own in silence and mark their standpoints on the line. Notice that there is a big difference between “Desirable” and “Likely”. That which may be regarded as likely might not be desirable at all.

3. Underline the title of the vision that is deemed most likely to happen as opposed to what is most desirable.

4. Place out four pieces of paper, each with the title of one of these visions, on the floor. Stand on the alternative you have marked as most likely. Follow the three steps on page 37-38.

5. Follow the same procedure for the “Desirable” future.

Comments

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1. The threats were exaggerated

Fears about climate catastrophes were fortunately not realized. The weather kept on changing as it always had done. Modern technology made it possible to store carbon dioxide underground and as a result emissions did not increase at the same rate as they did during the 20th century. This technology made it possible to utilize the existing huge deposits of coal while renewable sources were developed.

A new generation of nuclear energy plants contribute significantly to the production of energy

Using solar energy, hydrogen gas is produced and utilized as the major fuel in transportation systems. Solar cells and wind power generators provide electricity.

With these new technologies there is no longer any lack of energy in the world. Economic development prospers and standards of living are on the increase in most countries.

Unlikely Likely

1 2 3 4 5 6

Undesirable Desirable

1 2 3 4 5 6

2. What happens, just happens

Energy demands and the combustion of oil and coal has increased rather than decreased

Rich countries were not willing to change their standards of living. Developing countries have multiplied their consumption.

Changes in climate turned out to be even more severe than the scientists had predicted. Massive droughts, flooding and storms affected areas that weren’t able to cope with these conditions. Food shortages increased.

The global economy is in crisis. Our whole society is at risk. News broadcasts are dominated by the mounting problems.

Unlikely Likely

1 2 3 4 5 6

Undesirable Desirable

1 2 3 4 5 6
3. Some are worse off, some better

Cold countries have profited from rising temperatures. Northern countries like Sweden have increased their outcome from agriculture and forestry. Poor countries that usually are hot and dry have been negatively affected by rising temperatures. Drought, floods and storms have caused enormous damage. Large numbers of environmental refugees have exacerbated international relations. International conflicts are to a large extent a function of the scarcity of resources such as food and water. Climate war is a new concept.

<table>
<thead>
<tr>
<th>Unlikely</th>
<th>Likely</th>
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<tbody>
<tr>
<td>1 2 3 4 5 6</td>
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<table>
<thead>
<tr>
<th>Undesirable</th>
<th>Desirable</th>
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<td>1 2 3 4 5 6</td>
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4. We made it!

All the doomsday prophecies were wrong. The people of the world realized that climate change was real. A new generation of political leaders came into power. The global society agreed upon effective means of climate control. Laws, emission fees, and emission rights as well as changes in people’s priorities and lifestyle, resulted in decreased emissions of carbon dioxide.

The amount of energy used decreased considerably due to energy smart technologies. Renewable resources dominate all kinds of production and energy consumption has decreased significantly.

<table>
<thead>
<tr>
<th>Unlikely</th>
<th>Likely</th>
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<tr>
<td>1 2 3 4 5 6</td>
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The hot seat

Purpose

To help the participants form values and opinions based upon a broad understanding of their own and others feelings, opinions and values and to train them up in the noble arts of listening, speaking and arguing.

What to do

Arrange chairs in a circle and ask the participants to sit on these chairs. You can also do the exercise outside sitting on the grass. In this case you must indicate locations with an object.

The instructor then reads out a statement prepared in advance that is relevant to the topic or theme being studied. Those participants who agree with the statement move to a different chair and those who do not agree remain in their places. The participants are then encouraged to explain their thinking to the person sitting next to them or to the whole group. The instructor then reads out the next statement and the same procedure is followed.

Examples of statements:

- I have visited wildlife sanctuaries/National Parks several times
- Ranthambore is a beautiful forest
- Eating fish from River Ganga is dangerous
- The opinions of Indian boys and girls are similar to those of Pakistani boys and girls
- People in the past had a better life than people of today
- We have democracy and the rule of law in India
- There is a big difference between government and private schools
- All polluting factories should be shut down as soon as possible
- India is a fast-growing economy and an emerging superpower

Comments

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

You can also allow the participants to formulate statements themselves. As with the other values clarification exercises there are no ‘correct’ answers to these questions. As an instructor you should avoid giving your own answers as there is a risk that the participants may construe your answer as the ‘correct’ one.
ESD METHODS

There are no special “ESD methods” that have been exclusively designed for teaching and learning for sustainable development. However, some methods are much better suited to ESD than others. Typical for many of these is a focus on the learning process. The method chosen must suit the specific teaching or learning situation. The learning environment must also be created especially by each professional educator.

Opening exercises

Purpose
To do some easy and pleasant activities which will open up relations between the participants.

What to do
a) Form a pair with someone you have not talked with today.
Tell each other about some positive development and good things that you have experienced that has taken place in your home area recently. It may be something big or something small.
b) Form new groups of three persons. Take a few steps across the floor. Join persons that you have not talked to yet. Tell each other about your expectations for today’s activities. Choose a member in the group who will give the participants a brief summary of the discussions. Make sure that notes are taken.
c) Ask the participants in the small groups to present themselves:
My name is..., I come from..., I am good at (something outside school/work)...(keep it brief).

The closed bottle

Purpose
To learn to think in terms of cycles and understand the need to preserve natural resources and make priorities in a limited world.

Before you begin
Ensure that you have at least one jar or large bottle with a wide neck, a plant, soil and water.
What to do

This exercise is a metaphor illustrating natural eco-cycles.

Put some soil and a plant in a bottle and watering it a little. Close it and keep it in indirect sunlight. The bottle should not be opened again. Nobody should water the plant. Study what happens over a long period of time. Ask the participants to discuss the following questions:

- What will happen to the plant in the bottle?
- How long will the plant live?
- How long will water, fertilizers and air last?
- What will be the weight of the bottle in one year?

Ask the participants to discuss these questions in small groups. Continue the discussion in the whole group/class. Probably some of them will start moving their hands in circles to illustrate their explanations. This is a good way of expressing the meaning of eco-cycles.

Comments

The bottle can be regarded as a miniature model of Mother Earth. Green plants absorb carbon dioxide, water and sun energy and produce oxygen and carbohydrates. You can not see any living creatures in the bottle, but if you get close to the soil you will perhaps recognise small bugs. In fact there are billions of microorganisms. In one spoonful of soil there are as many microorganisms as human beings living on the earth. Actually there are only minor differences between microorganisms and human beings in this sense. We are all animals that depend on the decomposition of plant matter.

This experiment is just as valuable for preschool children as for university participants. For small children the message is to realize that we must be careful how we use natural resources. We live in a closed system. Nobody will ever fill it up again if we run out. We only have one earth to share with coming generations.

The most important thing about this exercise is discovering new patterns for thinking. It trains participants to think in terms of cycles instead of the traditional pattern of thinking, that is, in terms of linear consumption.

When starting a bottle, use soil taken directly from nature. It should not be too wet and not too dry. If you add extra water there is a big risk that the bottle will be full of mould after a while. Keep the bottle in a place with light but not in direct sunlight.

The mission

Start this exercise by doing the “The Closed Bottle” exercise. This will enable the participants to acquire the knowledge necessary for doing “The Mission”.

Purpose

To use a model of the earth to make us understand that we all live within a framework of limited resources and that a sustainable solution to future resource management is to have an ecological approach.

Before you begin

For each group you need a large piece of paper and some colour crayons.

What to do

In this exercise a space ship is a metaphor for our planet – Mother Earth. The challenge is to set up the conditions needed to maintain life within a limited space over a long period of time. Give the participants the following introduction:

The greatest adventure in history

You have been appointed by the Planetarian Council to participate in the greatest adventure in the history of mankind. You have are to embark on a journey in a giant spaceship capable of travelling an unimaginable distance.

The following conditions apply:

- The journey will take 6,000 years
- You do not have to worry about piloting the ship. It is already equipped with an engine and fuel for the journey
- The gravity on the ship will be the same as on earth
- You may only use established technologies
- You have access to solar energy throughout the whole journey
- The diameter of the ship is 5 km
- You should suggest what to bring with you

There will soon be a meeting with the Planetarian Council where you are expected to contribute with your proposals on what to bring.

- Prepare this meeting by writing your own personal list of the things you will bring on this long journey
- Please work on your own and keep your thoughts to yourself for a while

Smaller groups

After 15-30 minutes, form the participants into smaller groups and ask them to compare their lists. They are expected to agree upon a common list for each spaceship. These discussions should take at least one hour.

Picture

Then it is time to draw a picture illustrating the ship. Make it circular. Your illustration should be aesthetically pleasing but also show the all ship functions. In addition you can insert short texts describing the most important functions in more detail.
Comments

It is very important that the instructor does not do all the thinking for the participants. Do not tell them what issues have to be solved. Usually they will start by solving food, housing and clothing needs. They will describe the water cycle and how to provide access to clean drinking water.

It is very important that participants are given time and support to find solutions on their own. The process of thinking takes time. Here follows a sequence illustrating how participants and the instructor can cooperate:

- Do not do the thinking for the participants. They need time to come up with their own solutions.
- Give participants acknowledgements for their solutions and ask them if everything is set for a happy and fulfilling life over a period of 6,000 years.
- Soon somebody will come up with the question: ‘Who should be on the ship?’. Ask the group to write a little text somewhere with the headline: ‘Population.’
- Repeat your question: ‘Will everything function well for the coming 6,000 years or is there anything else that needs to be discussed?’.
- Do not tell your participants what issues you have in mind. After a while they will find questions by themselves: ‘How should they take decisions regarding these questions?’
- You can work with the metaphor of the spaceship during a full day or on repeated occasions. Since this task requires proficiency in many subjects it is a good idea to find a way to integrate different aspects.
- Give the participants time for reflection. Thinking takes time and in this task the process of thinking is more important than the result itself.

This exercise was originally developed by Wolfgang Brunner, Sweden.

The greatest adventure in history

You have been appointed by the Planetarian Council to participate in the greatest adventure in history of mankind.

You have been chosen to participate in a journey with a giant spaceship capable of traveling an unimaginable distance.

The following conditions apply:

- The journey will take 6,000 years.
- You do not have to worry about piloting the ship. It is already equipped with motor and fuel for the journey.
- The gravity is the same as on earth.
- You may only use already known technology.
- You have access to solar energy through the whole journey.
- The diameter of the ship is 5 km.
- What do you suggest to bring?

Issues to be raised

Who will decide? The solutions will be very varying in different groups. Some will invent direct democracy. Some will invent the parliamentary system. Some will appoint a dictator, a king – the smartest person who is given the right to take all decisions. Different groups will invent all decision making systems ever practiced during the history of mankind.

Do we need laws? Some groups develop the laws of their ship. What happens if somebody does not obey the laws? Do we need police? Do we need prisons or are there other possibilities?

How are resources going to be distributed? Are we going to have collective farming or a capitalistic system?

How will knowledge be transferred to coming generations? Will we have a traditional school? Let us make the curricula. Some invent a system where holders of special competencies train youngsters to follow them.

Are discos, sport facilities, theatres and music halls essential? Food is a necessity but is culture important? What makes life worth living? What are preconditions for people to live a life in harmony and peace? Why do we have so many wars on earth?

Why should we go on this trip? Well isn’t that a way of putting the eternal question: “What is the meaning of life?”
Green or red?

**Purpose**
To consider various statements and develop the participant’s own thoughts.

**Before you begin**
Prepare green and red “voting” papers for each person in the group.

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

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

Agree = GREEN  Do not agree = RED

We start with something simple so that everyone understands how the exercise will work.

**Weather**
- The weather is wonderful!
And soon the group will know what they are expected to do. Now let’s start with the topic at hand.

**Timber Industry**
- India’s forests are dying!
- It’s possible to tap into forest resources with more sustainability!
- It’s possible to change the methods used to stop illegal felling of trees!
- It’s possible to use new scientific methods to regenerate depleted forests!
- India’s forests have no future!

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

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**Role-play**

**Purpose**
Role-play allows people to separate relevant information from less important information, to express and to defend opinions, to listen to others and to be tolerant of different opinions.

**Background**
Role-play helps you to put yourself in somebody else’s shoes, imagine what their situation might be like and understand something about your opponent’s views or opinions. Role-play is also designed to foster and develop personal values. Playing out real-life situations in this way helps us to build up enough confidence to take responsibility for what is happening in different areas and activities and affect the outcomes.

Role-play therefore enables us to take part in a number of very different real-life situations and discuss possibilities and opportunities for a variety of outcomes.

**What to do**
Before the actual role-play begins the participants should be provided with a description of the situation in question, details about the characters involved and what they are expected to do.

The participants then decide which roles they would like to try and how they are going to portray the characters in the particular scenario they will work with. For this they will need to work out their arguments and how they are going to get their message across. Those who are not assigned roles or who prefer just to be observers can make up the audience and take note of what is happening in the role-play.

At the end of the role-play both the characters involved and the audience are encouraged to discuss what has taken place and evaluate the processes and outcomes. Apart from helping to build up confidence, role-play is also a good way of helping participants to develop problem-solving strategies and learn how to act in different situations.

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

**Preparing the participants for the role-play**
If background information research is necessary for the role-play the instructor should allow time for this before the actual role-play is performed. Giving the participants time to read and discuss both the topic and the roles is also important. When it’s time for the performance you or the group can select the actors, while the remainder of the group can act as advisors or supporters to the individual actors and observe what is being played out. This is a good way of motivating the participants to learn a lot about the background of a topic.
**Brainstorming** is a good way to open the floodgates to new and unexpected ideas. The method is to solve problems and come up with new ideas. For the method to succeed, certain conditions must prevail. There must, for example, be an open and tolerant atmosphere in the group.

Some rules:

- Criticism is forbidden in brainstorming.
- Encourage spontaneity, and originality
- All ideas are good ideas
- Quantity of ideas is important
- Encourage the courage to dare to make mistakes
- Participants develop each others ideas
- Number of participants: 5-8
- Everyone should be allowed to express themselves
- Write these ideas on a large paper or similar

### The action

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

### Whole group involvement

If the entire group or class is to be involved in the final discussion they will need to know this in advance so that they can make notes during the role-play if they wish.

One way of starting the discussion is to first of all allow the players to say how they felt in the roles and whether alternative actions might have been possible. Such a discussion can then be widened to include the audience’s views. The entire group can also discuss whether the actors could have played their roles differently, and if so, how and why.

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### A role-play: The reclamation of the river bank for agricultural use

#### Background

The National Chambal Sanctuary was set up in 1979 as a riverine sanctuary along an approximately 425 km length of the Chambal River and its ravines stretching over 2-6 km wide along the river. It constitutes a long narrow tri-state eco-reserve co-administered by the states of Rajasthan, Madhya Pradesh and Uttar Pradesh.

#### River

The Chambal River harbours a rich diversity of flora and fauna. It is home to an array of species ranging from water skaters and diving beetles, to the two species of crocodiles, which live in harmony with turtles and fish of many varied sizes.

#### Natural Barrier

The river is guarded by ravines on its banks on either side, which act as natural barriers to the flood waters of the river in the monsoon. The ravines have twisting winding pathways, with loose soil, rocky areas and thorny vegetation. These winding pathways help in preventing the flood water during monsoon from reaching the villages nestled on the other side of the ravines, and thus help the village inhabitants, as well as the terrestrial and aquatic fauna.

#### Gharial

The gharial (Gavialis gangeticus) an endangered species is facing a threat due to uncontrolled anthropogenic pressures. 79.8% of the total river area faced disturbance due to direct or indirect human activity. With sporadic increase in fishing activity in the river and agricultural or mining activities along the banks, the last stronghold of the gharial remains in a state of peril.

#### Fish

River Chambal is home to various fish species and the villagers living around the river earn their livelihood from fishing. Fish constitute a predominant portion in the diet of a gharial. Fish is also consumed by other fauna like the smooth-coated otter, Gangetic river dolphin, storks, pelicans and cormorants which inhabit the river. Thus fishing can potentially disrupt the food chain and the ecology of the river.

#### Birds

River Chambal supports more than 320 resident and migrant birds. It is the only known place where nesting of Indian skimmers is recorded in large numbers. The National Chambal Sanctuary is listed as an important bird area (IBA) IN122 and is a proposed Ramsar site.

#### Agriculture

Chambal being a perennial river has fertile banks that are close to the villages. The villagers find it convenient to grow crops on these patches. The most common agricultural crops in the sample area are *Brassica juncea* (mustard), *Triticum vulgare* (wheat), *Cajunus cajan* (yellow lentils), green peas and green gram.
Fertilizers

Urea is the most commonly used fertilizer for agriculture. This might have long-term effects on the river ecosystem. As the urea slowly seeps into the river causing eutrophication, the amount of floating vegetation in the river will increase. This floating vegetation will choke up the river water and alter the pace of the river. This might eventually affect all the riverine fauna and disrupt the food chain.

Mining

Mining is one of the factors that contribute to the destruction of the gharial habitat. Not only does it alter the natural habitat, but also negatively influences the highly important nesting sites. The gharial is a communal nester, i.e. a large number of females use the same sand bank to lay eggs. The banks of the river are mined for either Sand or Stone.

Bird Watching

Good opportunities for spotting birds of river and dry-land habitats.

Nature Walks

Walks in the ravines and along the river offer opportunities to see the unique flora and fauna of the National Chambal Sanctuary.

Nature Photography

National Chambal Sanctuary offers some unique photo opportunities of landscapes, birds and aquatic wildlife.

Gharial and Dolphin Sightings

National Chambal Sanctuary offers good sighting opportunities for gharial and dolphins.

Characters

In support of the reclamation project – Proposers

1. The Director of the Company

The director of the Company endorses the task of converting the river bank into a large scale agriculture initiative. In his opinion a long stretch of fertile river bank should be used for agriculture purpose. The project will create employment opportunities for the local people thus reducing the serious unemployment problems in the region. Food crops, especially yellow lentils, will be produced for local consumption and even for export. The project will create employment opportunities for the local people thus reducing the serious unemployment problems in the region. Better modern public utilities will be established in the area which will translate into good livelihoods for the local communities.

2. Local leaders

The local administration perceives the project as a source of income for the local people who are largely unemployed and poor. The establishment of schools and hospitals/health centres will reduce the problems of illiteracy and poor health and provide other benefits to the communities.

3. The unemployed

The unemployed openly support the project as it will generate employment opportunities. Once employed their standard of living is expected to improve as their income increases. This will make it easier for them to support dependents, children and other family members.

4. The State Minister for Agriculture

The State Minister for Agriculture sees the project as a gateway towards guaranteeing food security in the village. Food processing industries will be established thus creating more employment opportunities. Last but not least, the poverty index in this region will be reduced significantly.

Those opposed to the reclamation project – Opposers

1. The conservationist/environmentalist

The conservationist/environmentalist sees this reclamation project as a definite threat to the varied plant, fish and bird life of the area (biodiversity). This unique natural heritage needs to be protected and conserved for the good of the current and future generations. The river will be polluted by chemicals emanating from agricultural farms and it will reduce the prevailing fish stocks considerably. The major threat will be for Gharial population as they bank and nest on the sand banks.

2. The fisherman

The fisherman definitely sees the project as a great threat to the exploitation of fish on which their livelihood depends. They will be deprived of a reliable source of income, on which they have depended for a long time. Fish supplies will decline and the cost of living will go up.

3. The eco tourist

Ecotourism will collapse totally following the disappearance of invaluable biodiversity. The economic base of the local populace will be threatened and its future uncertain.

Start the role-play

a) Roles

The participants choose different roles.

Who will be the eco tourist, the politician or the fisherman?

b) Background

All characters read the background text about gharial, river etc.

c) The scenario

The National Chambal Sanctuary as a riverine sanctuary harbours a rich diversity of flora and fauna. The director of a multi-national-company wants to expand the large-scale farming on the river banks and he gets support from the local leaders and the unemployed. But there are some fishermen, environmentalists and other which are protesting against the exploitation.
d) Discussion

During a meeting, all characters are seeing each other to debate the question: ‘Will the endangered gharials face the threat of extinction if we reclaim the river banks for agriculture?’

Forum play

Purpose
To challenge the attitudes and values of the participants and make them visible in a safe environment.

Background
The different roles adopted and interactions between the audience and the actors are useful not only for learning how to solve make-believe conflicts, but have also proved useful in solving real conflicts. Forum play as a method emphasizes different crisis situations in a constructive way illuminating a variety of aspects.

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

Instructions
Forum Play opens with a role-play situation that develops into a crisis. After the entire situation has been played out a short break is taken, after which the entire sequence is repeated.

After this the audience takes over and, with help of a spokesperson (chosen by the participants), decides which actors they want to replace. When this has been decided and the actors have been replaced, the role-play begins again, although the play can be interrupted at any time by someone from the audience shouting ‘Freeze!’ or ‘Stop!’.

A new person then takes over one of the actor’s roles and a new twist to the story becomes possible. The play continues in this way right up to the end of the ‘story’. A discussion between the actors and audience then follows.

Example of a forum play:

The tiger and the farmers

Purpose
To understand problems with wild life in common domestic situations.

What to do
It is late April and two farmers are out tending their cattle and a newly-born calves. They find the animals grazing in the meadow, enjoying the tender grass and the pleasant weather.

They check the water trough and find cat-like tracks in the mud beside it. They follow the tracks and behind some bushes they recognize a shadow - a tiger near the fence. The cows are not far away and the farmers understand immediately what could happen.

Later the younger farmer contacts the local district administration and asks for help, but he is told that there is nothing they can do to help. The tiger is protected by the law and, as since it has not harmed the cattle or their calves, there is nothing the farmer can do either.

The following day the farmers find a dead cow and a dead calf beside it. Also, a second suckling calf seems to be missing its mother. The farmers involve all the people from the village. The oldest and wisest among them starts to track the tiger and meets with a specialist and a WWF-India resource person. They all know that tigers are protected by law, and become suspicious when they hear the story and see the farmer carrying a gun...

FREEZE the action here!

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

Case studies

Purpose
To encourage the participants to analyse and discuss specific dilemmas and enable them to develop their ability to formulate a variety of arguments.

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

• A case study describes a real situation
• A case study relates to a problem that has to be solved and where decisions have to be made.
• A case study is normally described from the decision-maker’s viewpoint and allows the participant to assume this particular role.
• Both source and background materials are authentic and describe a situation that has actually taken place.
• A case builds on field data and real-life observations or research in “the field”, using documents, interviews, articles, reports etc.
• The content of each case varies and often involves a decision-making situation.

Case studies can be taken from real-life situations found in books, newspapers etc. This method also lends itself to guided discussions where the instructor prepares the material and the participants work in groups with a final discussion to round off the proceedings. Cases can be chosen for different reasons, for example, in order to examine different values and ways of doing things, to learn communications skills, to learn management skills and so on.
Coal mining in India

This case is about India, one of the fastest emerging coal producers in Asia and problems associated with coal mining.

What to do

1. Read the following text about coal mining:
   The goal of coal mining is to obtain coal from the ground. Coal is valued for its energy content, and since the 1880s has been widely used to generate electricity. Steel and cement industries use coal as a fuel for extraction of iron from iron ore and for cement production.
   Coal mines are one of the major sources of energy in India. The energy derived from coal in India is about twice that of energy derived from oil, whereas worldwide, energy derived from coal is about 30% less than energy derived from oil.
   Uncontrolled coal mining and thermal power plants in Madhya Pradesh's Singrauli district have caused environmental destruction and health hazards to the people of the district. The community lives in the shadow of coal mine burdens, with dust everywhere.
   The coalfields in Jharkhand are run by Central Coalfields Ltd., a subsidiary of Indian state-run giant Coal India Ltd. Coal mining harms land, surface waters, groundwater and even our air. Impact to the land from coal mining causes drastic changes in the local area. Surface mining completely removes land from its normal uses.
   Coal mining involves worker exposure to high-risk conditions at various stages during mining, processing and burning of coal. The several thousand miners here have developed asthma and other respiratory problems. Some miners/workers suffer from tuberculosis and some suffer from serious eye problems because of coal dust.
   Due to noncompliance of the rules, water resources have been badly contaminated. The inhabitants have, however, been compromising by taking contaminated and sometimes polluted water, as there is no alternative source of safe drinking water. Thus, a sizeable populace suffers from water borne diseases.
   The ecological footprint of the contractors may become substantial, leading to luxury consumption since they earn more than local farmers and villagers.

2. Search for more texts and materials about coal mining.

3. Talk in the group about the problems connected with coal mining. Has anyone personal experience of this? Is the text credible? How can the environmental and health problems associated with coal dust be solved?

Drama, music, dance, poems

Purpose

Creating awareness about any of the ESD cornerstones, promoting self-esteem, skills and values in the individual learner.

What to do

Prepare/develop a theme about the situation that you want to address. Compose some music, choreograph a dance routine, and write a play, story or poem.

An example

A primary school in the community has problems with wild animals and thieves. The animals eat the crops and the thieves steal the fruit and vegetables they produce. The school is supposed to use the vegetables as food for the pupils and sell them on the market to provide revenues for the school.

The school wants to portray the situation as a drama with accompanying music and poems. First they discuss the pros and cons of growing their own produce and write them on the blackboard. A group of pupils then puts together a little sketch. Another group makes some music and practices songs and dances. The class selects the students who will participate. A leader is appointed. The props that are needed are borrowed from home or are created using simple materials and objects found in nature.

Finally it’s time for the big day when the play is performed. The students invite all school pupils and community members to the show.

Example of other themes:

- Our mangrove is our future
- A sustainable use of water
- Living sustainably with one planet
- Upstream and downstream, our mangroves connect us all

Study visits

Sustainable development is, among other things, seeing the linkages between ecological, social and economic aspects. Going out in the environment to see how reality plays out is an important part of ESD. When you do a study you must make careful preparations.

Purpose

To appreciate the theoretical and practical (action learning) components, to inform yourselves about the environment, to develop research and investigative skills. To promote the curiosity and first hand experiences of young scientists.

What to do

Discover your village/town

In the next 20 years development, often at the cost of the environment, will change the face of rural areas drastically. Since large areas that now house plants and animals will be at risk from the forces of development, the major challenge will be to ensure that the ecological wealth and diversity of these areas is not hampered. Creating a sustainable future for rural residents, who will be able to enjoy a high standard of living through this development, is a central issue.

In this exercise you will see and understand the linkages between how the community can act as a responsible organic unit and how it can influence policy decision to ensure that development and sustainability can be a symbiotic process.

Tasks

The participants are divided into small groups and select one of the following tasks:

- a) Interview officials responsible for different aspects of the area/district activities.
- b) Interview people belonging to the community in question.
- c) Make an inventory of the area’s ecology and its natural wealth.
**Prepare**

Ask the participants to do the following:

- Make a schedule. How much time do you have?
- Do you need to interview someone? Contact the person in question and fix a time for a meeting.
- Develop the issues to be addressed as a questionnaire.
- Determine how the final results are to be presented: as a report, orally, as drama...

**Officials**

Examples of questions to be put to various officials (visit various departments for example, environment and forest, health, welfare, rural development):

- What do you work with?
- Name three things that are positive in the village/area from your point of view?
- Name three things that are negative the village/area from your point of view?
- On a five-point scale, how sustainable is the city?
- Has the village/area a small, medium or large ecological footprint?
- How is the biodiversity in the village/area?

**Green areas**

Make an inventory of green areas in the city. How much of the city is green space? Count the number of species of trees, shrubs, other plants, insects, birds, mammals, reptiles etc.

**Interview people**

Interview people who move around in the area. Create a questionnaire that deals with how people live in their everyday lives. Some examples:

- How old are you?
- What is your occupation?
- Do you work in the village/area or nearby city?
- Name three positive and negative things about your village/area
- Name three things that are positive in the village/area from your point of view?
- Name three things that are negative the village/area from your point of view?
- On a five-point scale, how sustainable is the city?
- Has the village/area a small, medium or large ecological footprint?
- How is the biodiversity in the village/area?

**Presentation of the results**

Compile the results in charts, images and text. Determine how results will be presented: a report, an orally, a drama, etc.

**Demonstrations**

**Purpose**

To give a clear picture/understanding of an issue via hands-on (practical) experience.

**What to do**

A school decides to start a new theme that will last for a whole year – ‘Greening the compound’. They want to improve the schoolyard with a sustainability perspective. They will divide the school’s students into working groups that will plan, build, buy things they will need and fix things they already have. All teachers and subjects will be involved in the project. It will start with a “kick-off” and end with an opening ceremony.

Students participate by:

- Making suggestions about what should be built/made
- Reflections on what they can do themselves, what must be bought and what can be recycled
- Being involved in everything done to increase their sense of responsibility and participation
- Seeing themselves as part of the environment both in and outside school

**Workflow**

1. **Interview children**

Some questions:

- Mark on a map where you usually hang out (create a simple sketch map)
- What do you do in the schoolyard?
- What do you think of the playground (on a 1-5 scale)?
- Do you and your school class use the schoolyard during normal lessons?
- What would you like to do about the schoolyard?

2. **Teachers compile the answers** to the interviews.

3. **Present the answers** to the students. Ask them to discuss and have opinions on the design of the playground.
4. Divide students into groups of interest.
Together with the teachers involved students are divided into groups that will change the school yard.

5. Teacher discussions
Questions:
- What challenges exist with regard to the playground?
- How can the schoolyard be changed so that problems with erosion can be prevented?
- How and where can groves of trees, plots of vegetables and fruits be created?
- How can a schoolyard be used as an educational resource?
- Would the school be able to invest in a water tank to collect rainwater – so-called water harvesting?

6. Inauguration
After all work is finished, invite parents to the inauguration of the new playground.
Consider whether the school could invite neighbouring schools to show and inspire others who might be interested.

Other demonstration examples:
- Kitchen garden
- Student plot
- Woodlot

Simulation

Simulations
Simulations consist of a common activity and one debriefing process with four stages: reflection, interpretation, generalization and application. These latter describe how the activity was perceived, what actually took place, what the purpose of the activity was and similarities you can see to the real world.

Activity
The activity in a simulation is a simplification of reality. Reality is complex. It needs to be simplified to be understandable. The activity doesn’t need to specifically target your study object – on the contrary, it is usually an advantage if the activity is allegorical.

A simulation is an open activity but there are few rules. The participants act as themselves but may also take on operational roles that the activity might demand. It should be noted that the participants define and influence activities they undertake through their actions. It is reality that is simulated and not the roles.

The participants are autonomous – the leader should not interfere in and correct the exercise. Mistakes or unexpected developments in the simulation are desirable and something you can learn from.

Debriefing
Debriefing consists of four stages:
1. Reflection: Describes how the task was perceived and what actually took place. In this part there are no right or wrong activities either in terms of one’s own experiences and feelings or how others are to be understood.
2. Interpretation of what happened during the simulation: Interpretation takes place both at an individual and shared level. How did I act as an individual? What were the effects? These are some of the questions that should be considered.
3. Generalization: Similarities and differences with reality. First and foremost the participant’s thoughts, interpretations, concepts and theories are the focus of discussion, even if these thoughts do not comply with the leader’s intent with the simulation. At the end of this part the leader can explain his intentions with the exercise. It is during this stage that the leader relates to various concepts and theories in the study area.
4. Application: Action competence and a new understanding of reality can be attained by talking and discussing. The knowledge gained here can be applied in other areas and tested by experiments or in other exercises.

Simulation method
You can use the simulations in whatever way you want, at the beginning of your work to awaken interest, in the middle to vitalize the process, or at the end to assess what has been studied.

An example of a simulation
Footprints – simulation of sustainable development

Purpose
To show the resources the rich world uses compared to those used by the poor world and to demonstrate that understanding can lead to changes in relationships and behaviour.

Before you begin
Get hold of some tape, string or something similar to mark a start and finish line.

27 sheets of A3 paper (paper with footsteps on), see Resource 1. You may need more or fewer sheets depending on the number of participants in the simulation.

What to do
Round 1
Select a start line and a finish line in the room or outdoors. There must be at least five meters between the two lines.

Divide the participants into groups of 4-6 participants. The principle is that some groups are given few footsteps and others given many.

Distribute the sheets with the footsteps. In half of the groups two participants share a single sheet.
Read the instructions to the participants. Ask them if anything is unclear and if they have any questions.

**Instructions to participants**

You are now divided into teams — countries in the world. The goal is to get from one side of the room to the other. You should not touch the floor. You are only allowed to stand on the sheets that have been put down on the ground. If someone in the group accidentally touches the floor the whole team must start over again. Therefore it is particularly important that you help each other so that everyone gets to the other side.

**Round 2**

Participants now begin discussing how they will solve the problem of how to get from one line to the other.

**Round 3 – debriefing**

- What happened in the simulation?
- Let each team talk about their experiences, participants should wait to comment what others say
- How did you solve the problem that got you from one side of the room to the other?
- Was it hard to get the whole group from one line to the other?
- Did you help each other?
- Could you see what happened to the other teams?
- How did you feel when you were given the footsteps allotted to you?
- What were the goals of this simulation?
- Read the text about the ecological footprint. Ask the participants if they think differently now?

**Round 4**

- Tell the participants to repeat the exercise.
- Read the same instructions for the participants as you did in Round 1.
- Note if the participants solve the problem the same way as before or chose to act differently.

**Round 5**

- Allow the participants to sit in a ring.
- Ask why they chose to act in the same way or differently than before.
- How should we live in the world?
- How can we change the way we live now?

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**Ecological footprint**

When you walk on the beach, you notice where people have put their feet. Their footprints can be seen in the sand. Similarly, there is a way in which you can see how we humans live since we all make ecological footprints. We create a footprint every time we buy and use many different things like TVs, DVDs, bottles, shoes, newspapers, food etc. This is because, in order to produce all these things, we need a variety of materials such as plastic, metal, paper, floor, meat etc. The things we make are all useful but they also have a significant impact on the environment.

We buy and use lots of things that come from far away and they have to get here in one way or another. Aircrafts, trucks and boats need fuel—diesel, ATF, gasoline—and engines that use fuel and gasoline emit exhaust fumes.

When you add all of this together, all the things you do and the energy and raw materials that are needed, you leave tracks that are called ‘Ecological Footprints’. Every human being on earth makes a different-sized ecological footprint. What is significant is that each person living in a rich country leaves a footprint that is as large as 6–7 football fields, while the inhabitants of the poor world leave a footprint that is only as big as two football fields (relative to the area on earth).

India has vast amounts of natural resources, yet its population often suffers first and most tragically when human demands on nature exceed its capacity for renewal. Some impoverished parts of India have some of the lowest Ecological Footprints in the world per capita—in many cases too small to meet even basic needs for food, shelter, health and sanitation. One of the key factors for sustainable development in India is that there is equitable distribution of the resources that we have (and are currently using) across the country’s population. If this is achieved, we will not have to put extra pressure on our natural resources to ensure that we end poverty, hunger and disease.

Ecological Footprint measures humanity’s demands on the biosphere by assessing the area of biologically productive land and sea required to provide the resources we use and that which is needed to absorb our waste. This area includes the cropland, grazing land, forest and fishing grounds required to produce the food, fibre and timber we consume and the productive land on which we build our infrastructure. It also includes the area needed to absorb and store humanity’s CO2 (carbon dioxide) emissions.

The average Ecological Footprint per person in India is 0.9 global hectares (gha), while the Global Average Footprint is 2.1 ghs. Compared to the rest of the world, the average Indian’s footprint is small, and for many it is too small to meet basic food, shelter, health and sanitation needs. In order to make vital quality of life improvements, large segments of India’s population must have greater access to natural resources. Yet India’s growing population and the world’s escalating resource consumption makes this increasingly difficult.
The Jigsaw model

Purpose
To develop teamwork and cooperative learning skills, and to develop depth of knowledge.

Background
The Jigsaw Model allows participants to be introduced to a subject and induces a high level of personal responsibility.

What to do
- Divide the participants into groups of 4-5 members – the home teams. Appoint one participant from each group as the leader.
- Every member in the home teams is assigned a particular topic – these are called experts. The topics have been created by the instructor. Example: The topic Fishing can be divided into 1) Species 2) Ecology 3) The Fishing Industry 4) Challenges 5) The Future.
- Each expert in the group reads up on the subject and familiarises himself/herself with it. They all prepare a short presentation.
- The experts from each home team are assembled together in mixed teams.
- Each member teaches his or her expertise to the newly formed group. Encourage others in the group to ask questions.

Open space

Purpose
To form a group meeting that facilitates communication, collaboration and innovation.

Background
Open Space is an approach that can be used to form a group meeting or conference. Open Space is based on dialogue and participation and driven by the commitment and responsibility of the participants themselves. The participants create the agenda together and are given the freedom to choose what they want to talk about, with whom and for how long. The meeting is thus self-organizing. Open Space can be used in meetings of 5 to 200 people. Open Space is suitable when working with development and project work, change management and when you are exchanging experiences or networking.

What to do
1. Instructor
The focus on the current case is presented and the instructor explains the “self-organizing” process known as “Open Space”. Open Space assumes that all necessary knowledge is available and that people with the requisite experience are present in the room.

2. Create an agenda
There is no agenda for the meeting. The participants should create the agenda themselves in the first 30-90 minutes of the session.

3. Questions
The group creates a working agenda. Ask what issues are to be discussed. Invite the group to come forward and write down their questions on pieces of paper. The issue may be one that someone thinks is important to discuss and the rest of the group may choose to participate in.

4. Select a group
Put all the questions on a special plate that is divided into three different fields or put the questions on the floor. The participants choose the question that is of most interest, form groups and sit down together for an hour or so to exchange experiences. If some groups become too small, they can merge with another group that is dealing with a connected issue.

5. Different roles
You may be able to choose different roles. Either you are a bumblebee – flitting between groups whenever you feel that you are unable to add anything more to the discussion. Or you are a butterfly – flitting between groups and just listening quietly.

6. A summary
When the group has dealt with the questions it is time to make a summary of findings in a report sheet and then put it on a flip chart or a wall. The report sheet may have the following headings:
- Topic
- Summary of the discussion
- What should we do?
The development from being a green-school to become an ESD school

The greening process and learning

Students learn a lot when they are greening their school yard. When they build waste management facilities, vermicomposts, develop gardens with medicinal plants, or clearing areas of plastic waste, they certainly learn a lot of facts but also develop different abilities. They get to learn about the possibilities of starting their own personal development processes and gradually evolve an individual ‘action competence’, or to put it simply, they develop the ability to carry out meaningful social activities. In planning and building different kinds of greening facilities students not only learn to communicate with peers, but also co-operate, participate and solve problems in a focussed manner. And in doing so, they undergo positive personal changes will contribute in raising their self-esteem.

Moreover, in the school greening process teachers also become learners. The new tasks ‘force’ them to communicate with peers and their students in new ways. Teachers get opportunities to develop a more autonomous decision-making process and learn to solve many technical and logistical problems during the practical work that they initiate and oversee. In such activities, school managers like principals also become learners since they need to learn more about matters related to funding, planning and organization of these new and unusual types of school activities. What should be kept in mind is that the staff and students may need to be encouraged on different occasions by the management when things are not working out in an expected way. Therefore, greening activities are certainly learning experiences for all stakeholders involved.

The green school becomes an ESD school

A whole school approach towards ESD requires that the development of the ‘outer’ activities in the school yard also turns into a development of more ‘inner’ school processes. After the initial focus on the schoolyard and other outer activities like clearing plastic waste, there is a need to make sustained efforts to change ordinary educational activities into learning experiences. A common theme for ESD schools is the focus on learners’ development of new set of abilities and skills. Working on real life issues and undertaking different practical exercises facilitates students’ development of abilities such as decision-making, critical thinking and democratic skills. They can participate in exercises that develop and clarify their own values, and they can also learn to identify and formulate their opinion and perspectives on different types of key-issues. From the teacher’s perspective, besides empowering their students with these important abilities, it is also essential to pay attention to students’ personal development and to be able to handle an increasingly complex world in an informed way. After all, an increase in self-confidence, empowerment and ownership in problem-solving is a prerequisite for being able to use these developed abilities in an informed way and thereby unfold a developed action competence. For a teacher, the ability of informed action competence needs to be facilitated by personal characteristics like patience, listening to others’ opinions with an open mind, to be able to feel empathy with other peoples’ life situations, sensitive cultural understanding and above all, respect for others’ way of thinking.
Reorganize for development in school and community

The focus on the learner needs to be facilitated by changes in school organization, structure and classroom teaching. The organization needs to offer opportunities for teachers and students to meet each other outside the classroom in order to discuss about overall school development. Regular meetings where the principal is also present are essential. In general, this type of organization allows democratic discussion regarding school development to flourish—from discerning key issues that contribute to local community building to work that deals with other types of real life issues. Moreover, this type of ‘re-organization’ could also be directly connected with school issues such as making temporary schedule adjustments to accommodate these initiatives or more permanently by creating opportunities such that educational activities are more subject integrated, thematic and in line with ESD principles. It is vital that students get possibilities to use their democratic rights to participate and take full responsibility for their own education. They need to experience an everyday type of democracy in the school and in the societal work where they soon will be the key stakeholders.

Nature as a book

Purpose
To establish a close relation with nature in an easy way.

What to do
Nature is like a huge, open book full of letters: Letters such as B as in Bush, S as in Stone, L as in Leaf. There also other letters spiced with fantasy and sensuality: L as in Laughing bird and S as in Silver Shiny Stick.

All the letters are joined together to form words and sentences. Nature has its own alphabet and language. The more one reads the more one understands.

1. Surname subject
Pick an object in nature which begins with the same letter as your first name.

Then gather everyone in a circle. Start a presentation of the participants using their new surnames. Example: Meena Koel, Aslam Mango-tree.

2. Rebus
A rebus is a kind of word puzzle that uses pictures to represent words or parts of words. Make a rebus of objects from nature. Your rebus can be either completely free or very specific. Example: stone + unbroken stick = needle = SUN.

3. Alphabet
Try to create the entire alphabet with the help of objects from nature.

Garden safari

Purpose
To establish a more profound relation with nature.

Before you begin
You need paper and pencil.

What to do

1. Map
Divide into groups. Each group selects an area in the garden or the school yard. Draw a map of the area. Observe signs of living things in the area. Indicate your findings on the map.

Finally, report and discuss what you have seen.

2. Poem
Stroll slowly in your surroundings with an open mind. Try to be curious, sensitive and creative. Write a poem observing the following instructions:

• What have you observed?
• Name some objects you found.
• What feelings do they evoke?
• What can you smell?
• Try to describe different colours.
• Can you hear anything?
• Touch some leaves, branches etc. and describe your feelings.
• What are your reflections?
• Give your poem a name (a headline).

Read your poem to the rest of the group. Discuss in which subjects you can use this approach.
3. A poem called haiku
Write a kind of a poem called a haiku. It’s a form of a Japanese poetry consisting of three lines with 5, 7 and 5 syllables. The last line should be a bit of a surprise, a twist of some kind.

My secret

Purpose
To train the ability to describe things in a comprehensive way.

What to do
1. An object
This is an outdoor activity. Pick a natural object that you like such as a beautiful stone. Hide it in your hand or behind your back.

2. Describe and guess
Walk in pairs. Describe your object without showing it. Use any five adjectives. Ask your companion: “Who am I?”

Describe the object in the same way you would describe yourself:
“I’m hard and soft at the same time. If I fall on something hard you will notice a smell. I’m grey, but when I get wet I become dark grey. My edges are round but if I go to pieces I become sharp.”

A poem that asks you...

Purpose
To stimulate curiosity, imagination and the desire to discover the surroundings in a joyful and poetic way.

What to do
The instructor reads a poem which invites the participants to look for the things named in it.

Six things from the lake
Get something that is wet
and something that is tired,
something that rides on a wave
and something from a cave.
Get something new from the lake
and something that is weak.

Here is another poem:

Five things around you
Get three stones in a row
and something that is under a leaf
search for many colours
and striped things
catch finally something that creeps

Try to find your own little poems!

When everybody has gathered objects that fit the poem, the instructor reads the poem again. For instance, when the word “wet” comes up, the participants show their wet objects.

Soil erosion

Purpose
To experience soil erosion and draw conclusions from it.

Before you begin
You will need two buckets of water and something to dig with.

What to do
Select two slopes. One with grass and one without grass. Get two buckets of water. Pour one bucket of water on the bare ground. Pour the other bucket on the ground covered with grass. Ask the participants to observe the speed the water is absorbed and the colour of the water. Make a comparison and draw conclusions.
You can also prepare this exercise by making a pond at the end of the slope. Then the participants can observe the amount of water that ends up in the pond. Reflect about what has happened to the rest of the water.

Reflect together
What has the water brought? What has happened to the ground? Can you give some examples from real life showing the same thing as in the exercise? How can we use the experiences from the exercise in real life?

The value of a tree

Purpose
To realize that we have different opinions on trees and that our knowledge about them varies.

What to do
Ask the participants to spread out into a forest and sit under a tree and reflect alone without looking at each other.

• Use all your senses to describe the tree.
• What kind of a tree is it?
• How old can it be?
• How can people use the tree – both children and adults?
• What animals are in some way connected to the tree? Think of insects, mammals, birds, etc.
• What is the importance of a tree in the forest? What does it mean the ecology?
• What emotions do you feel when you embrace the tree?
• Do you have any memory connected with this tree or a similar tree?

Divide into groups. Brainstorm and discuss in the groups the value of a tree. Categorize the different suggestions. Make a mind map.

In plenary: What different perspectives have you found?

Gallery walk

Purpose
To activate the participants.

Background
Gallery walk is a flexible discussion technique that makes participants more active.

What to do
1. The instructor prepares 3-5 discussion questions.
2. The questions are placed at various stations in the classroom or outdoors.
3. Divide the participants into groups of 3-4 members. One member should take notes.
4. When a group of participants gets to a station, they read what others have replied and then add new thoughts.
5. Exit gallery walk with a summary and reflect together in the whole group.

Version for presentation
Gallery walk can also be used as an alternative way of making group work presentations. Instead of having all groups present the results of their group work in plenary, groups can be asked to present their results on flip charts. Those are displayed on the walls. All the groups walk around to read and discuss them. Blank sheets of papers can be put next to the flip charts for participants to write comments on.
THE SUSTAINABLE SOCIETY

What do you think?

The exercises in this chapter are about thinking for yourself, considering various issues and discussing them. If participants are unfamiliar with this approach you can start with this simple activity:

Purpose

To train yourself to take a stand, expose yourself to the reasoning of others and learn to respect other people’s points of view.

Before you start

All participants pick up at least seven pebbles each.

1. What is the colour of your shirt/blouse/dress?
   - Talk about the colours you identify e.g., blue, red and green. Paint or write the name of the colours on postcard-sized pieces of paper.
   - Each participant puts a pebble on the colour of the item of clothing he/she is wearing.
   - Create a chart that clearly illustrates the result.
   - Which colour is the most common?
   - Which colour is your favourite?

2. Which fruit do you think tastes best?
   - Talk about various fruits, e.g. oranges, mangoes, bananas…
   - Write the names of each fruit on a postcard-sized piece of paper.
   - Each participant puts a pebble on the fruit that he/she enjoys the most.
   - Which fruit is the most popular?
   - Which fruit is the most valuable to your family?

3. Which environment do you think is the best to live in?
   - Choose between urban, rural, urban park, forest, savannah, maritime, river and field. Write the name of each environment on a postcard-sized piece of paper.
   - Each participant puts a pebble on the appropriate environment.
   - Which environment is the most popular?
   - Ask some of the participants to justify their responses.
4. Which is your favourite sport/game/activity?
   - Select the sports/games/activities that you can choose between.
   - Write the name of each on a piece of paper, for example, cricket, football, swimming, etc.
   - Each participant puts a pebble on the selected sport/game/activity.

Complex exercises
5. What challenges exist in your village/community/city?
   - Talk about different challenges. For example, water shortages and lack of electricity.
   - Write the names of some of the challenges on postcard-sized pieces of paper.
   - Each participant puts a pebble on what he/she thinks is the biggest challenge to the neighbourhood.

6. How can we achieve a sustainable society?
   - Talk about various measures such as investing in education, land reform and international agreements that will leverage a sustainable future.
   - Each participant places a pebble on the solution he/she thinks is the most important factor needed to create a sustainable society.
   - End the activity by discussing different ways to achieve a sustainable world.

Comments
These issues range from the impersonal and neutral, for example shirt colour, to more personalized and opinion-related questions. The answers to questions 1-2 are factual. The rest of the questions are more about opinions. These opinions are important as they develop democratic thinking.

Walking with your food glasses on!

Purpose
To pay attention to objects in the neighbourhood associated with the consumption and production of food.

What to do
1. Walk in the neighbourhood
   Put your “food glasses on”? Walk with your friends around the neighbourhood and collect impressions. What kinds of things remind you of food?
   Perhaps you will see:
   - Fields of rice or wheat that can be used for making wonderful food
   - An empty tin lying in the ditch that someone has carelessly thrown away
   - A lorry transporting milk from a person’s cattle/buffalo shed to the dairy
   - Someone carrying shopping bags on his or her way home from the supermarket
   - A cow that makes you think about a breakfast of rice and milk, curd or butter
   - A lake or a fish
   - A ship with bananas and mangoes
   - A cat hunting mice
   - Animal droppings like cow dung or horse dung
   - An orange tree
   - A leaf that has been nibbled by a caterpillar

2. Report
   Tell each other what you have seen and experienced.

3. Create food chains
   Try to create a food chain, its path from cradle to grave. Example: ORANGE: core-tree-orange fruits-factory-juice-juice packaging-grocery store-kitchen-waste

4. sustainable use
   Discuss if the food chain is sustainable. How can it be changed for the better?

Human settlement – the built-up environment

Urbanisation is a fast-growing global trend. Today more than half of the world’s population lives in cities. The UN predicts that by 2030, 70% of all people on Earth will live in urban concentrations. It is in the cities that the challenges posed by human ecological footprints (see page 73) will be most felt and thus the solutions are also to be found there. New ways of thinking and acting about food, mobility and housing are necessary. These activities are however just as relevant in small communities as in big cities. It is important for students to work actively with real challenges and solutions in the local community if they are to develop action competence.

Purpose
Through active participation help participants understand and involve themselves in the complex forces behind urban development.

What to do
People have developed structures that make living in their particular environment more economical and enjoyable. Divide your participants into groups of 4-6 people. Decide if all groups should do the same thing or whether they are to be allocated different tasks. Choose among the tasks shown below according to your goal. Indicate where in the community they are to carry out their investigations. It is not possible to do everything on one occasion. Make an implementation plan and adapt the tasks accordingly.
1. Visit your community in person to observe and record how the physical environment has been planned and developed. Draw a preliminary map.
2. Visit a Civic Centre/Government record’s office, ask for plans and study the structure of the neighbourhood.
3. Plan additional field trips and surveys. Study the present situation, investigate challenges and possible solutions. There may be some overlapping between areas that must be taken into consideration:
   a. Environment – study plants, animals and sources of pollution.
   b. Mapping – refine the preliminary map.
   c. Transport and communication – how do people usually move around and communicate? Make a survey of transportation and means of communications, e.g., bicycles, trucks, cars, taxis, motorcycles, mobile phones, radio, TV, Internet, fax and E-mail.
   d. Housing – how do people live? Investigate types of buildings and the materials used. Are building practices and repairs guided by sustainability?
   e. Energy – investigate the flow of energy in, around and out of your community. Investigate energy supply and the use of technology. Do the same for your school.
   f. Resources – investigate the flow of resources such as food, water and waste in, around and out of your community. How were they produced, consumed and where do they end up? Do the same for your school.
   g. Trade and consumption – investigate the consumption patterns of some community/city members. How does trade work? Investigate trade patterns by studying markets, retailers etc.
   h. Community services – investigate community services that have been set up to meet people’s needs – waste management, food, utilities, fuel and resting places.
   i. Social institutions and identity – investigate the social components of neighbourhoods in your community (a neighbourhood is a local area whose residents are generally aware of its existence, know their neighbours and share social institutions which are unique to them – churches, clubs etc).
   j. Growth zones – locate current and future growth zones, and areas which have been restored.
   k. Laws – investigate laws and regulations which protect natural and residential areas from intrusion by industry, roads etc.
   l. Health and sanitation – investigate how issues of health and sanitation are dealt with in the community. Study access to health care, toilets, clean water, etc.
   m. Local history – try to find out how your community has grown and changed (interview elders).
   n. Culture and pleasure – investigate the range of activities available for culture, leisure, learning, exploration and enjoyment.
   o. Future development – interview local politicians, decision-makers and local residents about their thoughts on current challenges and possibilities, and their visions for the future.

Groups present and discuss their conclusions. Find the connections between different areas and create a common assessment of the community. Then, most importantly, suggest changes that can be made in the city or community to develop it in a more sustainable direction. Summarize and compile the results in a common report. Present your findings in a public forum where local politicians, decision-makers and other key persons are present.
Writing an article

Headline
Make this as catchy as possible because your reader will read it first before deciding whether to read the rest of the article. The title should be attractive, witty, true and/or be designed as an assertion.

Sub-heading
A second line that provides additional information and incites curiosity.

Preamble
The preamble introduces the main body of the text and makes people want to read more. It answers the questions: When, where, who, how and why.

Body copy
The body copy is the main text in the article. Write about most recent and most important things first. Leave the least important to last.

Byline
The byline gives the journalist’s name and may include a photo.

Letter to a newspaper

Purpose
To help participants formulate written arguments and clarify these arguments further in their own minds. Moreover, this exercise is intended to impart the required skills and train the participants to engage in public debate in the media.

What to do
Ask the students to write well-formulated articles backed up with strong arguments with the intention of sending them to the local newspapers in an attempt to influence local developments and decision-making. In the box you will find suggestions for the structure of such an article that can be given to the participants.

Below you will find an example of a suitable topic. It is a good idea to use local examples and/or be designed as an assertion.

Tourism development
Tourism development in the Sundarbans is expected to bring economic advantages to the region. In order to cope with the anticipated number of tourists, numerous recreation centres and marinas have been planned or have already been constructed in shallow water areas. It is likely that these will have considerable impact on the sensitive and fragile ecosystems in these mangroves (for example, on fish breeding and nursery areas) and may pose a serious threat to landscapes and the biodiversity of the respective areas.

To work with innovations

Purpose
To develop the ability to create innovative solutions to small and big problems that hinder progress towards a sustainable future.

Background
We are born with a creative ability in the same way as we are born with more or less developed ball skills. However this ability can be trained and developed further. In the following we start off with simple exercises to warm up our creative ability and raise it to a higher level. This means that our capacity for innovation will be increased.

Creativity is the ability to invent something new. For example, taking two things that already exist and making something completely new by combining them. This means thinking in new ways. Your creativity is based on your skills, experience and the motivation that you feel for your mission. You also need a great deal of courage to think outside the box.

The word innovation means renewal. An innovation is something that people actually use. An innovation may mean that you use an existing object in a radically new way or manufacture an existing product in a new way. The goal of an innovation process is to create positive change, to do something better (Wikipedia).

To start a small scale business is not a quick fix, it’s a process. You need ideas, money and other equipment. But you can always start to think from different perspectives and try to see things in everyday life in new ways.

How to get an idea and develop it is a matter of several things:
- to be brave
- to be smart
- to have fun
- to be open-minded
- to be curious
- to see things from different perspectives
- to think outside the box

An innovation can also be social, a new way of thinking, cooperating, teaching, etc.

Being creative and designing innovations can be summarized as follows: Dare to think of new ways of doing things!

Innovations often have their roots in everyday problems. Sometimes these are something negative. For example, a shortage of wood or the desire to increase the value of gnatting. An inspiring example of this is a product called Sovlatten. Undeveloped countries have lots of problems with diarrhea. It’s often necessary to walk a long way to fetch water. This problem has led to an innovative solution. The Solar Safe Water System is a portable container that uses energy from the sun to treat and heat water. Access to safe water is an enormous challenge in most African countries. The World Health Organization estimates that lack of access to safe drinking water accounts for as many as 1.8 million of worldwide annual fatalities due to diarrhoea – of which 90 percent are children under the age of five. A large proportion of these deaths occur in Africa.

What to do
Some creative exercises performed in groups of 3-5 participants:

1. Heating exercises
a) Three things
Choose five people, five items and five places that you have a relationship with and write them on pieces of paper and divide them into three separate piles: People, things and places. Take one item from each pile, e.g., Sarojini Naidu – banana – Sundarbans. Write a short story based on the three words, e.g., “Sarojini Naidu, a noted activist in the Indian Nationalist Movement has a relative in West Bengal who grows bananas close to Sundarbans”.

b) Small everyday problems
Write down some things you can find in your surroundings, e.g., rock, desk, chair, pen. Choose one of the things. What problems are associated with it? How can you solve them? List different solutions. Evaluate them. Pick out the best solution.

c) Discover and invent
Look for some natural objects. They can be quite varied, e.g., a crooked stick, a multi-coloured stone and a leaf lobed like a hand. Discover the various possibilities and qualities inherent in things. Put together natural objects in an innovative way. Create a charming, wonderful invention of any kind! What would you call it?

d) Body Machine
Gather the group and create a fantasy machine using the human body, for example, one participant stands up and lifts his/her leg up and down. Another stands on his/her hands and a third waves a hand, etc. What would you call this machine?

2. Examples of innovations
The first bicycle ever had a frame and a very large front wheel and a very small rear one. It was called a penny-farthing! Today bicycles are made differently.

a. Give more examples of everyday things which have changed like the bicycle.
b. Study a few examples of innovations such as energy saving stoves.
c. Study the “Low Cost Ways of Treating Drinking Water” poster. What is innovative...
about the proposals? Do you think there are other clever ways to treat water simply and inexpensively that are not shown on the poster? (Resource 10)

3. Create an innovation
Identify one problem that you run into every day. For instance you have a long way to go to get to the store or your school, there are lots of droughts or your shoes are always falling to pieces Choose the issues you are most concerned about. How can you solve the problem? Conduct a brainstorming session:
• Identify a problem.
• Conduct a brainstorming session.
• Pick out some positive and workable ideas. Find a solution to the problem.
• Present the solution to the other participants. Ask for comments.

Criteria for sustainable production

Subjects
Art, Natural Science, Social Science, Language.

Purpose
Students/participants learn about important eco-labelling and its purposes.

Material
Information about different labelling systems and their principles and criteria.

What to do
1. Introduce the concept of sustainable production to the class/group. In the UN meeting in Johannesburg 2002, one of the key challenges identified for the future was to discover more sustainable production and consumption patterns. This deals specifically with the question: 'How can we ensure that production is made sustainable?' Certification schemes and eco-labelling is one way.
2. If possible, select types of products/services which have been identified locally/regionally as having the potential to generate income from sustainable alternatives. In the case of Chattisgarh for example, this might be agriculture, timber, eco-tourism, mining and fishing. Group them into product areas.
3. Tasks for group work:
   a. Write down at least 5 criteria/principles that might contribute to a sustainable production of your product/service. These may be social, environmental or economical.
   b. When each group has agreed upon 5 criteria/principles for their respective products, distribute fact sheets and information material about different labelling systems, for example, QCI (Quality Council of India), FSC (Forest Stewardship Council), ISO (Indian Standards Organization), NAB (National Accreditation Body), organic farming, etc. Ask the groups to compare their own proposals with current labelling systems and to see if there are any other criteria/principles they would like to add to their list.
   c. Hand out flip charts and ask the groups to design a suitable logo for their product.
      Add information on the criteria/principles you have identified.
4. The groups display their flip chart presentations on the wall.
5. Pin a blank sheet of A4 paper at each side of the flip charts. The left sheet is given the headline: Good! The right hand sheet is given the headline: Suggestions for improvements.
6. All participants walk around the room and read the flip chart presentations and they all write one comment each on each sheet of blank paper.

Developing the exercise further
The group work could be extended as follows:
Students are given different roles in the group, for example, medicinal plant scientist, conservation scientist specialising in plants, mammals, birds, amphibians etc, a community leader, local tourist guide, forest owner, designer, local priest or other person needed in the project. The students can apply for the roles/tasks as if they were applying for a job.
Each student works out the most important aspects of their character. They utilize different materials, books and carry out activities that will enable them to obtain important information that can be used by the project group. This information can be compiled in small or large reports, wallpaper magazines/posters, models etc., depending on the time allotted and the level of ambition set.
Each student makes their own list of demands that his/her character wants to add to the development of criteria for the label. The project group meets and all the experts present their results and demands orally. The group discusses and compromises until they reach an agreement on a label with a logo and a list of criteria and principles.

Links
Useful links concerning FSC and Principles and Criteria for Sustainable Palm Oil Production:
www.fsc.org/1093.html
www.rspo.org/?q=page/513

Some rules:
• Criticism is forbidden when brainstorming
• Encourage spontaneity, and originality
• All ideas are good ideas
• The quantity of ideas is important
• Encourage the participants to dare make mistakes
• Participants develop each others ideas
• Number of participants: 5-8
• Everyone should be allowed to express themselves
To connect the school with the real world around it and to encourage it to focus on issues important in the local community such as questions of water and agriculture.

Background
One of the important aspects of ESD is to connect school work with reality outside the school—connecting school work to the local community, the needs of the country and the whole planet. If education is to support development, it must be based upon the needs of the society we are a part of. Therefore, in any such endeavour key issues for development must be identified. These issues cannot be conveniently divided up into isolated sectors that target history, biology, language, etc. separately. In reality, all school subjects are connected and to understand them all, a holistic approach is essential. All work in school must integrate the knowledge and skills that are to be gained by studying different subjects.

What to do
1. Brainstorm and mobilize
Identify and mobilize teachers at the school who are willing to work together on a particular theme. Brainstorm together about important questions that touch the local community.

LOCALLY RELEVANT THEMES

Purpose
To connect the school with the real world around it and to encourage it to focus on issues important in the local community such as questions of water and agriculture.

Background
One of the important aspects of ESD is to connect school work with reality outside the school—connecting school work to the local community, the needs of the country and the whole planet. If education is to support development, it must be based upon the needs of the society we are a part of. Therefore, in any such endeavour key issues for development must be identified. These issues cannot be conveniently divided up into isolated sectors that target history, biology, language, etc. separately. In reality, all school subjects are connected and to understand them all, a holistic approach is essential. All work in school must integrate the knowledge and skills that are to be gained by studying different subjects.

What to do
1. Brainstorm and mobilize
Identify and mobilize teachers at the school who are willing to work together on a particular theme. Brainstorm together about important questions that touch the local community.
2. Prioritize
Choose a single issue that is currently the most important to work with.

3. What should be taught?
Group work is an important aspect in all kinds of LORET activities. As a teacher, therefore, what should you teach to facilitate an understanding of the selected issue, for example, soil erosion? You might consider studying different soil types, ecology, water management, economic topics, etc. Along with this, monitor the important social and cultural issues that should be covered when working with the theme that is picked up. Treat your students as potential farmers, workers, businessmen, social workers, etc. in your community. What knowledge, skills and values do they need to develop as students in your school? Be as specific as possible.

4. Workplan
Make a mindmap of your theme.

Construct headlines and sort your aspects under subtitle headlines.

Determine which subjects are needed to cover the different aspects. Mark this in your mindmap using different colours for different subjects.

You will probably find that several subjects are needed to cover your theme. How will you integrate these subjects? How will you organize your work?

Now you have developed a framework for your theme!

5. Organizing the work
• Create an overview of the plan
• Try to estimate the time needed
• Document all achievements as your work proceeds
• Assign a secretary

6. A model for developing a locally relevant theme
It’s a good idea to make a plan with the following headlines and content:
• The theme
• A summary – an overview of the plan
• Methods – pedagogical methods and exercises
• Organization – how can you collaborate on different subjects in the school
• Goals – a description of goals, skills, values etc. (link to the curriculum)
• Results – what results are expected?
• Information – the literature, resource materials, etc. that highlights the importance of the theme taken up

• See also the six cornerstones on page 6 for ideas on how to develop exercises and a thematic approach in an ESD way.

Water – a limited resource
This is an example of a Locally Relevant Themes (LORET) – plan. Here you will find examples for lessons and activities connected with this theme. The plan is not complete but it illustrates how you might work.

Case study on water sharing of the Teesta

Extracts from: Shifting of the Ganga and Land Erosion in West Bengal
A Socio-ecological Viewpoint: by Kalyan Rudra

"...the Ganges above all rivers of India, which has held India’s heart captive and drawn uncounted millions to her banks since the dawn of history. The story of the Ganges, from her source to the sea, from old times to new, is the story of India’s civilization and culture, of the rise and fall of empires, of great and proud cities, of the adventure of man and the quest of mind which has so occupied India’s thinkers, of the richness and fulment of life as well as its denial and renunciation, of ups and downs, of growth and decay, of life and death.”

-Jawaharlal Nehru in The Discovery of India

Teacher could simplify the language and use this passage as a comprehension piece leading to further points of discussion for future classes.

The Farakka Barrage on the river Ganga (Ganges) is located about 40 km. upstream of the point where the river branches into two major distributaries, the Bhagirathi-Hugli that flows through India and the Ganges-Padma that flows through Bangladesh. Both branches meet the Bay of Bengal downstream of the cities of Kolkata and Dhaka respectively. With the historic decline in the flow of the Bhagirathi-Hugli, a barrage was contemplated with the objective of improving the status of the navigation channel of the river on which the port of Kolkata is located. However, this basic objective of the project has largely remained elusive with the problem of siltation in the Hugli estuary remaining largely unsolved. The port of Kolkata is not yet easily accessible for large vessels.

On the contrary, the engineering intervention in the Ganga at Farakka has impacted on the dynamic equilibrium of the river. The recurrent bank failures and consequent changes in the course of the Ganga upstream and downstream of the Farakka Barrage continue. This has resulted in many
problems like land reallocation causing border dispute between Jharkhand and West Bengal and created a large population of environmental refugees. The politicians and the governmental engineers are addressing the problem as a ‘natural disaster’, while the basic geomorphological processes remain relatively ill-researched. There are apprehensions that the shifting of the Ganga, so characteristic of the Himalayan rivers, may lead to it outflanking the barrage in the future years. This will be the result of the use of narrow and sectoral knowledge base in the management of the river.

The land eroded in recent years from left bank of the Ganga in Malda is more than 200 sq km, while that from Murshidabad is about 358 sq km. Since the flow of the river got intercepted by the barrage and the water level of the river was raised by about 6.70 metre at Farakka, the sedimentation on the riverbed has increased. The huge load of boulders used in erosion control works are dislodged every year and get deposited on the riverbed. The victims of land erosion, some of whom have settled on the newly emerged chars on the opposite bank, are living without the minimum civic facilities. The people living on the chars have been suffering, as neither the state of Jharkhand nor of West Bengal, is willing to take them within its fold. This has resulted in a major human tragedy in this region, the longer term solution to which lies in a more holistic and comprehensive approach to the management of the river system.

Teachers could use this information for the geography lesson

The precipitation over the Ganga basin which is spread over an area of more than one million sq km, belonging to eleven states of India, Nepal, large parts of Bangladesh and smaller parts of Tibet (China) is temporally skewed and spatially uneven. The total annual discharge in the Ganga at Farakka is estimated to be 2,45,03 cu km. (Gol, 1993:32) and more than 80 % of that flow occurs during the monsoon months of July to September.

Four out of every ten Indians depend on the water of this river and the basin is the home of about 350 million people (Pun, 2004).

The mighty river after its long eastward journey through the north Indian plains enters the state of West Bengal passing by on its right bank the outlier of the Rajmahal hill and flows about 72 km. From Rajmahal to Farakka. Downstream of Farakka, before the river leaves the state of West Bengal, it gets divided into two branches. One of them is Bhagirathi-Hugli which takes a southwardly direction near the village of Mithipur in Murshidabad district and flows for about 500 km. southwards to reach the Bay of Bengal. The city of Kolkata (Calcutta) is located on the eastern bank of this branch of Ganga.

The other stream flows about 60 km along the India-Bangladesh border with the name Ganga and finally enters Bangladesh with the name Padma.

Both the rivers were extensively used for navigation for centuries. With the arrival of the British, the size of the vessels also went up. The temporal variation in the precipitation generates very high discharges during the monsoon months and quite low flows in the drier periods. Extraction of water for irrigation in the upper riparian states in India, like Uttar Pradesh and Bihar, accentuates the scarcity in the downstream areas during the lean months from March.

Since the introduction of high yielding variety of crops and expansion of irrigation in the upper and middle Ganga plains, the available flow of water at Farakka during lean months has dwindled.

In the first 260 km the distributary of Ganga flowing south wards entirely through India has the name Bhagirathi. From the point of confluence between Bhagirathi and Jalangi at Mayapur in Nadia district, till the estuary, the stretch has the name Hugli.

The total length of this distributary will be called Bhagirathi-Hugli. The port of Kolkata is located along the left bank of Bhagirathi-Hugli, about 150 km. inland from the open sea. It is only during high tide, that the sea-going vessels can negotiate through the sinuous thalweg of the estuary as fifteen underwater shoals impede the passage.

The feeble headwater supply appears unable to flush out the sediment load from the estuary and thus silt-management has been a formidable task for Port authorities.

Material below relevant for history lesson and how the British changed things

In 1651, the East India Company selected the town of Hugli as the site for their trading operations (Nair, 1993). Hugli maintained its importance till the end of the 17th century. In 1686, the British came in a conflict with the Mughals and started to look for a better and secured anchorage. In 1690 Job Charnock was granted permission for trading operations by the Mughal Emperor Aurangzeb and the volume of goods transported increased. Under the colonial rule the Port of Kolkata gained importance during the late 18th century, though the wooden ships had been plying through the area in the preceding centuries (Ghosh, 1972).

The British rulers after taking over the administrative control of this part of the subcontinent, the hinterland of the port of Kolkata extended quite far - from Assam to eastern Uttar Pradesh. However, because of the existence of many under-water shoals and sinuous thalweg of the river, the movement of the ships along the 150 km stretch from the Sandhead to Kolkata had always been an arduous task (Ray, 1990). The 20th Century witnessed a revolution in the ship building technology and ships of much larger size and greater draught started to dominate the maritime trade. Large sea-going vessels requiring draught of more than eight metres could hardly approach the inland port at Kolkata.

It was during the high tide that a ship could move up the Bhagirathi-Hugli estuary.

The hydraulic regime of Bhagirathi-Hugli basin was modified by the depletion of forest cover, expansion of agriculture, indiscriminate exploitation of ground water, expansion of road and railways and building of dams and barrages across its tributaries.

While there is a great paucity of relevant data on this, it is not unrealistic to link the impacts of all these combined to contribute increasing sediment load and diminishing water in all the tributaries within the basin.

Since a few dams and barrages had been built across some of its western tributaries, the peak discharge of the Bhagirathi-Hugli has got reduced.

This in turn affected its ability to flush the sediment load into the sea.

Teachers could use this information for the geography lesson

The fluvial processes in the Bhagirathi-Hugli estuary are extremely complex. In this funnel shaped and north-south aligned estuary, even during the peak monsoon period, the tide dominates over the headwater supply. The Bhagirathi-Hugli estuary is unique in nature compared to many other outlets of the Ganga.

It is the only river that reaches the sea from north to south while all others flow in a
south-easterly direction. The alignment of the estuary renders an easy passage to the north flowing tide loaded with huge amounts of sediment that chokes the channel. Even after artificial induction of water from the Farakka Barrage, the total upstream flow may not be strong enough to stop sediments being transported into the river by the tidal flow.

The annual discharge hydrograph of Bhagirathi at Jangipur below the outfall of the feeder canal for the year 2000 gives a clear understanding of the variable discharge in this river. The hydrograph was extremely skewed as minor tributaries like Bansloi, Pagla, Madhabjani, Kanloi contributed huge discharge because of a cloud burst in late September over uplands of the Santal Parganas in the neighbouring state of Jharkhand. The lean season discharge in the river was below the threshold limit fixed for the maintainance of the navigability of the port of Kolkata in spite of the additional flow induced by the Farakka Barrage. One should also keep in mind that the Farakka Barrage was designed on the data base of late 1950s. But the catchment area of the Ganga has been drastically modified during last five decades and there is a need for a fresh review of the drainage basin statistics.

The water resource engineering in India during the post-independent era was largely dedicated towards the expansion of irrigation to ensure the food security for the growing population. The irrigation was the prime objective of 96 % of the 4291 dams built in India (WCD, 2000).

The Farakka Barrage does not belong to this general category. It was built with the intension of inducing water into the Bhagirathi-Hooghly river with a view to flush the sediment load into the deeper parts of the estuary and to resuscitate the navigational status of the Kolkata port.

In 1957, Government of India invited Hensen to explore the causes of decay of the Hugli river and to suggest remedial measures. After careful investigation, he suggested that the

“The best and only technical solution of the problem is the construction of a barrage across Ganga at Farakka with which the upland discharge into the Bhagirathi-Hooghly can be regulated as planned, and with which the long term deterioration in the Bhagirathi-Hooghly can be stopped and possibly converted into a gradual improvement. With a controlled upland discharge a prolongation of freshet period will be obtained, and the sudden freshet peaks which will cause heavy sand movement and bank erosion will be flattened”

(GoI, 1975).

Teachers could use this information in a math lesson

The construction of Farakka Barrage was started in 1962 and was completed in 1971. The excavation of the 38 km. long feeder canal took four more years and the project was commissioned on 21 May 1975. Technical details of the Farakka Barrage are given below.

Salient Features of the Farakka Barrage Project

A. Farakka Barrage:

Length: 2.62Km.
Number of Bays: 109
Span of Each Bay: 18.30m.
Lowest Bed Level: 10.30 m above m.s.l.
Pond Level: 21.90 m above m.s.l.
Crest Level of Spillway: 15.80 m above m.s.l.
Crest Level of Under Sluices and River Sluices: 14.30 m above m.s.l.

B. Head Regulator

Pond Level: 21.90 m above m.s.l.;
Full Supply Level at Land: 1132 cumecc.
Clear Water Way: 11 bays of 12.20m.each.
Crest Level: 18.10 m above m.s.l.

C. Feeder Canal:

Length: 38.30 km.
Design Discharge: 1132 cumecc.
Bed Width: 150.80m.
Full Supply Depth: 6.10m

D. Jangipur Barrage:

Length: 212.70m.
Number of Bays: 15
Span of Each Bay: 12.2m.
Crest Level: 12.80m. above m.s.l.
Source: Basu (1982)

The hypothesis of arithmetic hydrology contemplated in favour of the Farakka Barrage project was subsequently proved inadequate. In a tidal estuary like that of Hugli where the ratio of volume of water carried by a north flowing tide and by the southward flowing monsoon freshet may be of the order of 160:1, the idea of flushing the sediment load down to deeper estuary was too unrealistic (this was computed from Tide table of KPT, 2004). In view of the very large volume of the tidal flow, the induced water is too meagre to bring any positive impact.

Teachers after using the above information in different subjects now prepare the students for the role play after they are aware of the geographical and historical significance of the Barrage.
The commissioning and operation of the Farakka Barrage became an issue of great political friction between India and Bangladesh. The actual induced flow during the period 1977-1996 in Bhagirathi-Hugli had barely been of the order of the recommended flow in the feeder canal of 1532 cusec. The available flow dwindled to 454 cusec in the first week of April (Dasguta, 1996) and the port of Kolkata continued to face the problem of declining navigability.

Bangladesh claimed equal share of dry season flow (Rao, 1979). But the available water in Ganga at Farakka during the dry season dwindles far below the threshold level required to satisfy the requirements of both the countries.

The Indo-Bangladesh agreement (1996) over the sharing of Ganga water was based on the average discharge of the river during preceding four decades (1949-1988). There is little compatibility between computed flow in 1977 and the actually available flow at Farakka after that. The reason is simply that the lean season flow in the Ganga during earlier decades was much higher than what it is now. (Ask the children why this may be so?)

So the computed average discharge at Farakka leads us to a mythical figure that is far away from the reality. The problem was not beyond apprehension during the treaty of 1996 and it was decided that if the discharge at Farakka dwindles below 70000 cusec, the two countries would share the available water equally. The treaty of 1996 will remain valid for thirty years. This was decided without any regard to the projected demand of water in the Ganga basin in the ensuing decades. available water dwindles below 80000 cusec in the last week of February and continues to decline further till the end of April, when both the countries suffer from acute shortage of water.

The discharge hydrograph shows a upward trend from the month of May when the Himalayan snow and glaciers melt and contribute some discharge into the rivers.

**Induced Water and Increased Quantum of Dredging**

The induced water through Ganga-Bhagirathi feeder canal was supposed to flush the sediment load from the estuary and keep the navigation channel free from siltation. The arithmatic hydrology that contemplated the Farakka Barrage Project was subsequently proved futile in the context of changing geo-political scenario of the Indian subcontinent.

The port of Kolkata was hardly ensured with the arithmetically computed discharge (40000 cusec) needed to flush the sediment from the navigational route. Thus the objective of Farakka Barrage was proved a myth as sedimentation in the estuary continues unabated. It is admitted in the published document of the Kolkata Port Trust that induced discharge from Farakka Barrage has not been able to negate the estuarine sedimentation. The annual quantum of dredging has increased from 6.40 MCM during pre-Farakka days to 13.24 MCM during post-Farakka days. (Sanyal and Chakraborty,1995). This has further increased to 21.18 MCM per annum during 1999-2003.

The differential velocity of the high and low tide is one of the major causes of decay of the river. In this north-south aligned estuary, on rushing tide flows at a faster velocity (~ 9 km/hour) and deflected towards eastern bank due to coriolis force.

At Sagar, the water-level may vary from 0.96 to 5.71 m during August-September and at Diamond Harbour it may vary between 0.90 to 6.45 m within a span of six hours (Gol, 2003). The ebb tide flows back along the western bank at a slower velocity (~ 6 km/hour) during next eight hours.

This fluvial process leaves behind a substantial part of the sediment that entered into the estuary with high tide. Major Hirst (1915) apprehended that the "forces controlling it are so powerful that any artificial interference would be futile".

**Land Dispute between West Bengal and Jharkhand**

The uninterrupted encroachment of the left bank by the river and the emergence of new land on the other bank have created the condition for dispute over the interstate boundary between Jharkhand and West Bengal. During the British rule the course of Ganga was accepted as the border between Santal Fargana district of the then state of Bihar and the Malda district of Bengal.

It is noted in the topographical sheet bearing No. 72 P/13 surveyed in 1922-23 and published in 1924 (reprinted in 1946) that, “the province and district boundaries in the Ganges river follow the main deep water channel and will vary as the course of deep water channel changes". The area was subsequently surveyed in 1970-71 and the map was published in 1975 by the SoI with a footnote that, “Owing to changes in the course of Ganga river, the state boundary between Bihar and West Bengal and the district boundary between Malda and Murshidabad should not be accepted as authoritative.”

The matter was also discussed in the Ganga Erosion Committee (Singh et al, 1980). The representative of Bihar in the Committee objected to the proposal for the construction of two long spur near Manikchak Ghat of Malda to deflect the huge Monsoon flows, on the ground that such measures were likely to aggravate the problem of erosion thereon.

An important question that remained unsolved in the meeting was that to which State did the possession of the territorial right of char that had emerged along the right bank of the Ganga, lie. The matter was referred to the Survey of India (SoI) and the then Director of SoI, Eastern Circle took the position that, “The boundary in this portion of the Ganga follows the deep water channel and varies as the course of the deep water channel changes.”

The note surprisingly contravened the earlier note of the Survey of India expressed in the map 77/P/13 published in 1975.

One of the representatives of the West Bengal Government declined to accept the opinion of the SoI and intimated the Committee that, “The boundary between Bihar and West Bengal in this reach is under dispute.” More than two decades have elapsed since the Pritam Singh Committee (1980) submitted its report but the problem still remains unsolved. The district map of Malda published in 1994 by SoI described the border as unauthenticated.

While the India-Bangladesh border has been declared fixed irrespective of any change in the course of the Ganga in accordance with the award of the Bagge Tribunal (1948), the interstate boundary should not be shifting with changes in the location of the deep water channel.

**Changing Course of the Ganga-Padma and the India-Bangladesh Border**

In recent years possession of some newly emerged Char have become the matter of Indo-Bangladesh conflict (Rudra, 1996).

When India was liberated in 1947, the course of the Ganga was accepted as the international boundary between Rajasthan District of East Pakistan (now Bangladesh) and Murshidabad District of West Bengal (India).

Subsequently, when the Ganga continued to encroach towards Indian territory and eroded extensive areas, Char of almost equal aerial extent emerged along the opposite bank.
These Char, being attached with the mainland of Bangladesh, are difficult to approach from India, when the river is in spate. The erosion wiped away boundary posts at many places, where the border is now merely an imagination.

The matter was raised in the Parliament and the members expressed their serious concern over the issue. The minister concerned assured the house that the boundary was fixed on the map and the erosion of Ganga would hardly affect it (The Hindustan Times, New Delhi, 25 July 1986).

Whatever the assurance from the Government, the infiltration and occupancy of these Chars by Bangladeshi nationals have very often been reported. The Char emerged opposite to Jalangi, which has been cultivated by the Bangladeshi nationals in spite of strong protest by our Government.

In April 1993, a joint survey was conducted to ascertain the boundary on the Char, but Bangladesh subsequently declined to accept this newly identified boundary.

Certainly, Bangladesh has a better access to the Char, and also it is often difficult for the district authorities of Murshidabad to provide proper security to the new settlers there (Rudra, 2004).

**Endangered Communication Lines**

The encroaching river very often engulfed important roads and railways, as had happened in mid-1950s when the railway track near Dhubian station collapsed into the advancing river and train services remained delinked for about a decade.

It was realigned to the further west and normal services were resumed not before 1965. The alarming rate of encroachment continued near Sankopara halt station where river is now only 165 metres away from the railway track. The National Highway no. 34, the only road to connect North and South Bengal was also realigned in 1966 in view of the threat of erosion. In June 1990, this author observed the collapse of about 20 metres of metal road into the Padma at Akheriganj and in 1994 the road to Karimpur was delinked at Jalangi. The following table presents the diminishing distance between the railway and the Padma at some important stations, as measured from older maps of Survey of India and the map prepared by the Public Works Department of West Bengal.

**A Holistic Approach to the Understanding of Erosion and Its Impacts**

The bank erosion is no new process in deltaic West Bengal. However, in view of the major interventions made in to the river, the present day bank erosion by the Ganga should not be seen in the context of natural processes alone. The design of the Farakka barrage was made in a period when the eco-hydrology of river systems was not even recognised as an important aspect. While the river was blocked at Farakka, the critical issue of the management of the sediment load was not given much importance. The hydraulic head crated at the Farakka pond lead to the release of relatively silt-free water with added velocity. The scouring of bed just below the barrage could easily threaten even the foundation of the barrage itself. The safety of the structure is extended by the piling of huge boulders.

The geographical scenario of the flood plain of Ganga has been changed to a large extent during last few decades. The unplanned growth of settlements, wrongly aligned roads and railways have made the area more vulnerable to erosion than it was in the past. While it is admitted in the official records that, “the severity of erosion has increased after the construction of Farakka barrage” (GoWB, 1997), the affected population can rightly be described as environmental refugees and their demand for economic rehabilitation is fully justified.

The question which so often challenges many development projects is who pays and who profits? The millions of people who are victims of erosion have so far been denied of the right to rehabilitation. The Section 11/2 of the West Bengal Land Reform Act, 1955 (amended till July, 2000) ensures that if any land is eroded and emerged on the opposite back within twenty years, the right of the owner (raiyat) shall remain intact. But this act remains hither to ineffective (Government of West Bengal, 2000).

If the Ganga is allowed to swing freely as was proposed by the irrigation department in a Report published in 1999, money allotted for the protection work can be utilised for the rehabilitation programme. The piecemeal programme of bank protection caused nothing but wastage of money; we need a holistic and positive approach to tackle the problem. The important question is whether we should wait further to witness the imminent disaster or do something positive to save the millions of people from the danger at the doorstep.

When the roads and railways were aligned through the meander belt of the Ganga-Padma during the first half of last century, the engineers failed to foresee that the gnawing river would encroach upon that limit. Dhulian, Suti, Akherganj and Jalangi; all developed as important trading centres after the partition of India.

No one took into account that the process of delta-building involves oscillation of distributaries within a wide limit. In contrast, in this age of application of remote sensing techniques and quantitative geo-morphology, identification of the meander belt, which is prone to rotational bank failure and annual flood, has become easier.

Considering a tremendous eroding force of the Padma, the local people have learnt to live with accommodating continuous erosion. The response of the Government should be proactive. The low-cost house building, with easily detachable and movable materials, like corrugated sheets, bamboo, wood etc. maybe provided on the chars. The futile ventures of bank restoration spending a large sum of money every year should also be avoided. The Government pays more attention to protect non-displaced, and the relief generally provided for the displaced persons seem to be meagre.

There is hardly any official record regarding the number of people living on the Chars at present, but even at a very modest estimate it is not less than 20,000 in Murshidabad and more than 100,000 in Malda—the number is increasing every year. The erosion-victims migrate to Chars losing everything into the river. The displaced persons with their skill and experience of agriculture start a new struggle for existence on char.

Evidently, the environmental refugees lead their life under the shadow of poverty and insecurity. The erosion and resultant homelessness cause an oversupply of agricultural labour. The labourers are often engaged at a wage lower than the minimum fixed by the Government. Unfortunately, even after the five decades of independence, there has been no master plan to reduce the distress of these afflicted communities. The environmental refugees survive on the Char with their improvised strategies. When the char first emerges above the water level of the Ganga or Padma, it is sandy, and is not habitable. With the passage of time, the finer sediments of silt and clay are deposited and make the land fertile and cultivable. The conflict over the possession of land is a common feature in the social life on the Char. Paddy, pulses, vegetables, watermelon etc. are the main agricultural products. The natural pastures help to rear cattle and goats.

The displaced persons rebuild their huts with corrugated tin sheets, bamboo and mud. The roof is made with straw. These materials, being light and not very costly, are brought from the mainland. The country boats are the main mode of conveyance, while on land bicycles and bullock-carts are used.
The human life on char lacks facilities of safe drinking water, sanitation, education, medical facilities, market, etc. The residents prefer to go to Bangladesh for treatment or marketing to avoid the trouble of going to areas within India, for which they have to cross the Padma. Thus they enjoy virtually dual citizenship. The article 21 of the Indian Constitution have ensured right to life for every citizen. The Supreme Court of the country has stated in a landmark judgment that “The right to life under article 21 means something more than survival or human existence. It would include the right to live with human dignity. It would include all those aspects of life which go to make a man’s life meaningful, complete and worth living...any act which offends against or impairs human dignity would constitute deprivation pro tanto of right to live” (Supreme Court, 1981). To the thousands of environmental refugees in Malda and Murshidabad, the judgement may be just another official record. They are compelled to live in a subhuman condition. The two committees formed earlier; one in 1980 another in 1996, to explore the possible remedial measures of erosion paid no heed to the question of their rehabilitation. Decrease in distance between the railway track and Ganga (1925-95) Both the National Highway and the railway track extend through a narrow stretch of land before approaching the Farakka Barrage and the river is not too far away from this stretch. The Padma in between Farakka and Dhulian flows through a narrow channel carrying highly concentrated hydraulic energy. The water released from the Farakka barrage is relatively silt-free and has a good bank-cutting capacity. The altered hydraulic gradient adds to this capacity. The accelerated erosion of the left bank in Malda anThe Farakka Barrage Project was contemplated without any regard to the holistic eco-hydrology of the Gangetic delta. The mighty barrage at Farakka has impaired the dynamic equilibrium of the river.

• The Ganga annually carries more than 700 million tons of sediment at Farakka and about 300 million tons of it is being trapped in the barrage pond, encouraging the river to change its course.

• The induced water from Farakka has been inadequate to flush the sediments from the estuary and thus navigation in this river is still a difficult task.

• The annual quantum of dredging in the Hugli river and estuary has increased even after the commissioning of Farakka Barrage.

• The Ganga has changed its course both upstream and downstream of Farakka and now threatens to outflank the barrage. It tends to open a new outlet through the moribund distributary called Pagla.

• Since Ganga has altered its course in Malda, about 64 mouzas (revenue villages) have been wiped out and an extensive char covering more than an area of 200 square kilometres have emerged on the opposite bank, along the mainland of Jharkhand. Though the territorial boundary of the state is fixed and has no relation with the changing course of the river, the Government of West Bengal does not acknowledge the newly emerged settlements as revenue villages.

• Indo-Bangladesh conflicts over the possession of newly-emerged chars have been common even in Murshidabad.

• Bank-failure continues to create environmental refugees who have been denied of the minimum means of livelihood. The erosion-victims living on the chars that emerge on the opposite side of the river at Malda have been suffering from identity crisis, as neither the state of West Bengal nor Jharkhand acknowledge their franchise.

• Bank revetments with boulders or construction of spurs to deflect the impinging current are expensive measures but do not offer any guarantee of bank protection. Rather, it aggravates the situation.

• The situation demands a holistic approach in planning that will ensure the fundamental Right to Life of the environmental refugees as guaranteed by the Constitution of India.

Information provided here is extensive and may seem a bit too much for students of class 7 but it is meant more for you, the teacher to become aware of the situation and then share with the students the information you feel will be relevant for them to put forth strong arguments in the role play.

Best of luck!
Introduction

The long awaited drop of water falling on your cheek, ice-cold melting water from Himalayan glaciers, a splash of life-giving water from the Betwa on a hot, sunny day. These are images of beauty and joy that we can all connect with. But what about the flip side: screaming thirst in Kalahandi in Orissa, drought-like conditions in Andhra Pradesh, dead animals at a watering hole in Rajasthan, and long walks to get drinking water. These too are some of the different faces of water.

The way in which we use this resource is vital today and a burning issue for the future. We use fresh water in many ways—to drink and prepare food, to irrigate crops, generate electricity and much more. A third of the world’s population lacks fresh water and a large number of plant and animal species are threatened with extinction because of the way we use water. Because of climate change, with melting glaciers and rising sea levels, water has become one of mankind’s greatest concerns.

Your need for water

Think about this. We start off our lives in a water-filled uterus and are born onto a blue, watery planet. Every day we need 2-3 litres of freshwater to survive. In many countries you can just turn on a tap to fill a glass with excellent drinking water. But in Madhya Pradesh or Rajasthan, one may have to walk for miles to fetch one’s daily supply of water.

Most of the world’s population is concentrated alongside water bodies or catchment areas—river basins. A catchment area is the land, including lakes, which is dewatered through the same waterways. The area is bounded by a watershed that separates it from other river basins. All precipitation that falls within the basin flows into the sea through a particular waterway.

For better or worse, water is a good solvent and even a small drop of a toxic substance can pollute thousands of litres of water. The things I do in the upstream catchment area that I inhabit, affect the lives of the people downstream. Whatever happens in Kanpur influences life in the Sundarbans many hundred kilometres distant.

All the water on Earth reduced to a litre

Purpose

To create a model of Earth’s water resources and understand how much salt and fresh water there is on Earth. Before you begin

You will need:

- A jug that will hold 1 litre
How to do
You are going to create a model of the Earth’s total water resources.

1. Take the jug with one litre of water.
2. Pour off 2.5%, i.e., ¼ dl or 2.5 cl in a decilitre measure. Pour the salt into the jug.

What have you created? A model that shows the distribution of salt and fresh water on Earth.

3. Take the decilitre measure that contains ¼ cup water and discard ⅔. This is water that is bound up in glaciers.

4. The water that is left is the available water for humans and animals.

5. Pour the rest away now, but save a single drop of water. The water that you have discarded is the groundwater. Some of this is deep down in the ground and cannot be easily used by people and animals.

6. The single drop of water that is left is the fresh water we can see in lakes, rivers, streams and rivers. This water can be used by plants, animals and humans directly.

Does the availability of freshwater differ between countries?

7. Take this droplet and put it on your cheek. What does this make you think of?

Water ceremony

Purpose
Kick start a larger thematic work and focus on water as a global issue.

Before you begin

• You will need
• A big bowl
• One cup for each participant
• 2 litres of water

What to do

• Gather the participants in a ring.
• Place a bowl of water in the middle.
• Ask the participants to look at the water and to think of three words to describe it. Encourage them to make up their own words.
• Everyone is given a paper with the word water in different languages. You can also ask the participants if they know the word water in any other language.
• Everyone is given a cup of water to hold in their hand.
• The participants walk up to the bowl one at a time, pour the water from their cup into the bowl and say a water-word and a word that describes water for example “aqua – refreshing”.

Some examples
Wasser (German), eau (French), acqua (Italian), woda (Polish), Maji (Swahili), Pula (Botswana), miizu (Japanese), Siu (Chinese), pana (Hindi), air (Indonesia)

The Earth’s Water

The Earth is truly a water planet: 70% of its surface area is water and 30% is land. There are a total of 1,400 million cubic meters of water on Earth of which some 35 million cubic meters are fresh water. If you could fit all the water from the Ganga, the Brahmaputra, the Indian Ocean, the Himalayan glaciers, etc into a litre jug then you will have created a model—all of the Earth’s water reduced to one litre.

Chart of thoughts

Purpose
To identify pre-existing knowledge and experiences in the group. It may be important to bring these out into the open as resources that can be utilized by the whole group.

To identify pre-existing attitudes and emotions in the group that may cause the instructor to re-evaluate the best way to lead the group.

What to do

To discover what the participants think and feel about the issue you might simply ask them: What does water mean to you?

Let everybody have an opportunity to talk. Write down everything they say on a flip chart or board so that all participants will be able to see what they have said. If you are used to working in this way you might want to simultaneously categorize the things they say under separate headings. If not just let them talk freely, and afterwards help them to put what they have said in some form of order. The results may serve as a platform for creating topics and questions later on. Save the chart so that you can compare it with ones created in previous sessions. What have the participants learnt?

Invisible water

A small exercise that can be done on the way to outdoor exercises:

What to do

1. Sometimes water is visible. You can see water in a lake or when it rains. Now put on your “water glasses” and try to find three items which contain invisible water. Search at three levels – low, medium and high.
2. Gather in a ring at the end of your walk and tell each other about what you have found.

Comment
The water it takes to produce 1 kilo of some of the foods we eat has been calculated: Potatoes 500 litres, milk 900 litres, wheat 1,200 litres, rice 2,790 litres, meat 16,000 litres, cotton 7,000-29,000 litres. This water is invisible, so-called virtual water.
The water cycle

Purpose
To describe the water cycle.

You will need
4 plastic containers
4 plastic bottles
4 cups and some water

What to do
The different containers symbolise parts of the water cycle for example rain, river, lake and sea.

1. Put the four plastic containers in each corner of a square (15 x 15 meters).
2. Put a bottle containing 3 decilitres of water inside each container. Place a cup next to the container.
3. Divide the participants into four teams and place them according to figure XX
4. The first member of each team runs to a water source (the next team’s container), pours some water from the bottle into the cup, runs back with it and adds it to their own team bottle.
5. The activity should continue until stopped by the leader.
6. Note how much water each team has ended up with. Relate this to natural events such as droughts, floods, high and low tides etc. Some areas may have little water while others are flooded. The total amount of water on earth is constant.

Comment
There is a simpler version of this activity. Everyone stands in a ring. Everyone has a cup in their hands. One person has a decilitre of water in his/her cup and pours this water into his/her neighbour’s cup. This is repeated around the circle. What has happened to the amount of water after one turn around the circle? What happens with the water circle in reality? Does the water disappear? We all live in a hydrological circle!

Life in water

Purpose
Discover diversity in a lake or a river and find out more about various creatures by getting close to them.

Before you begin
You will need small plastic cups or plastic bottles and a strainer.

What to do
Visit a lake, river pond, etc. that contains lots of aquatic life (fish, insects etc.). Ask the participants where such a place can be found.

If you were a small fish, snail or something else living in the water, where exactly would you most like to be? By the shore, out in deep water, behind a stone...?

In this exercise, you should keep a look out for living things in the water. Look under rocks and among plants. Use a strainer and move it gently along the bottom. Keep the creatures you have caught in recycled plastic bottles. Observe and discover.

Choose one creature and study it carefully. How does it move? What do you think it eats? Who eats it? What other questions do you have about the creature? Study it and try if you can find out the answers.

End the task by making an illustration. Create a magnified image of the creature you have found using objects from nature such as sticks, leaves and stones. Invent a fanciful name for the creature, a name that aptly describes the creature’s appearance and behaviour. For example, a yellow beetle could be given the name ‘Jumping Gold Beetle’.

Consider: Is the creature threatened in any way?
**Lemna minor tells you a story**

**Purpose**
Using a scientific and cheap method to ascertain the quality of freshwater.

**Background**
All green plants require small quantities of nitrogen and phosphorus. The more of these substances there are in the soil and water, the more and larger plants you will get. Of course you also need sunlight if things are to grow.

Eutrophication is a phenomenon that occurs when water contains too many nutrients, especially nitrogen and phosphorus. These substances determine how well plants grow in the water. You can judge the nutrient content of water by observing how well it supports plant growth. Low nutrient content will result in smaller and fewer plants whereas high nutrient content will result in larger and more abundant plants. You can see this by just observing plants growing in water and along the shore.

**Before you begin**
You will need four small plastic cups.

**What to do**
When you want to compare different water resources or water collected at different seasons you can use Lemna minor (duckweed) as a bio indicator in an indoor experiment. The species is common in fresh water ponds all over the world and the plants are easy to handle in laboratory experiments.

1. Fill two cups with control water and two cups with the water to be tested. The water level should be about 2-3 centimetres high.
2. Pick 80 leaves of Lemna minor.
3. Let them grow at room temperature in the highest possible light intensity for at least 2 days.
4. Measurement: Observe the plants. Do they have large or small leaves, has their colour changed, do they have yellow spots, what does the root look like? Count the numbers of leaves in all cups. Calculate the average for the control and for the test water. Compare the result.

Britta Eklund, PhD, Research Scientist at the Institution of Environmental Science, Stockholm University

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**A national park in the Sundarbans area**

**Purpose**
To understand the different aspects of a conservation project.

**What to do**
The participation starts by addressing the group:

Dear representatives of the local community, people living in the area, conservationists/environmentalists, representatives of tourist companies, farmers, fishermen and representatives of mining companies.

I have come to you as a representative of WWF-India to ask you for your opinions concerning a proposal to develop a national park/wildlife sanctuary in this part of the country. The area consists of a variety of forests and plains with a rich biodiversity. Here we can find a great variety of big mammals, birds and rare plants. The area is the source for several rivers that supply people with water all along their courses. The soil is rich and has great potential as farm land. There are several thousand people living in the area. They are mainly forest dwellers who subsist on forest products. Coal and iron ore has been found in the central part of the area, but has not been exploited as yet.

There is a proposal to establish a park in the area but no decision has yet been taken. To help us make a wise decision the government needs your opinions and reflections about the need for a park and its possible impact. It is just as important to focus upon advantages as on negative consequences.

In a moment we will ask you for your opinions but right now I want you to start by sitting in your respective groups and preparing yourselves for the meeting.

**Groups represented at the meeting:**
- Local community
- People living in the area
- Conversationalists/environmentalists
- Tourist companies
- Farmers
- Mining company

**What to do**
1. The instructor is the facilitator and presents the role-play.
2. The different groups prepare the coming meeting.
3. The groups present their opinions.
4. Discussion.
5. When the role play has ended everybody is free to express their own personal opinions.
**Sundarbans news**

**Purpose**
To induce participants/students to find out facts and to learn more about Sundarbans in an interactive way.

**Before you begin**
Make a simple “television” with the help of a cardboard box.

**What to do**

1. **Prepare a broadcast**
The participants are asked to plan a short local TV program on the Sundarbans in groups of three. You can introduce this session by acting as a well-known local TV host, asking the students to help him/her with this TV production. Each group prepares three minutes of broadcasting on a specific topic and tries to do this in a way the viewers will find interesting. The format may be a news bulletin delivered by a reporter, interviews with stakeholders in the field, etc.

2. **Topics**
Ask the participants to choose among the following topics:
- Land use management
- Oil palm plantation
- Timber plantation
- Protected areas
- Illegal logging
- Forest fires
- The biodiversity of the Sundarbans
- People living in the region
- Forestry
- Erosion
- Water management
- Fishery
- Health and sanitation
- The future of the region
- A tourist advertisement

Provide the participants with information material such as pictures, maps, films, brochures, etc.

3. **Group work**
The groups research information, prepare a manuscript, rehearse lines, prepare props and create a signature image and jingle.

4. **Broadcasting**
Time for the broadcast: The teacher can act as programme leader introducing topics, or set up a list of topics in order on the blackboard/white board so that the groups will know when it is their turn. The group that is to broadcast sits by the front desk and plays their section of the programme for the rest of the class through the cardboard TV box. They pass the box quickly between themselves to simulate rapid cuts (MTV/Channel V style).

Further suggestions: You might suggest that the students produce more varied TV programmes such as commercials, music videos, serials/soap operas, short documentaries, weather forecasts, etc.

**A model of a catchment area**

**Purpose**
To highlight the fact we all live in a catchment area and have an impact on it. These impacts are caused by everything from the way people wash and the footprints left by large agricultural enterprises. To develop decision-making skills and planning in a sustainable perspective.

**What to do**
Make an outdoor model of a catchment area.

1. Divide the participants into smaller groups.
2. Ask each group to choose an area 1-3 m² large. Use natural material (sticks, cones, stones etc.) and build a catchment area containing:
   - A small lake
   - Forests
   - A river

Then decide where to put:
- A water power station
- A large-scale farm
- A coal mining unit
- Some small-scale farms
- Villages
- Water wells for drinking water
- A petrol station

Be good planners and take the character of the catchment into consideration. What do you put where and why?
3. A hydel power station is planned in your area (or a new major plantation, or whatever kind of large-scale impact you want to challenge the students with). What kind of consequences will this activity have locally, for the catchment and over time? Discuss and find a common view within your group about what you think of these plans and how you should tackle the situation.

4. Either the whole group walks around and shares the results from all groups or groups are matched into pairs and are invited to each other’s catchments to see, listen and share thoughts.

**Use of water in a sustainable way**

**Purpose**
To understand the significance of land use in relation with water.

**Background**
Water is the basis of life and we need water for cooking, drinking, hygiene, food production and more. Everything we do affects water—land use, pollution, dams, overfishing, etc. We all know that the world population is growing. How can we in such a situation leverage sustainable water use?

**What to do**
Choose a stream nearby. Bring a map and highlight interesting things such as dams, industries, housing, agriculture and other land uses along the watercourse.

Plan an investigation into a designated area along the river. Study the interplay between land use, resource use, water quality and ecology. Each participant must have clear idea about the way in which the investigation should be implemented.

Plan a field trip. Contact a local industry or equivalent for a visit. Do the same in the case of agricultural activity and visit a farmer. Consider the objective of the study visits. Create a list of questions about water use and the impact on the local water ecosystem.

Sample questions:

- Why has the industry been established by the river?
- What does the water do for the industry?
- What impact has the industry on water ecosystems and water quality?
- Has the industry been involved in serious toxic spills?

Farmers may have questions about farming practices and how they use or affect the water.

Choose two suitable examination places, one upstream and one downstream, in relation to the industrial unit you visited. In both the spots, investigate plant and animal life and use them as indicators. Also investigate water quality (N, P, K), pH and Secchi depth.

Write a single report on the results and focus on land use, resource utilization and quality of the aquatic ecosystems. Consider how water quality can be improved.

**A weekly plan**

Day 1: Water is our life – an introductory day
Day 2: A fictive trip
Day 3: Monitoring my travel
Day 4: Water as a resource
Day 5: Summing up

**Water is our life - an introductory day**

**Water, water everywhere**

**Purpose**
To introduce the concept of water.

**What to do**
Study a world map or a globe. The planet should have been called Water instead of Earth. Two thirds of the surface is covered by water, one third by land. Challenge the unreflecting perceptions of the participants with some questions:

- There is water everywhere. Can you see any water at this moment?
- Is there any water, visible or invisible, indoors?
- Where is the water inside you?
- Where is the water in the landscape?
- Where does all water in the landscape come from?

**Follow up**
Use the words from the questions and the answers you get above in the map in the Chart of Thoughts activity. Also take a look at the Resources chapter at the end of this book.
**WHOLE SCHOOL APPROACH**

**Introduction**
In order to meet the important challenge of sustainable development we need to equip all students with the all important knowledge, skills and values. This must not only be a major concern of all staff members at the school, but also means that all students, staff and parents should be encouraged to be involved. Crucially, due emphasis and effort should be made such that the approach towards sustainable development embraces all subjects and aspects of school life. We call this a ‘whole-school approach’.

**Back casting**

**Purpose**
To facilitate the development of a vision for a sustainable school.

**What to do**
This exercise follows the backcasting method. Its purpose is to illustrate this method and an important aspect of ESD—the shift from analysing current problems to a focus upon a desirable future.

Ask the participants to sit comfortably and put down anything they might be holding. Tell them to close their eyes and sit in silence. Ask them to consider the following questions:

- How do you want your school to be ten years from now? Not how you believe it will be, but how you want it to be.
- You come to the school in the morning. What does it look like?
- You meet some colleagues. What do they talk about?
- You meet some students. What do they talk about?
- What is your job at the school?
- What difference does it make if you are a male or a female teacher?
- What difference does it make if a student is a male or a female student?
- Who influences your tasks?
- Who do you cooperate with?
- How do you integrate your teaching with other subjects?
- What influence do students have?
- How do you cooperate with students’ parents?
Why do you connect schoolwork with the local society?
To what extent do you use nature in your work?
What does the school yard look like? How is it used in school work?
How do you get food for meals at the school?
What happens to the waste?
Where do you get energy from?

Tell them that you will now be silent for a few minutes and that you want them to concentrate on the question about how they want their school to be ten years from now, and that you will tell them when it is time for them to open their eyes again.

Play some soft music for a few minutes. Now tell everyone to open their eyes and return to the present. Ask them to figure out what they can do today to turn this vision into reality.

Aspects of a whole-school approach

Purpose
To identify important aspects and development areas for an ESD whole-school approach.

You will need
Three resource sheets:
- Aspects to be taken into consideration. (Resource 7)
- Whole-school Approach – summary points. (Resource 8)
- Self-assessment (Resource 9)

Background
WWF has worked with whole-school approaches in many countries. Based on this experience and on research carried out in the UK six important development areas have been identified and these have been further elaborated in Sweden and elsewhere. These areas are:
- School culture and ethos
- Monitoring and evaluation
- Teaching and learning
- Pupils
- Community
- School estate

These six areas provide a good basis for developing the whole-school approach. However, each individual school must identify the aspects they find necessary to develop the target areas and tailor them to fit conditions prevailing locally.

What to do

To start with, you may give the participants a few examples of how the whole school approach may be implemented. But remember to do this without listing all the development areas mentioned above. Ask the participants this question: “What aspects do you think are important when implementing a whole school approach?”

Let them think about this and come up with their own suggestions.

Next, distribute the work sheet, ‘Aspects to be taken into consideration’ (See Resource 7).

Ask everyone to think for themselves for a couple of minutes and note some aspect that they find important on the sheet. You should also do the same.

Divide into groups and discuss:
Compile the input from the groups by asking each group to underline one particular aspect first; others can be added later on by anyone who wants. Note keywords on the black board (or flip chart) and use them to create a mindmap. Try to group different aspects together. Compare them with the six development areas identified by WWF.

Self-assessment

How can we know how far we have progressed with the whole school approach? You have been told about some important development areas for this approach, such as school culture and ethos, monitoring and evaluation, teaching and learning, pupils, community and the school estate.

How can we identify milestones and stages in the implementation process? And how can we assess them? A whole school approach is a journey with a destination but no end. You may reach higher stages along the way but you never get to the journey’s end.

Purpose
To assess the progress of an ESD whole school-approach.

What to do

Show participants the assessment sheet.

Point out the meaning of the different stages in the simplified version.

Distribute the sheet and ask the participants to start off by thinking individually. Save the group discussions for later.

After you have elaborated the summary points and everyone has made a personal judgement of their relative importance, compare and discuss them in the various groups.

Then compile the results in plenary.

The assessment can be used to identify relevant actions that can be taken to develop each area to a higher level.
Action plan for whole-school approach

Purpose
To develop action plans for an ESD whole school-approach.

What to do
Ask the participants to look at the development areas they have identified and to evaluate the results of the assessment. With this in mind, what other actions might it be important to take?

Use the method: Workshop on concrete ideas for development, described on page 123.

To develop work plans use Resource 8.

Please find a full proposal for developing a whole-school approach in the material:
- “Pathways, a development framework for school sustainability”
- The material is available for free download on http://assets.wwf.org.uk/downloads/pathways.pdf

Comments
The traditional method of planning for the future is built upon extrapolation. An example:
- How many cars did we have in 1980?
- How many cars did we have in 1990?
- How many cars did we have in 2000?
- How many cars will we have in 2012?
- How many cars will we have in 2020?

...and the result might be a society that is not desirable!

The backcasting method isolates a desirable vision and asks the question: What should be done today to turn this vision into reality?

This method is used a lot by the business sector to clear out a desirable vision for their activities. The method can be illustrated by a story about Alice in Wonderland who one day met a cat in the middle of a dense forest:

Alice: ...I was just wondering if you could help me find my way.

Cheshire Cat: Well that depends on where you want to get to.

Alice: Oh, it really doesn’t matter, as long as...

Cheshire Cat: Then it really doesn’t matter which way you go.

We must start by developing our visions for the future in order to discover what steps we must take today to enable us to move in a desirable direction.
Roads in nature
A two-lane road passes through a forest where many animals live. Since the road is not very wide animals cross it frequently, especially at night. Traffic is becoming heavier and there is a demand for increased capacity. Some people want a four-lane road but the biologists say that then the animals will not cross the road any more. What alternative solution is best?
- Build a road going around the forest
- Keep the old road
- Build a four-lane road through the forest
- Your own alternative

Who is most responsible for spreading environmentally harmful substances in our surroundings?
- The politicians
- The consumers
- Those who sell the products
- The producers

What is the main cause of forest degeneration?
- Collection of non-timber forest products
- Grazing
- Fires
- Fuel-wood collection
- Encroachment

Rank from 1-3

Moral dilemma
When walking through the park one late evening you happen to see a man throwing out refuse from his car. Many containers full of waste have already been thrown into the creek that runs through the park. As you get close you see that the man is your new teacher. What should you do? Write down all possible alternatives regardless of whether they are bad or good.

What would be the consequence if you acted according to the different alternatives?

Predators attack livestock because
- They are angry and aggressive
- They need food for their offspring
- Livestock wanders deep into the forests
- Their natural habitats have been encroached upon

How can conflicts between man and wildlife best be lessened?
- More fences
- Pay compensation when livestock is killed
- Protect larger areas
- Relocate populations that live in conflict areas

What is the most effective way to achieve a sustainable society?
- By legislation that forces good behaviour
- Taxes and fees that force good behaviour
- Through the educational system
- By international agreements

Elephant
1. When I think of elephants I think of ...............................
2. The best thing about an elephant is ...............................
3. If elephants are to coexist with farmers it is necessary that ...............................
4. The best way of protecting elephants is to ...............................
5. Elephants should be protected because ...............................

What is the main cause of forest degeneration?

Elephant

Resource 6
Aspects to be taken into consideration

Whole-school approach – summary points

SCHOOL CULTURE AND ETHOS
Whole-school approach
- The whole school is involved in decision-making.
- Participatory decision-making addresses all aspects of school life.
- Whole-school policy.
- Learning for Sustainability is embedded in the school’s mission and ethos.

MONITORING AND EVALUATION
Monitoring and evaluation for good practice
- The school is a learning organization and uses a cycle of planning, action, observation, reflection and revision to develop good practices.

TEACHING AND LEARNING
Formal curriculum (core and non-core)
- If education for sustainable development (ESD) is statutory, curriculum requirements are addressed.
- A progression describes age-appropriate Learning for Sustainability that explores key concepts, theories, skills, values and attitudes.

Diversity
- Direct experiences with ‘nature’ inspire learners and link learning with values and attitudes that advance sustainability.
- The curriculum has a global dimension that offers a relevant context through which pupils enrich their understanding of other cultures and societies.
- The ways in which the school respects and values diversity are apparent to pupils.

Quality teaching
- Stimulating learning resources and rich learning environments are available.
- Child-centric learning models, modes and strategies are applied.

Professional development
- Professional development opportunities that advance Learning for Sustainability are available to all teachers and staff.
Whole-school approach – summary points

SCHOOL CULTURE AND ETHOS

Whole-school approach
• The whole school is involved in decision-making.
• Participatory decision-making addresses all aspects of school life.
• Whole-school policy.
• Learning for Sustainability is embedded in the school’s mission and ethos.

MONITORING AND EVALUATION

Monitoring and evaluation for good practice
• The school is a learning organisation and uses a cycle of planning, action, observation, reflection and revision to develop good practices.

TEACHING AND LEARNING

Formal curriculum (core and non-core)
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• A progression describes age-appropriate Learning for Sustainability that explores key concepts, theories, skills, values and attitudes.

Diversity
• Direct experiences with ‘nature’ inspire learners and link learning with values and attitudes that advance sustainability.
• The curriculum has a global dimension that offers a relevant context through which pupils enrich their understanding of other cultures and societies.
• The ways in which the school respects and values diversity are apparent to pupils.

Quality teaching
• Stimulating learning resources and rich learning environments are available.
• Child-centric learning models, modes and strategies are applied.

Professional development
• Professional development opportunities that advance Learning for Sustainability are available to all teachers and staff.

PUPILS

Safe and supportive learning environment
• Pupils are supported as they take creative risks.
• Pupils appraise their own learning.

Pupil participation and empowerment
• Pupils have meaningful opportunities to participate in school-based decision-making.
• Pupils have opportunities to practise leadership and citizenship skills.

COMMUNITY

Links with parents, governors and school boards
• The school – and its governors or school board – fosters productive relationships with parents.
• The school values the contributions of parents and governors or staff members.

Links with the community
• The school is valued as part of the community.
• The community is valued as part of the school.
• Pupils have the capacity and the opportunity to make a positive contribution to the community.

Links with the wider community
• The school recognizes that it is locally based and globally placed.
• This recognition figures prominently in decision-making.

SCHOOL ESTATE

School resource management
• Sustainability guides decision-making about procurement, waste management, energy and water use.
• The school models good practice for sustainability.

School build and restoration
• The school employs and models technologies that advance sustainability.
• The school is a ‘building that teaches’.

School grounds
• The school grounds support the curriculum.
• Pupils are engaged in school grounds research, design, construction and maintenance that advance sustainability.
## ASSESSMENT CRITERIA OF THE LEVEL OF ESD IMPLEMENTATION IN SCHOOLS

<table>
<thead>
<tr>
<th>Theme</th>
<th>ESD INDICATOR</th>
<th>A GRADE</th>
<th>B GRADE</th>
<th>C GRADE</th>
<th>D GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Culture &amp; Ethos</td>
<td>Whole school approach</td>
<td>All the students, teachers and non teaching staff are involved in decision making.</td>
<td>All the students, teachers and non teaching staff are in the process of putting in place systems that will facilitate an inclusive participatory approach to learning for sustainability.</td>
<td>A few teachers are aware about inclusive participatory approach learning for sustainability and they are interested in its implementation in the school.</td>
<td>Not aware and/or do not understand the concept of ESD. No sign of participatory approach to Learning for sustainability and decision making is done at the School Board Level.</td>
</tr>
<tr>
<td>Learning for Sustainability is embedded in the school’s mission and ethos and all the school’s stakeholders understand it</td>
<td>There is a clear indication that Learning for sustainability elements are emphasized in the school’s operations.</td>
<td>The school is considering incorporating aspects of Learning for sustainability in its operations.</td>
<td>Very little or no comprehension of Learning for Sustainability and how it could be a part of the school policy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The school has also partnered with community in greening initiatives and income generating activities</td>
<td>The school is in the process of engaging with the community on greening initiatives and income generating activities.</td>
<td>The school has made contacts with the community on collaborating on environmental improvement and income generating activities.</td>
<td>The school has not involved the community in its greening initiatives and income generating activities.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pupil’s Participation &amp; Empowerment</td>
<td></td>
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</tr>
<tr>
<td>Pupils are engaged in meaningful decision-making about their issues and running of the school.</td>
<td>Only school prefects are involved in meaningful decision-making about student issues and running of the school.</td>
<td>Pupils are consulted about their issues and the running of the school but their suggestions are never considered.</td>
<td>Pupils are never consulted in any decisions made on their issues and running of the school.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality Teaching</td>
<td>The systems of teaching and learning are learner centered.</td>
<td>There are indications that the teaching and learning systems give consideration to the learners.</td>
<td>There is a general agreement that the learner should be the focus in both teaching and learning.</td>
<td>No idea on how teaching and learning could be made learner centered.</td>
<td></td>
</tr>
<tr>
<td>Teaching and Learning (formal curricula and co-curricula)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There is emphasis of growth of both body and mind for holistic education of the learner (not just examination oriented education).</td>
<td>There is a strong indication of holistic education.</td>
<td>The school encourages learners participation in activities that involve both mental and physical growth.</td>
<td>The school emphasizes completion of syllabus, utilizes all the school hours for academic work and measures the schools success by the numbers to students who pass the national examinations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guidance and counseling is part of the curriculum</td>
<td>There is evidence that guidance and counseling takes place.</td>
<td>There are plans to introduce guidance and counseling.</td>
<td>The school does not consider guidance and counseling as having anything to do with the curriculum.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversity</td>
<td>There are strong indications that the school respects and values diversity (staff gender balance, physically challenged learners, religious differences, ethnic differences) and this is apparent to the pupils</td>
<td>There is some evidence that the school respects and values diversity</td>
<td>The school recognizes that diversity should be accommodated but there are no signs of implementation</td>
<td>The school does not demonstrate any sign of acknowledging diversity and has no idea on how to consider it in the school</td>
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</tr>
<tr>
<td>Values and Attitudes</td>
<td>The school has incorporated a variety of teaching and learning methods</td>
<td>Some teachers have attempted to use a variety of teaching and learning methods</td>
<td>A group of teachers do attempt to integrate the concept of sustainability as they teach the curriculum.</td>
<td>The teaching and learning methods used in the school are the traditional instruction methods</td>
<td></td>
</tr>
<tr>
<td>Community Links with Parents, Governors &amp; School Boards</td>
<td>The school has recognized links with parents, governors, local leaders and the Parents Teachers Association (PTA)</td>
<td>There is evidence that the school has functional links with the community</td>
<td>The school has issued specific links with the community</td>
<td>There is no formal link with the community but sometimes the community is invited when there is need</td>
<td></td>
</tr>
<tr>
<td>Professional development of teachers in ESD</td>
<td>All teachers in the school have undergone in-service training on ESD</td>
<td>Most teachers in the school have undergone in-service training on ESD</td>
<td>A few teachers have undergone in-service training on ESD</td>
<td>No teacher in the school has ever attended an ESD workshop</td>
<td></td>
</tr>
<tr>
<td>Links with the Community</td>
<td>The school values contributions of parents, neighbouring community, sponsoring institution (e.g. church) and staff members</td>
<td>There are indications that contributions from the community are welcome and valued</td>
<td>The school respects contributions from the community</td>
<td>The school assumes independence and has all required mechanisms; therefore do not consider input from the community as being of any value</td>
<td></td>
</tr>
<tr>
<td>School – Community Integration</td>
<td>The school is viewed as part of the community and the community is viewed as part of the school</td>
<td>The school considers the community part of the school</td>
<td>There is general consensus that the community is part of the school because the community is its source of pupils</td>
<td>The school considers itself independent of the community and the community does not identify with the school</td>
<td></td>
</tr>
<tr>
<td>The School Estate</td>
<td>Sustainability guides the choice and use of resources such as water and energy</td>
<td>There is evidence that sustainability influences the use choice and use of resources such as water and energy</td>
<td>There is general knowledge about wise use of natural resources for sustainability</td>
<td>Choice and use of resources such as water and energy are guided by other considerations</td>
<td></td>
</tr>
<tr>
<td>Waste Management</td>
<td>There is a well-established waste management system</td>
<td>There is evidence that some care has been taken in dealing with waste</td>
<td>Evidence of waste is not visible but there is no indication that this has been done in relation to the principles of good waste management</td>
<td>Waste is not considered a big issue, there are other priorities e.g. pupils are passing in their exams</td>
<td></td>
</tr>
<tr>
<td>School Compound</td>
<td>The school compound is generally clean and free of plastic and waste paper</td>
<td>There is evidence that effort is made towards keeping the school compound rubbish free</td>
<td>The compound is generally clean apart from some used plastic here and there</td>
<td>There is no sign that any effort is ever made to clear the school compound of rubbish</td>
<td></td>
</tr>
<tr>
<td>School Build &amp; Restoration</td>
<td>The School has sound structures that are well maintained and safe to be in with evidence of optimum use of school building e.g. rain water harvesting etc.</td>
<td>The School structures are well maintained. There is little evidence of optimum use of the school build to promote sustainability principles</td>
<td>The school structures are in fairly good state.</td>
<td>The school structures are old and broken down and need serious renovation</td>
<td></td>
</tr>
<tr>
<td>School Grounds</td>
<td>The school compound qualifies to be called a “talking compound” i.e. has some eco-codes and signs of conscious environment</td>
<td>The school compound has labeled some trees and the school believes that “a</td>
<td>There is very little or no evidence that any effort has been made towards creating</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
conservation demonstrations, in formation, eco-codes (e.g. “water is life—save it”, have you switched off the light?), trees are labeled, tree planting projects, composting pits, bird feeding tables etc

<table>
<thead>
<tr>
<th>Monitoring and Evaluation</th>
<th>Action Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation demonstrations, information, eco-codes</td>
<td>There is participatory monitoring and evaluation in the school whereby the learners develop good practice by continuously managing and monitoring their greening initiatives on the school ground.</td>
</tr>
</tbody>
</table>
| Trees are labeled, tree planting projects, composting pits | A few students are involved in monitoring and managing the greening initiatives in the school grounds.

| School environmental club or wildlife club is assigned the task of monitoring and managing the school greening initiatives. |
| There is no proper assigned responsibility on managing the school greening initiatives and the trees, flowers, grasses planted e.g. wither and die. |

| The teachers use the school grounds to teach most of the school curriculum. |
| The teachers use action learning only with specific topics with no interlinked continuous activities on the school grounds. |

| Action learning is used in a class once a term on a practical session or field trip. |
| There is no action learning and an end of term field trip is considered as sufficient to complement the classroom teaching and learning for the whole school term. |

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**Make water safe to drink**

### Direct Boiling

1. Collect water
2. Warm it under the sun to save boiling time
3. Bottle the water using energy saving store
4. Filter the boiled water using a clean cloth

### Charcoal Filter

**Materials:**
- Sand
- Charcoal

**How to make:**

1. Drill hole below the tap for the charcoal filter. The hole should be cut in the floor of the tap.
2. Fill the hole with sand and charcoal.
3. Place a layer of charcoal and sand on top of the charcoal.
4. Place the filter under the tap and let the water pass through.

**Disinfect water with sunlight**

**Materials:**
- Solar water disinfection (ODIS) bottles

**How to make:**

1. Use clean plastic bottles
2. Fill bottles with water and close the cap
3. Line bottles horizontally on the road
4. Expose bottles to direct sunlight for at least 6 hours in a sunny day (under very cloudy conditions)

**Drink ODIS water directly from the bottles or from clean cups**

“Learn to conserve for a better tomorrow.”
Methodologies towards a sustainable future

India is full of natural resources. Yet it faces vast challenges from depleting environments, climate change, poverty and overpopulation. If these challenges are to be turned into opportunities, schools and communities have important role to play.

This material is intended as a source of inspiration and support for teachers and trainers to develop forms, tools and methodologies that will develop action competence for sustainability.