



Best Practice Guidelines for Teaching Environmental Studies in Maldivian Primary Schools

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↑ *The Maldives and its ecosystems are among the most vulnerable in the world.*

↓ *Male' continues to grow as more people move to the capital.*



BACKGROUND

The Maldives are a chain of 1,190 small low-lying coral islands grouped into 26 atolls in the Indian Ocean: 198 islands are inhabited and 80 house tourist resorts. The islands are predominantly coastal entities, and their ecosystems are among the most vulnerable in the world. The Maldives have a narrow economic base that relies on 2 critical sectors; fisheries and tourism. As most atoll workers are employed in these sectors, protecting the Maldives' fragile coral reefs and coasts, fisheries and the marine environment, which comprise the main source of livelihood in the atolls, from polluting sources is central to any poverty strategy. Unique geography and vulnerability pose key development challenges for the country. The dispersion of the population across the archipelago raises the cost of delivering social services, as economies of scale are difficult to achieve in service provision.

Changes are taking place both on the land and seascape, changing the ways we must live, the shape of our communities, and, even, threatening the viability of many islands for continued habitation. Inside influences that contribute to these impacts include the ways populations are shifting and changing and the ways that the economy is developing unevenly around the islands. From the outside, influences include the impacts of globalisation, the problems of climate change, and the after effects of natural disasters such as oceanic earth quakes, the December 2004 tsunami etc.– all of these global (or regional) processes and events have a significant and cumulative local impact.

A response is required in order that the Maldives might look forward to a sustainable future. To be sure, some problems such as the rising of sea levels attributed to global climate change are not solved simply by anything that can be done in the archipelago. Yet, it is important that we join with others around the world in meeting these challenges through informed daily choices and local activities.

Around the world and to the highest levels there is a general understanding that we need to foster – through education – the values, behaviour, and lifestyles required for a sustainable future.

“Education is the most effective means that society possesses for confronting the challenges of the future. Indeed, education will shape the world of tomorrow. Progress increasingly depends upon the products of educated minds: upon research, invention, innovation and adaptation. Of course, educated minds and instincts are needed not only in laboratories and research institutes, but in every walk of life. Indeed, access to education is the sine qua non for effective participation in the life of the modern world at all levels. Education, to be certain, is not the whole answer to every problem. But education, in its broadest sense, must be a vital part of all efforts to imagine and create new relations among people and to foster greater respect for the needs of the environment”.

Source: UNESCO (1997) *Educating for a Sustainable Future: A Transdisciplinary Vision for Concerted Action*, paragraph 38.

Thus, education is a key part of the response to local issues such as:

- The depletion of the freshwater lens ,
- Contamination of well water by sewage,
- Increasing levels of introduction of new pests and diseases,
- Soil and water lens destruction by artificial fertilizers,
- Depletion of forest resources,
- Over exploitation of reef resources,
- Import of genetically modified (GM) grains and seeds,
- Increasing levels of sea level rise; and
- The bleaching of coral reefs due to global warming.

The response is both in the changes to the content of education and the ways that it is taught.

EDUCATION FOR SUSTAINABLE DEVELOPMENT

The concept and practice of education for sustainable development is based on many different ways of thinking or perspectives. Thus, you will often hear different terms such as ‘education for sustainability’, ‘education for a sustainable future’, ‘sustainable education’, ‘sustainability education’ to describe much the same thing and these may sometimes be used interchangeably, although some communities do make distinctions. The lack of any one fixed term is a sign of how relatively new this emphasis is in contemporary educational thinking. This variety of terms should be seen as a positive development as it means that schools, colleges, universities, education systems, teachers, indeed anyone, can feel free to develop their own definition to suit local priorities and needs.

Many of the ideas about education for sustainable development have come from the merging of more traditional environmental education and development education thinking and teaching practice. For the purpose of this best practice guideline, the important thing is there is a consensus understanding that education for sustainable development is fundamentally about learning ways to go forward in a changing world in order to respond to the sustainability challenges that we face, no matter where we might live in the world.

The definition below provides an idea of key perspectives on education for sustainable development.

Definition of Education for Sustainable Development (ESD)

Education for Sustainability is a lifelong learning process that leads to an informed and involved citizenry having the creative problem solving skills, scientific and social literacy, and commitment to engage in responsible individual and co-operative actions. These actions will help ensure an environmentally sound and economically prosperous future. Education for Sustainability has the potential to serve as a tool for building stronger bridges between the classroom and business, and between schools and communities.

Source: Second Nature – An educational NGO in the USA.

Viewing sustainability as learning, leads to education that prioritizes community building, citizenship, economic perspectives such as the use and dispose of goods and services and how it affects the economic well being of individuals and the society as a whole. Hence the following approaches can be used in teaching and learning environmental studies:

- **Personal and community relevance of learning:** organizing learning around major ideas – such as concepts and principles – that are relevant to the everyday life, experiences and perceptions of students.
- **Healthy communities:** selecting learning themes that provide opportunities to reflect on these everyday life experiences and perceptions and develop strategies for contributing to safe, healthy and sustainable communities.
- **Critical and systemic thinking:** relating these everyday life experiences to the social, economic, environmental and cultural factors and processes that can promote safe and healthy sustainable communities.
- **Empathy and respect:** viewing these everyday life experiences through the eyes of others, near and far, and learning to respect differences and a willingness to learn from others.
- **Attitudes and values:** clarifying personal and community attitudes to local, national and global issues and using cultural values to reflect upon the implication so these attitudes for the quality of life of people and environments near and far.

- **Action and service:** developing willingness and the skills to be of service to one's community by contributing to improvements in people's quality of life and protecting the environment.

THE CURRICULUM EXPERIENCE

If the curriculum is defined as 'the sum of all the formal and informal teaching and learning experiences provided by a school', then education for sustainable development cannot just be added to the curriculum as a new subject. Rather, it is a dimension to be emphasized in every aspect of school life.

Education is not just about what happens in the classroom. It is also, for example, in the school governance structures, in the maintenance of the school grounds and facilities, in after school clubs, special events and commemorative days in the school calendar, and so on. Education for sustainable development can infuse the whole of the school curriculum. The different aspects of school life are illustrated in a model of the school curriculum in Figure 1. All the elements in this curriculum model affect the educational experiences of young people in schools.

Whether the curriculum actually achieves this goal or not will be affected by many issues. While these often extend beyond the responsibilities of a single school or teacher, there are many things that schools and teachers can do, including:

- Interdisciplinary teaching and learning;
- Integration through educational objectives;
- Infusion into learning experiences in all subjects; and
- Celebrations in the school calendar.



We all have a role to play in contributing to safe, healthy and sustainable communities.



Current and future generations need to respond to sustainability challenges.

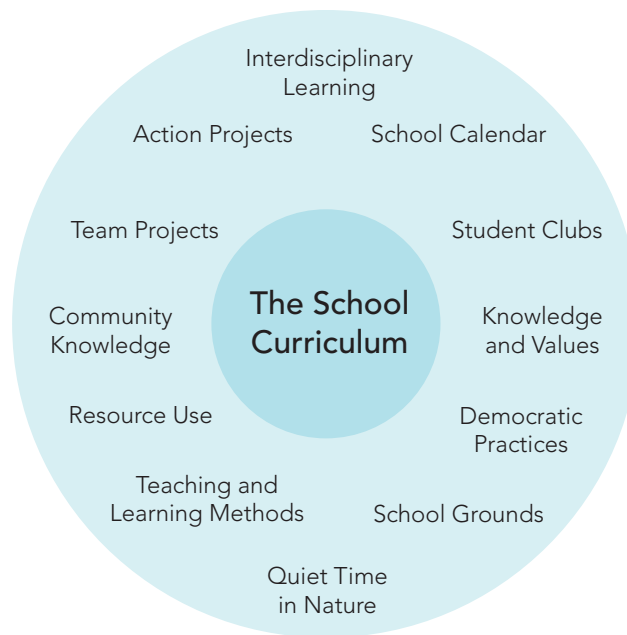


Figure 1: A model of school curriculum

Community Knowledge

Perspectives developed in school learning materials often do not reflect knowledge that has direct local relevance. The school curriculum can be enriched with local stories, history and community experiences of change and how people lived in the area in earlier times. Programmes that enable students to interact with local people and to find out about early history and change are essential to successful education processes. Children often have an intuitive capacity to distinguish between fact and fiction when listening to the stories of older people. This critical capacity can be enhanced through teaching with stories in ways that reveal and yet respect local cultural traditions as valuable sources of rich ideas for sustainable living. Teaching processes that include local and traditional knowledge are also useful ways of contextualising the school in community.

Interdisciplinary Learning

Education for sustainable development can be taught in all school subjects in such a way that the learning objectives of the subject are achieved whilst keeping students talking about and planning ways of living sustainably as citizens in a local and a global community. This can be done either through infusion into each subject area or through interdisciplinary modules.

Democratic Practices

Democracy cannot be taught as a set of rights and responsibilities. Democracy has to be practiced in all aspects of school life, ranging from the way students are encouraged to care for each other, the ways teachers care for students, the ways rules are made and enforced, and how decisions are made.

Knowledge and Values

The knowledge explosion means that it is not possible for everything that people have discovered to be taught in schools. Rather, the curriculum is a selection of this knowledge. The values that are used to select the knowledge that is taught in lessons should take account of student learning needs, local community interests and ways of learning to live sustainably.

Action Projects

Action projects in the school grounds and local community by a class or club can provide valuable learning experiences. Projects can include: maintaining school compost heap, visiting and accompanying elders, caring for a garden, cooking with elders, making gifts of preserved food and handicrafts for friends and relatives away from home, monitoring local air or water quality, and so on. One of the many educational benefits of action projects is the self-esteem that young people feel from being successful in planning and conducting a project that benefits others.

Resource Use

Schools can undertake environmental audits of resources such as water and energy used and the amount of waste produced in the school. If environmental auditing is done carefully and methodically reliable information can be gathered about problem areas and the associated costs. Auditing and the consequent saving of resources can save your school money by reducing the cost of resources such as water and electricity. Your school can also save by re-using and recycling resources such as paper.

Teaching and Learning Methods

The richness of learning activities made available to children is of utmost importance. How students learn is often more important than what they learn. This is because different students have different abilities and learning styles and so a variety of strategies and methods are crucial to ensure that all students have opportunities to learn. Teacher oriented expository approaches such as questioning, explaining and demonstrating are effective for covering a large amount of information and if done well can be very exciting and motivating for students. These approaches can also be followed by collaborative learning providing opportunities for learning and sharing with among students in the classroom. Alternate approaches for structuring classrooms such as small groups, individual, pairs and larger groups can maximize opportunities for students to learn from each other, developing mutual respect and cooperation on various tasks and projects. Collaborative learning through learner centered interactive approaches such as inquiry, problem solving, story telling involving students, brainstorming, using surveys and work sheets along with learning outside the classroom can help students feel responsible for their own learning, developing thinking skills, and fostering independent social and group processes.

School grounds

School grounds and the local environment can be an important resource for many learning experiences. The school grounds can be used in a number of different ways, including local studies of plant and animal life found in the school grounds. This could lead to local action projects such as a gardening or recycling project in the school.



Action projects such as school gardens provide valuable learning experiences.



Waste audits can reveal how resources are used at school and in the community.



Collaborative learning can help students feel responsible for their own learning and develop important thinking skills.

School Calendar

Many national and international 'days of celebration' relate to aspects of social, ecological, political and economic sustainability. It is possible to celebrate these days through special events, such as displays, guest speakers and concerts, or through relevant teaching units and/or field trips integrated into the school curriculum. Such activities can promote thinking about sustainable futures by teachers, students and the wider community.

Student Clubs

Many extra-curricular activities can be organised by/ for students at interval break, after school, at weekends, and during vacations. Student clubs are an ideal way of integrating sustainable development issues into young people's thinking and activities.

Team projects

It is easy to integrate team projects into the formal curriculum. Projects that start off as classroom tasks can be presented to the whole school, and maybe even entered into a competition. Competitions can provide public recognition for the work students are doing. They

are also opportunities to share work and ideas, and to learn from others about what they are doing. Increasingly, competitions are being seen less as competitive interactions, and more as opportunities for young people to learn and work together. Team entries encourage group work and often the emphasis is on sharing rather than competing.

Quiet Time in Nature

The value of quiet reflective time in nature where students can calm their inner selves, reduce stress, integrate experiences and continue with their learning experiences is extremely beneficial for students. In a world which is chaotic and stressful for children, the place of quiet time in nature needs to be enhanced in the curriculum. Teachers can explore the possibility of providing students with this valuable time engaging them in reflective reading and interesting art work, music, and observations not only in the classroom but also within the outside environment.

Source: Adapted from UNESCO (2005) Teaching and Learning for a Sustainable Future.



Spending quiet time in nature can be very beneficial for students.

Case Study

In 1939 a popular allegory of education, *The Sabre-Tooth Curriculum*, by Harold Benjamin explored the difficulties posed by an out-moded system of education that had lost its contemporary relevance but still clung to old ways of knowing and doing. It remains a popular book as it has relevance as much today as when it was first published. This story is of a pre-historical stone-age community where the fundamental survival skills centred on the provision of shelter, gathering food, and protecting themselves from the many large and terrible animals that shared their surroundings of which the most fiercesome was the sabre-toothed tiger.

These skills had to be passed down through the generations and at some point in their history the tribal elders decided that it was no longer sufficient to expect or rely that parents would pass on the essential skills so they sought to systemise the education process and formed a school. The fundamentals of the educational curriculum were: 1) catching fish with bare hands, 2) clubbing tiny horses to death, and 3) frightening sabre-toothed tigers with torches. By studying those three subjects in the “schools” the stone-age people got along fairly well and the school turned out to be very successful as the young people became skilled in hut making, fish-catching and, in particular, sabre-toothed tiger hunting. So proficient did they become in the latter that the tigers rapidly became extinct.

Right about at the same time as the sabre-toothed disappeared, the climate conditions began to change caused by the movement of ice from the north – the forerunner of the ice age. All of a sudden the grass huts that people were so skilled at building did not sufficiently protect them against the cooler, more stormy weather so people began to seek shelter in caves. Due to increase flows in the rivers the waters muddied and it was no longer so easy to see the fish in the water and because over a number of generations people had been so proficient in catching fish only the kinds of fish that stuck to the bottom parts of the rivers were left to breed, the fish that they easily caught with their hands before were in very short numbers. To add to their mounting troubles, while they had eliminated the threat of the sabre-toothed tiger, the new weather conditions brought a new threat of large black bears that had migrated south with the advancing ice age – the lessons they had all learnt about scaring and killing the sabre-toothed were ineffective against the bears.

But the schools continued to teach the old ways of fish-catching, hut building and sabre-toothed tiger scaring because that is what had always been taught at school.

Those who were of a more liberal persuasion in the tribe wanted to add new subjects into the curriculum that taught new skills and technologies that were being developed to meet the changing environment and circumstances. For example, the new technology for catching fish that required net-making and casting, and the skill of covered pit-making that was become increasingly important as a defence against the large marauding black bears. While some people were happy to add new subjects but wanted the old subjects retained for their “cultural value”, still others, who were soon branded as ‘radicals’, wanted to do away with the old curriculum altogether in favour of subjects that better met contemporary challenges.

However, among the leaders of the community there was a reluctance to change just because the old system had proven so successful. They insisted that “Training to catch non-existent fish with bare hands is the best way to achieve muscular coordination and agility and practicing to frighten tigers that do not exist develops courage. Some things are fundamental and sacred in education and must not be changed.”

At the time it was published, *The Sabre-Tooth Curriculum* was a powerful indictment of the ways education systems had become irrelevant. The allegory is still an important cautionary tale for us today. The lessons in it are especially relevant as we look to the future where the skills and tools needed for living are not easily learned within current educational frameworks. Indeed, current education systems could equally be said to be designed for another age. This UNICEF project is part of this response to change and also hopes to be an agent of further changes for the positive. ■

Celebrations through the school year

International bodies such as the United Nations have obtained the agreement of governments around the world to designate certain days and weeks as times of celebration and remembrance for particular issues. Education is the key purpose of these days and many provide opportunities to educate for sustainable development.

A regular programme of celebrations in the School Calendar is a powerful way of promoting interest in sustainable development.

International days of celebration and commemoration and some suggested activities include:

February 2

World Wetlands Day

An activity to mark the day –Each participant will be provided with a card box sized 8 inch (length) x 8 inch (width) x 4 inch (depth). Inside: 6.5 inch (length & width) x 4 inch (depth). Participants will be required to create 3-dimensional wetland models, which highlight the features and characters of wetlands, as well as organisms living within wetlands (e.g. mudskippers, shrimps, crabs, fishes or birds). Participants can demonstrate their personal experience and memory related to this particular habitat

Source: Adapted from <http://sc.afcd.gov.hk/gb/www.wetlandpark.com/www2008/english/activities/activities20071020-15.html>

March 21

World Forestry Day

An activity to mark the day –Celebrate World Forestry Day by visiting your local forests and learning more about the many contributions they make to our well-being

Source: Adapted from <http://www.dpi.vic.gov.au/dse/nrenfor.nsf/childdocs/-8E773CD126CA22704A256AA40000EDEE-034EBCC6B1670D984A256AA40011A9F8?open#2>

March 22

World Water Day

An activity to mark the day – To mark World Water Day, the School can organize a poster exhibition under the theme “Water for Life”. All the students can participate in the exhibition. The messages of the

works can be Water and health, Stop pollution, Protect water, Water in community. The posters can be put up in different locations of the school. Three winners (1st,2nd and 3rd) can be selected from each grade.

March 23

World Meteorological Day

April 7

World Health Day

April 22

World Earth Day

An activity to mark the day - Friendly packaging Grades 3 and up). Invite your students to study a variety of product packaging and discuss which packages are most “Earth friendly.” Then have them work in small groups to redesign a product whose package they deem “unfriendly”.

Source- Adapted from http://www.education-world.com/a_lesson/lesson174.shtml

May 1

Workers Day

May 15

International Day of Families

May 18

International Day of Museums

June 5

World Environment Day

An activity to mark the day – The school can conduct a quiz competition among school children where they can be asked several environmental

related questions.

Source- Adapted from http://www.erc.gov.mv/index.php?option=com_content&task=view&id=172&Itemid=35

June 17

World Day to Combat Desertification

July 11

World Population Day

August 9

International Day of the World's Indigenous People

September 8

International Literacy Day

September 16

International Day for the Preservation of the Ozone Layer

September 17-19

Clean Up the World

September 21

International Day of Peace

October 5

World Teachers' Day

October 16

World Food Day

October 24-30

Week for Disarmament and Development

November 20

Universal Children's Day

December 10

Human Rights Day

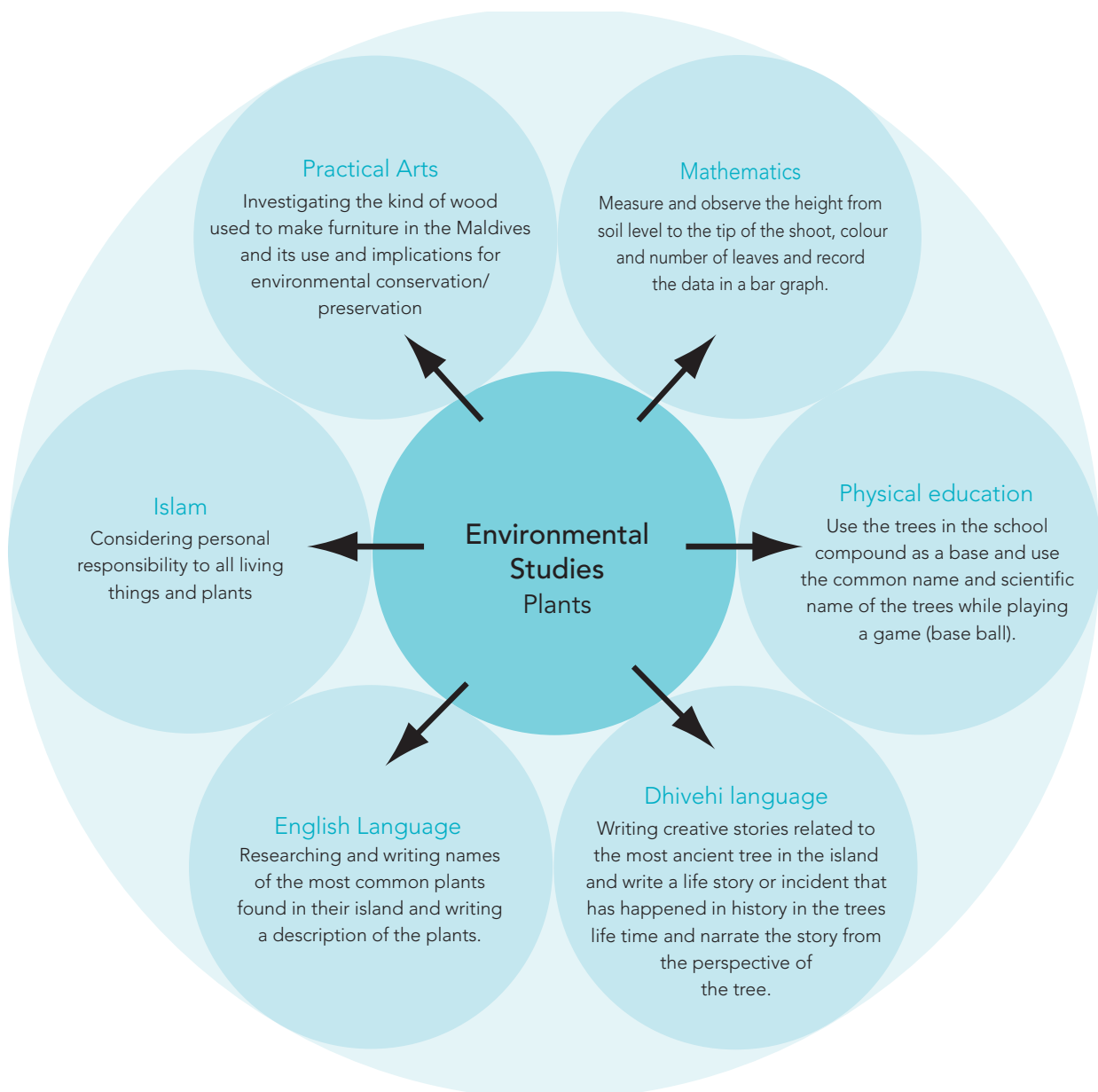
Teaching and learning approaches

Meaningful learning requires students to integrate ideas from many different perspectives rather than compartmentalize what they learn into discrete 'boxes' of knowledge. As a result, teachers need to be flexible and skilled in accessing and integrating knowledge from different sources and disciplines. Solving society's problems requires inputs from many disciplines or specializations. Just as a variety of specialists need to work together to solve problems in the world outside the classroom, disciplines should not be separated unnecessarily inside the

classroom either. It is possible for teachers to emphasize interdisciplinary teaching and learning in their own classes, e.g. through the topics and examples they choose.

Teachers need to have professional skills for using teaching and learning strategies that can help students achieve the wide range of skills, knowledge and values objectives of education for sustainable development. It is also important that teachers work in a co-ordinated and co-operative way so that students are given the opportunity to integrate knowledge across subjects and across the years of schooling.

A Topic web for ES teachers:



1

INTRODUCTION

1.1 THE BEST PRACTICE GUIDELINES

There are over 60 million teachers in the world. Each one is a key agent for bringing about the changes in values and lifestyles we need for a healthy and sustainable future. For this reason, innovative teaching is an important part of educating for a sustainable future. Teachers require opportunities to reflect upon and discuss the principles of education for sustainable development, learner-centered education and the enquiry learning model in order to utilize these complementary teaching materials effectively.

This guideline, together with complementary resources and discussion forums on the Maldives Teachers Resource Website (<http://www.edonline.edu.mv/>) provide the space and opportunities for this to happen. This guideline is based on a vision of education that promotes teaching and learning approaches that contribute to a sustainable future. This document will enable teachers to plan learning experiences that empower students to develop the skills, knowledge and attitudes they will need to work creatively with others to help bring their visions of a better world into affect.

1.2 KEY COMPONENTS OF THE BEST PRACTICE GUIDELINES

Environmental studies are teaching in, about and for the environment. Environmental studies are about understanding the local environmental issues facing them in their everyday life and how best to solve these environmental issues. There are a number of activities that are simple and easy to conduct in the schools as everyday activities with the primary school students. Most of the activities do not require any sophisticated equipment or resources. It is important that schools and teachers identify these activities and introduce options on how best to manage them, so that the students can practically learn by doing and through their own experiences.



This document will help you do that with simple, common-sense guidelines on the following topics:

1. Using the resources in the local environment.
2. Using simple investigative techniques.
3. Using critical thinking and problem solving.
4. Using the Inquiry approach in teaching Environmental Studies.
5. Using story telling and indigenous knowledge in teaching Environmental Studies.
6. Using Flip Charts:
 - a. Flip Charts on Weather, Water, Waste and Energy
 - b. Flip Charts on Environment and Biodiversity
7. Using the 'Schools for a Healthy Environment' Modules and how to link them with everyday teaching in the classroom.
8. Using field guides in teaching.
 - a. Plant field guide
 - b. Mangroves field guide
 - c. Birds and beaches
9. Using the toolbox materials in teaching Environmental Studies.
10. Assessment

1.3 HOW TO USE THESE GUIDELINES

Best practices are constantly changing as we gain information about ways to improve environmental management. These Guidelines provide directions for schools to seek resources and information. In addition it provides assistance in teaching environmental issues practically and in a more enjoyable way by utilizing locally available resources. They are not definitive or meant to limit the way schools might address the environmental issues or how it is taught to the students. The best practice guideline is a tool for the teachers and schools to explore how best to utilize these materials effectively in the teaching learning process in the Maldivian schools.



This Best Practice guidelines will provide simple guidelines for ES teachers to follow in their teaching.

2

USING RESOURCES FROM THE LOCAL ENVIRONMENT

2.1 THE ISSUES

- Lack of availability of resources from the environment;
- Not knowing where the resources are available; and
- Difficulty of getting permission to use the resources, from the respective authorities who have access to them. Sometimes teachers have to follow a formal procedure to get the resources and it takes a long time to process.

2.2 RISK FACTORS AND CONSIDERATIONS IN OUTDOOR ACTIVITIES.

Learning outside the classroom will be an important part of Environmental Studies. Providing students with high quality learning activities in relevant situations beyond the walls of the classroom is vital for helping students appreciate their first hand experiences from a variety of different perspectives. An experience outside the classroom also enhances learning by providing students with opportunities to practice skills of enquiry, values analysis and clarification and problem solving in everyday situations.

Local area investigations are useful, not only because they can be linked to meet student outcomes of Environmental Studies subject areas, but also because they can be most enjoyable. They can provide the thrill and satisfaction which stems from discovery and recognition. They can be extremely motivational with school children of all ages. A range of very useful skills can be developed and practiced in the course of a local area investigation. Local area studies or investigations are sometimes referred to as excursions.

The great thing about any excursion is that it provides **FIRST HAND EXPERIENCE** that is **REAL EXPERIENCE**.

Such experiences can be used as a base upon which to build. One might say the excursion is a relaxed, enjoyable approach to learning. The chief skill associated with an excursion is **OBSERVATION** although most teachers emphasise inquiry, an approach based on data collection and interpretation. Furthermore, any excursion does not restrict learning to observation at a specific site but can provide a wealth of information en route to the particular site. Hence, excursions can be very meaningful and, although sometimes awkward and time consuming to prepare and manage, invariably they have a great impact on the children.



Excursions are enjoyable and provide students with first hand experiences.

“Outdoor observation and work connected with it should be the central part of a child’s study, at least up to about the age of eight or nine years, and in some respects throughout school life.”

Teachers have been aware of the need for excursions for many, many years! Garrett, cited in Traill et al., *Teaching the Social Sciences* (1972, p. 210) stated:

Gray and Gordon (1972) went even further and claimed “excursions beyond the four walls of the classroom can so obviously help to give a boy or girl wider experiences in many ways: there is raw material for the mind, the emotions and the senses to draw upon”. More recent emphasis on the need for excursions can be found in Marsh, 2001:

“Studies of society and environment have one major advantage over most other subjects. Its focus is on people and the environment and there are countless examples of these social interactions all around us. TEACHERS SHOULD TAKE ADVANTAGE OF THESE “LIVE” EXAMPLES AND NOT LIMIT THEIR TEACHING TO TEXTBOOKS AND IN-CLASS EXAMPLES”. (Marsh, 2001 p. 50.)

Nevertheless even though excursions, field trips and local area studies can be of great value recent events have illustrated the need for careful planning and extreme vigilance on the part of organizers.

Marsh (2001) emphasizes this point when he states:

“Local community studies do not just happen. Very careful planning is required by teachers to ascertain the resources available, personnel to be contacted, travel details to be arranged, fields of emphasis, follow up activities and reference materials just to mention a few aspects. Field trips can be used very effectively to integrate theoretical models with real world practical examples. As noted by McElroy (1984), teachers can use field work to introduce a topic or to reinforce it, as revealed by the following example”.

- Model -----field work;
- Field work-----models;
- Model-----field work-----model. (Marsh, 2001 p. 50.)

In particular, attention needs to be directed to TEACHER RESPONSIBILITIES AND LIABILITIES for student travel. In order to devise, plan and implement excursions it is necessary to have an extremely sound overview of what is involved.



Points to remember

1. You are responsible for the safety of the children.
2. Seek to have well prepared parent helpers to accompany the children on excursions. (Consider to have a number of competent adult helpers for any excursion.)
3. Always check numbers regularly BEFORE and AFTER segments of the excursion.
4. Use the 'buddy system'. Get children paired.
5. Ensure all Ministry of Education and school regulations are met.
6. You can never be TOO CAREFUL when in charge of children.

2.3 DID YOU KNOW?

The Ministry of Education has produced guidelines for Excursions and swimming safety which can be used by teachers and the school management (Appendix A). Following these guidelines ensure that you as a teacher and the children are protected and remain safe. Furthermore, every school has its own policy regarding excursions (Appendix B). Some schools also have their own 'parents briefing sheets for teachers' to help teacher prepare parents for field trips (Appendix C).

2.4 ADDITIONAL INFORMATION

Books: Gilbert, R. (2001). (ed.). *Studying Society and Environment: A handbook for Teachers*. Melbourne: Macmillan. (Fieldwork - p.235, p.236 and p.239)

Marsh, C. (Ed.). (2001). *Teaching Studies of Society and Environment*. Sydney: Merrill Prentice-Hall. (Field Trips - pp.68-69; pp.285-286)

Moroz, W., and Reynolds, P. (2001). *Teaching and Learning in Primary Society and Environment*. Perth: A Mastec Publication. (Local Area Studies - pp.149-150)

3

USING SIMPLE INVESTIGATIVE TECHNIQUES

3.1 THE ISSUES

- Teachers and students may have difficulty in trying out the proposed investigation techniques as they may not be familiar with them; and
- The suggested techniques may not be applicable to the schools in all the islands as investigative techniques require time for planning, preparation and to implement action

3.2 TEACHER RESPONSIBILITY

Simple investigation techniques make science and technology relevant to students' daily lives and help them develop skills in researching, processing and interpreting data. It is the foundation for determining a range of possible solutions to a particular problem by constructing hypotheses, considering different approaches, and designing methods for gathering, organizing and processing information.

Environmental Studies text books incorporate units relating to science and investigations so that students progress each year in their conceptual understanding and skills development.

One of the strong features of the program is cooperative learning, where students work with each other in *small groups* to solve problems. Students enjoy this learning style, and it enables them to learn effectively and to become more positive about themselves and each other. Cooperative learning also contributes to better classroom management.

Another feature is *student-centered learning*. Lessons start from students' current understanding and provide opportunities for them to test and explore this understanding. The program framework enables students to build reliable knowledge about basic scientific principles.

Simple investigations techniques are flexible so that teachers can use their innovation to adapt the program to their teaching styles. However, it is designed particularly to assist teachers who may be hesitant about teaching Environmental Studies.

The teacher has to carefully plan in advance to take the students outside the classroom to carry out an investigation. Investigation is not complex- it needs the teacher to guide the students to observe and record their observations in a guided manner.

What must the teacher be able to do in order to successfully conduct local area investigations?

- Know the area to be examined very well.
- Become immersed in the area and see its full potential and possibilities for research.
- Have a positive outlook about investigating the area and what students can learn from the experience
- Talk with two knowledgeable elders and two others
- Use all available sources of information. Remember (historical documents/information) in the island office archives, libraries, newspapers, online resources etc.
- There is a vast range of resources available to the keen local area researcher; shopping centers, ward offices, old and new buildings, banks, institutions, water and sanitation plants, libraries, newspapers, TV and Radio stations, power stations, telecommunication providers, boat yards, recycling plants, factories, seedling nurseries, home gardens, homes, various offices and not least of all, people.
- The really perceptive local investigator has a range of possibilities open to analysis.

3.3 DID YOU KNOW?

When you are conducting any investigations take note of the following steps:

1. Discuss your **Aim**. Come up with one sentence that describes what you are trying to find out.
2. Think about your investigation and write down all the **Equipment** you think you will need.
3. Now plan every step of your investigation, from who gets what, to exactly how you are going to carry it out. Think of it in tiny steps to make sure you don't forget anything. This will be your **Method**.
4. What are you going to measure and how? What are you going to record? What are you looking for? This will be your **Results**. How will you record your results? Table? Diagram with labels? Graphs?
5. Now you have to predict what will happen when you do your investigation. Write down the results you think you will get. This is your **Prediction**.



Simple investigative techniques help make science relevant to students.

3.4 ADDITIONAL INFORMATION

Websites: www.rsc-ne-scotland.ac.uk/map2learn/mindmaps/Hospitality/extdoc/Lesson%206.doc
http://www.celt.iastate.edu/teaching/small_group.html
http://www.wcer.wisc.edu/step/ep301/Fall2000/Tochonites/stu_cen.html
<http://www.maldivesinfo.gov.mv/info/index.php>

4

USING CRITICAL THINKING AND PROBLEM SOLVING

4.1 THE ISSUES

- Critical thinking and problem solving are not directly addressed in the curriculum. Therefore teachers and students may not be familiar with these approaches;
- The current curriculum is mainly knowledge based. Therefore teachers may be reluctant to try these approaches in everyday teaching
- Critical thinking means sometimes there are no fixed answers. Teachers who are used to give answers will find it difficult to let go
- Students and parents will take time to accept that thinking process is as important as product.

4.2 TEACHER RESPONSIBILITY

Critical thinking is an important approach to be introduced in the teaching/learning process in the primary schools. Critical thinking is about asking questions, challenging prior knowledge and learning, challenging assumptions (what you believe/think is real or true) and what we already know. Critical thinking is about not taking anything at face value. It is about uncovering assumptions and finding the underlying meanings. Critical thinking can question external issues in society such as water use practices and resource management. Critical thinking is also about looking inward to challenge your own assumptions, beliefs, values and attitudes.

Why should we be doing this? Isn't it painful, difficult, and uncomfortable to ask so many questions and to delve deeper into information and circumstances? This question is part of the critical thinking process.

Our answer to this question would be: **we believe the critical thinking process is very important.**

As the world changes and we are exposed to new experiences, new learning, new ways of acting and working, we need to engage in critical thinking as we try to understand what these changes mean for us. Questions to ask when experiencing social change (e.g. such as the introduction of a new desalination plant in your community) may include:

- How will this change affect my life? My family? My community? The environment?
- Are my values changing as a result of this new aspect of life?
- How has it affected my life? Is this what I want? Is this what is best for the environment in which we live?

Critical questions that could be asked about polluted beaches on your island could include:

- Where is this pollution coming from? What must occur so that the beach is not polluted?
- Who or what is polluting the beach? Why are they polluting the beach? What would make them change?
- What is the best way to address this issue? What would happen if the beach continued to be polluted?

These are the sort of questions – challenging, uncovering, discovering- that are asked when using critical thinking. This is so that we can uncover and discover what is occurring in our world, how we feel and what we are going to do about it.

Students must make choices, evaluations, and judgments every day regarding:

- (1) Information to obtain, use and believe,
- (2) Plans to make, and
- (3) Actions to take.

4.3 DID YOU KNOW?

Findings from Research indicate that:

There needs to be a shift in many classes, from a teacher-centered classroom to a student-centered classroom in which students can be involved in collecting and analyzing information, paired problem solving, cooperative learning settings, simulations, debates, and critical reporting sessions.

Providing experiences in **real-life situations or situations that simulate real-life situations increases the probability that skills will be used.** Providing modeling of the skills, ample opportunities for practice, and feedback on the effectiveness of the student's thinking are also important considerations. Selection of experiences should be based on the developmental levels of the students.

4.4 ADDITIONAL INFORMATION

Websites:

<http://www.skeptdic.com/refuge/ctlessons.html>

<http://philosophy.hku.hk/think/>

www.keyskillssupport.net/teachinglearning/individualkeyskills/problem

'How will this affect my life?'



Critical thinking is an important skill for students to develop.

5

USING THE INQUIRY APPROACH IN TEACHING ENVIRONMENTAL STUDIES

5.1 THE ISSUES

- Teachers who are not familiar with the approach will require ongoing support to bring about change; and
- Time is a constraint with the current organization of the curriculum. Therefore teachers may find it difficult to apply this approach in everyday teaching unless the organization accommodates for flexible learning experiences.

5.2 TEACHER RESPONSIBILITY

A key teaching and learning strategy is the 'Inquiry Approach'. It is an overarching strategy through which teaching and learning can take place in many ways. Hence there are a number of lessons and activities based in the inquiry method of learning provided in the Environmental Studies syllabus.

The syllabus encourages students to ask questions and to actively search for answers (Appendix D). This method also enables teachers to design an extensive range of teaching strategies to address the needs of the students in the classroom (Appendix E). Inquiry-based learning will involve a process of investigation, the results of which will be communicated in the class and both shall be done in a participatory manner. Application of the inquiry method should include:

- Teacher assistance from dependence to independence.
- Progressive development of students' skills.
- Use of range of scales to measure achievement (Diagnostic, formative and summative)
- Increasing complexity of materials and product.

When you are ready to use inquiry as a learning strategy you could proceed as follows:

- Decide exactly what you want students to learn. (Student learning outcomes and levels).
- Locate or develop a suitable problem / question or a series of problems / questions that can be used to help students achieve the desired learning outcomes. Normally, these problems / questions will be built around an important concept or principle (e.g., the concept of water conservation). The problems / questions should also be built around some realistic situation that the students think important (such as the need to conserve water in the home).
- Identify what prior knowledge the students will need in order to try to solve the problems or find answers to the questions. If necessary, teach the needed prior knowledge.
- Decide how you will motivate the students to engage in the inquiry (i.e., how will you make the problem / question one that they will want to resolve).
- If necessary, teach the students the inquiry skills that they will need, or structure the problem - solving or question - answering process so that these skills will be learned as students work through the process. Do not forget that thinking skills are very important.
- Identify parts of the problem and questions that are likely to cause the most difficulty for the students. Decide why this might be the case. Help the less able students through those parts.
- Try to identify a number of strategies that will help students learn as they attempt to solve this problem / question.
- Use this information above to plan your lesson or series of lessons. (Often, problems / questions that will help students to gain real insights into the subject matter have to be investigated over an extended period of time.) Make sure that your plans give the students the freedom they need to think, explore ideas and experiment. If you are using inquiry for the first time, do not be too ambitious, try it with one class and refine your approach until you feel comfortable that it is working successfully, then try it with other classes.



The inquiry approach encourages student participation.

5.3 DID YOU KNOW?

The teacher's main roles in inquiry learning are to:

- Frame the inquiry situation so that students understand what they have to do;
- Guide students to resources that will help them to solve the problem;
- Facilitate group processes as the students work on the problem;
- Encourage student participation;
- Help to keep students on track;
- Challenge students' logic and beliefs;
- Provide constructive feedback to correct erroneous student reasoning; and
- Assume the role of fellow learner.

5.4 ADDITIONAL INFORMATION

Websites:

<http://www.ltag.education.tas.gov.au/Planning/models/default.htm#models>

<http://www.thirteen.org/edonline/concept2class/inquiry/index.html>

6

USING STORY TELLING AND INDIGENOUS KNOWLEDGE IN TEACHING ENVIRONMENTAL STUDIES

6.1 THE ISSUES

- Story telling may not be valued as a good teaching strategy, therefore teachers may not be confident to use the approach;
- Teachers may lack skills/ expertise in storytelling;
- A lot of indigenous knowledge lies with the elders in the community and needs to be explored by the teachers in relation to the theme or topic addressed.

6.2 TEACHER RESPONSIBILITY

Folktales about the relationship between the Earth and its human inhabitants have been at the heart of storytelling since earliest times. Not only do such stories offer a source of inspiration, they also contain a potential for understanding the many ways in which we value and devalue our planet. Stories provide us with practical insight into approaches to our most persistent environmental difficulties.

A good story is not only entertaining, but is capable of holding student attention while they learn important concepts, attitudes and skills. Storytelling can be used to explore important shared themes and vision. There are many reasons why stories may be important in our cultures and to each of us personally.

- Stories safeguard and codify information as well as beliefs, and rules for living, e.g. Maakanaa Kaloa Vaahaka.
- Stories remind us of other times and different places and lift us beyond our limiting pre-occupation with the 'here and now'. Thereby, they facilitate the emergence of a fresh perspective on our actual situation, e.g. Meliyage Dhiyage Karuna Thiki Vaahaka.

- Stories provide us with a known completion, a unity of form. Each story has a beginning, middle, and an end. A specific conflict and patterns of conflict resolution are usually embedded within this structure.
- Stories evoke powerful emotional responses. These emotions help us to clarify the way we feel and
- Stories evoke powerful emotional responses. These emotions help us to clarify the way we feel and can fuel the desire for change.
- Stories nearly always generate communication. Not only does listening to a story create a warm bond between us, once the story is finished we often automatically turn to each other to talk and to share our responses. Likewise, a good story invariably evokes the longing to retell it to others.
- Stories often reflect traditional and indigenous perspectives. Indigenous stories are extremely valuable because they have a different message to the stories commonly told on television and in movies and advertising.

6.3 DID YOU KNOW?

Stories are found everywhere:

- a. Stories that are narrated by the elders in the community.
- b. Stories that are published in the newspapers.
- c. Stories that are published and sold in the bookshops.
- d. Everyday events narrated from the news broadcasts.
- e. Stories that are broadcast on the radio every Saturday by the Voice of Maldives.

6.4 ADDITIONAL INFORMATION

Websites:

<http://en.wikipedia.org/wiki/Storytelling>

<http://www.storyarts.org/>

http://www.bluepeacemaldives.org/environment_news.htm



Story telling help to engage students and learn about their environment and culture around them.

7

USING FLIP CHARTS IN TEACHING ENVIRONMENTAL STUDIES

7.1 THE ISSUES

- Teachers of grades 1 - 5 will may have to share only one flipchart amongst them requiring careful organization across the grades;
- Teachers may be hesitant to use them as they are new resources. Teachers will need to plan in advance for duplication for classroom use e.g. using student, artists talent etc ; and
- Teachers may be reluctant to use them when they are not directly included in the scheme of work.

7.2 TEACHER RESPONSIBILITY

Flip Charts are designed to be used by teachers and facilitators during relevant school and/or Eco-club activities. There are 2 Flip Charts. The first flip chart consists of 4 sections: 1. Weather, 2. Water, 3. Waste, 4. Energy. The second Flip Chart consists of 2 sections: 1. Environment and 2. Biodiversity. Each section contains background information which should be shared with the students. The sections also have activities relevant to the respective topic. There are suggested times allocated to conduct each activity to help you plan the class.

On the front of each page is a large A2 size illustration so the students can find a context for the discussion. The front section may also contain diagrams related to the activities children are required to do.





Flip Charts help to engage and involve students in learning.

The back of the pages contain background information for teachers, which provides you with information to support the lesson. You may want to use some of the facts in your discussion. To make teaching easier each page refers to discussion points that should be read out and discussed with students.

Before you start:

- Before the class, the teacher should read and familiarize themselves with the relevant Flip Chart sections.
- Ensure you have all the materials you need to conduct the lesson.
- Organize the students around the Flip Chart, ideally seated in a semi circle. Ensure they all can see the Flip Chart clearly.

During the class:

- Allow the student's time to look at the picture or

illustration and then share some of the relevant theory with the group.

- Make the activity as enjoyable and practical as possible – people remember more when they feel happy.
- Try to get everyone to participate.

7.3 DID YOU KNOW?

- Students are motivated and understand better when they see visual aids.
- All the students can participate in the learning activities.
- It is easier for the teacher because the visual aid initiates discussions among the students.
- The information for the teacher is at the back of the Flip Charts.
- The teacher can select any activity to be conducted from the activities at the back of the Flip Chart.

8

USING THE 'SCHOOLS FOR A HEALTHY ENVIRONMENT' MODULES AND HOW TO LINK THEM WITH EVERYDAY TEACHING IN THE CLASSROOM

8.1 THE ISSUES

- The unavailability of the modules for each grade will lessen the usage of them in everyday teaching. Teachers of grades 1 - 5 will have to share only one copy amongst them, requiring coordination across the grades;
- Teachers may be hesitant to use them as they are new resources;
- Teachers may be reluctant to use them as they are not similar to how classroom teaching in Environmental Studies was done previously; and
- Teachers need to familiarize themselves with the whole module in planning schemes of work.



8.2 TEACHER RESPONSIBILITY

The Modules are designed to be used by teachers and facilitators during relevant school and/or Environment club activities. Each module provides the curriculum linkages which help the teachers in choosing the activities when planning during the weekly meetings and in carrying out the lessons with the students.

Each of the Module activities follows the similar format of a **seven step Inquiry Model**. The Inquiry Model is chosen to be followed in the activities because this method focuses on student centered learning. When applying the inquiry steps the teacher will act as a facilitator and the students will:

- Gain a deep understanding of the subject matter;
- Develop thinking and reasoning skills;
- Develop problem-solving skills;
- Have their intellect challenged;
- Take greater responsibility for their own learning;
- Understand the relationship between what they are studying and the real world; and
- Have varied and interesting learning experiences.

The seven steps used in the Inquiry Model are as follows:

1. Tuning in
2. Deciding directions
3. Finding out
4. Sorting out
5. Drawing conclusions.
6. Considering, planning and taking action.
7. Evaluation and reflection.

8.3 DID YOU KNOW?

The modules are also linked to the formal Environmental Studies curriculum

(Appendix F).



Teacher preparing for the lesson with one of the Modules.

9

USING THE FIELD GUIDES IN TEACHING

9.1 THE ISSUES

- The unavailability of the field guides for each grade will lessen the usage of them in everyday teaching ;
- Teachers may be hesitant to use them, as they are new resources ; and
- Teachers may be reluctant to use them as they are not directly included in the curriculum

9.2 TEACHER RESPONSIBILITY

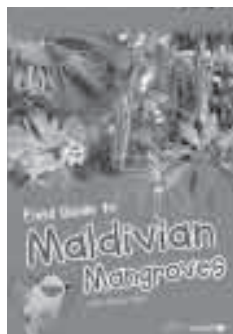
The steps to follow in order to develop your own school field guides for your island:

Step 1: Choose a good topic – some topics are easier to work on, while others may be a bit difficult (e.g. it will be more difficult to develop a field guide on animals than on plants as it will be difficult to locate animals from the surrounding environment as they move from one place to another, unlike plants which do not move from place to place).

Step 2: Research the topic well by finding information available locally (by talking to local experts), search for information on the internet, search for good quality pictures etc. Please note that preparing a field guide takes time, depending on the topic chosen.

Step 3: Once the information and pictures are gathered, compile everything in an orderly manner. Make sure that the field guide is colourful and fun for kids. The size of the font should be readable. Please note that illustration could also be used in the field guides, instead of photographs.

Step 4: After compiling the information and the pictures or illustrations, get it reviewed by people who know about the topic. You also need to cross check the information with experts as well.



9.3 DID YOU KNOW?

Three field guides have been developed for teachers as a result of a study undertaken in the schools with teachers and communities (Live & Learn, 2005).

1. Field guide to Maldivian Plants.
2. Field guide to Maldives Mangroves.
3. Field guide to Maldivian birds and beach ecosystems.

The field guides cover the most common species of plants, creatures in the swamps and mangroves, common birds and living things found on the beaches. The 3 field guides highlight the scientific names and the common names of the species.

The field guides can be used by teachers in classroom teaching and when taking students out on field visits as a tool to identify the species. The field guides have been designed as an A4 booklet, with photos and large font so they can be used easily by teachers and students alike.

Each field guide has a cartoon character to help the students learn. A Maldivian animal was selected so that the students would enjoy learning. Also students learn that the ecosystems are alive with many different plants and animals.

- In the Field Guide to Maldivian Plants, Bakuru and Basheera Bondu provide helpful hints on each page, so that students can learn to identify the most common plants of the Maldives.
- In the Field Guide to Maldivian Mangroves, Minna Mas provides helpful hints and information on each page.
- In the Field Guide to Birds and Beach Ecosystems, Baaree Baraveli provides helpful hints and information on each page.



9.4 ADDITIONAL INFORMATION

Books: Neville Coleman (2000) *Marine Life of the Maldives*, Tien Wah Press Pte Ltd.

Krys Kazmierczak (2000) *A field guide to the Birds of India, Sri Lanka, Pakistan, Nepal,*

Bhutan, Bangladesh and Maldives, Gopsons Papers Ltd.

Dr. R.C. Anderson, *Living Reefs of the Maldives*, Novelty Publishers.

National Centre for Linguistic & Historical Research (2002) *Maamelaameli*.

National Centre for Linguistic & Historical Research (2002) *Gasgahaagehi*.

National Centre for Linguistic & Historical Research, 2001, *Dhivehi raajjeygai hedhey baeh meyvaa*.

Dr. R. Charles Anderson, *Reef fishes of the Maldives* (2005) Manta Marine Pvt. Ltd.

Environment Research Centre (2003) *Faa Foyi*.

Posters: Environment Research Centre - *Birds of Maldives* Poster

Marine Research Centre - *Fish of Maldives*



10

USING A TOOLBOX IN TEACHING ENVIRONMENTAL STUDIES

10.1 THE ISSUES

- The unavailability of the toolbox for each grade will lessen the usage of them in everyday teaching. Teachers of grades 1 - 5 will have to share only one set amongst them, requiring coordination among grades and classes ;
- Teachers may be hesitant to use them as they are new resources ;
- Teachers may be reluctant to use them as they are not directly included in the curriculum; and
- Schools will need to budget for and duplicate toolkits depending on school environment in primary grades.

10.2 TEACHER RESPONSIBILITY

The steps to follow in order to create toolkits for topic based learning:

Step 1: Identify the topic and grade for which you want to compile the toolkit.

Step 2: Go through the topic thoroughly and list down the materials needed to teach the topic.

Step 3: Contact the ministries, NGOs, other parties etc and also do some internet search to find the availability of complementary resources for the topic/ theme.

Step 4: Take time to collect the materials and create your own toolkits for topic based learning.

The table below provides a sample for planning to develop a toolkit.

Theme/Topic	Grade	Materials required	Where to locate the materials from
Living things : Fish	2	Book: Fishes of the Maldives	Marine Research Center, Ministry of Fisheries, Agriculture and Marine Resources, Male' Republic of Maldives
Living things: Birds	4	Posters 1 and 2: Protected Birds of Maldives	Environment Research Center, Ministry of Environment, Energy and Water, Male' Republic of Maldives

Operation and maintenance of Toolboxes:

- Toolbox Log – each time someone takes any equipment from the toolbox they should sign for which pieces they are using and sign again when they return them. An equipment log will be kept in each toolbox.
- Paper materials – it is important that books, posters, Flip Charts and pictures be kept in a dry place that is well aerated and free from insects. If these materials do get wet it is important to dry them immediately and not to put wet items back with the dry items.
- Outdoor equipment – if any equipment is used outdoors it is very important to ensure that it is clean and dry before it is put away. It is important to store this equipment in a dry, well aerated area that is free from insect or animal damage.
- Wet equipment – some equipment such as masks, snorkels, booties, etc are made for using in the ocean, but if you don't rinse them in fresh water after each use they will quickly become damaged. It is important to store this equipment in a dry, well aerated area that is free from insect or animal damage.
- Specialist equipment – some items don't just need care in storage they need skill in setting them up for correct use. Binoculars for example need to be calibrated for use – different people may need it adjusted for their eyesight.
- Damage – if items are damaged beyond use it may be possible to get replacement items from your local Teacher Resource Centre. They only have limited replacement items so keep your toolboxes in good order.



10.3 CONTENTS OF THE TOOLBOXES

The toolboxes provide the physical material needed to conduct the activities and the materials needed would be listed in the toolbox requirement on the content page of the modules. There are 2 separate boxes one for indoor equipment and the second one for outdoor equipment. There are 2 baskets for wet equipment. The 2 flip charts are included in the toolboxes.

There are 2 baskets of wet equipment which provides each school with booties, goggles and masks for the students to go out to the sea and observe the health of the coral reefs. A coral watch guide is provided to help the teachers on how to observe and keep a record of the health of the corals. This information can be shared within and outside the school and with the concerned authorities. There are 15 pairs of the equipment so that the teacher can take a class out on observation of the coral reefs (Appendix G).

11

ASSESSMENT

11.1 THE ISSUES

- Teachers' lack of knowledge and experience in applying different kinds of assessment.

11.2 TEACHER RESPONSIBILITY

There have been many changes in how we think about assessment over recent years. Many of these changes are relevant to education for a sustainable future. Perhaps the most noticeable change is the focus on relating learning with the measurement and reporting of what students have achieved. This relationship helps make assessment an integral part of students' day-to-day learning rather than a series of end-of-term tests. This goal is especially important in education for a sustainable future because of the wide range of objectives concerned with knowledge, skills, values/attitudes, and action.

The approaches outlined in this Teaching and Learning guideline require teachers to use a range of assessment techniques rather than just 'paper and pencil tests'.

Defining assessment

- Assessment refers to the process of monitoring student learning achievements for the purposes of diagnosing learning strengths and difficulties, reporting to parents, and providing a certificate of achievement for employers and other educational institutions.
- Evaluation is the broader process of monitoring all aspects of the learning process (including the relevance of objectives, appropriateness of content, resources and teaching methods, the quality of the learning environment, etc.) for the purpose of making judgements about how to improve the learning process.

Assessment and Student Learning

Comparing the two approaches to assessment it is possible to identify one that is most appropriate to education for a sustainable future.

View 1

We teachers say that we test children to find out what they have learned, so that we can better know how to help them learn more. This is about 95% untrue. There are two main reasons why we test children: the first is to threaten them into doing what we want done, and the second is to give us a basis for handing out rewards and penalties on which the educational system - like all coercive systems - must operate.

View 2

Assessment should play a critical part in any educational process. Wherever learning takes place, or is intended that it should take place, then it is reasonable for the learner, the teacher and other interested parties to be curious about what has happened both in terms of the learning process and in terms of any anticipated or un-anticipated outcomes. We would argue that good education, by definition, encompasses good assessment. However, we would wish to disassociate ourselves immediately from much of what has gone under the guise of 'good' educational assessment. Assessment has been viewed for far too long as a formal process, which normally involves the administration of formal tests and examinations through procedures that are totally divorced from the educational process and setting to which they are supposed to relate.



Assessment can provide feedback to learners to improve understanding and skills.

Assessment can contribute to student learning, among the reasons are:

- To find out what students know about, what they understand and what they can do;
- To find out what students do not know, do not understand and cannot do;
- To provide a basis for feedback to learners to help them in their understanding and skill development;
- To motivate learners to learn about particular values and concepts, or to develop particular skills;
- To evaluate the suitability of curriculum materials; and
- To see whether learning objectives are being met.

Two types of assessment:

1. Formative assessment

Formative assessment refers to the ongoing forms of assessment that are closely linked to the learning process. It is characteristically informal and is intended to help students identify strengths and weaknesses in order to learn from the assessment experience.

2. Summative assessment

This form of assessment usually occurs towards the end of a period of learning in order to describe the standard reached by the learner. Often this takes place in order for appropriate decisions about future learning or job suitability to be made. Judgments derived from summative assessment are usually for the benefit of people other than the learner.

Methods of assessment

There are many different methods of assessment, including:

- Multiple choice tests
- Map or diagram interpretation
- Vocabulary tests
- Debate performance
- True-false tests
- Lecturette
- Labels-on-a-diagram tests
- Structured essay
- Comprehension tests
- Unguided essay
- Short answer tests (paragraph answers)
- Field trip report
- Decision making exercises
- Library research essay

After discussing examples of these methods of assessment, the choice of different assessment methods should be related to different educational objectives:

- **Knowledge:** What a person knows.
- **Skills:** The ability to do something, especially manual or physical.
- **Thinking Processes:** Advanced ways of thinking, such as applying, analysing, synthesising and evaluating.
- **Values:** Standards and principles that can be used to judge the worth of an idea or action.
- **Actions:** What people do as a result of the other kinds of learning

Innovative assessment methods:

- Decision-making exercises.
- Self-assessment.

Traditional assessment methods are not usually useful for assessing thinking skills and the process of analysing attitudes and values. Decision-making exercises are an excellent way of doing this. Decision-making exercises are structured problem solving exercises that are presented to students as a series of tasks:

- Identifying the problem
- Finding solutions
- Understanding the problem
- Summing-up

Self-assessment is an important skill for students – and is a very good indicator of high quality learning. One example is provided below.

'I Can-Do' Self-Assessment Report

After completing this project:

I can analyse data/statistics to see the increase in the number of vehicles in the country.

Yes / No

I can understand how the increasing of number of vehicles is causing problems; air, pollution, sound pollution, accidents etc.

Yes / No

I can understand different peoples' view points about decreasing the number of vehicles.

Yes / No

I am walking to places whenever possible, instead of travelling by a vehicle.

Yes / No

Signed: _____ Date ___/___/___

An example of a checklist

This checklist can be used during or after completing a unit (e.g. Coral Reefs), the teacher or the student can use a sample checklist such as this to find out what the students can and cannot do.

	Yes	No
Can identify features of a coral reef	<input type="checkbox"/>	<input type="checkbox"/>
Can name animals living in coral reefs	<input type="checkbox"/>	<input type="checkbox"/>
Can identify plants formed in coral reefs	<input type="checkbox"/>	<input type="checkbox"/>
Can explain how humans use coral reefs	<input type="checkbox"/>	<input type="checkbox"/>
Can explain what causes harm to coral reefs	<input type="checkbox"/>	<input type="checkbox"/>
Can provide ideas on what can be done to save coral reefs from being endangered	<input type="checkbox"/>	<input type="checkbox"/>

An example of an assessment of, an investigative project.

Conduct an investigation of the beach on your island and find out about the following:

- Beach material (sand, stones, rocks etc)
- Animals (crabs, birds etc)
- Plants and trees (sea weeds, sea grass and plants and trees near the beach etc)
- Debris / litter (waste on the beach)

Also explore how the beach can be affected by humans and how it can be protected. Develop a scrapbook to document your work.



Scrap book evaluation form

This form is designed to assess student created scrap books. Read the statements below. Then indicate the number from the following scale that reflects your assessment of the students; or group's work.

1= Weak 2= Moderately weak 3= Average 4= Moderately strong 5= Strong

1. The scrap book includes a table of contents and an introduction.

1 2 3 4 5

2. The items in the scrap book are categorized, relevant and each item has an accompanying caption.

1 2 3 4 5

3. Captions in the scrapbook are clear and descriptive.

1 2 3 4 5

4. All items in the scrap book are relevant to the project/topic under investigation.

1 2 3 4 5

5. The scrap book provides full coverage of the investigative project/topic

1 2 3 4 5

6. The scrap book indicates an understanding of the project.

1 2 3 4 5

7. The contents of the scrap book appear to be well researched.

1 2 3 4 5

8. The scrap book is neatly executed and inviting.

1 2 3 4 5

9. The scrap book includes material on how the beach can be affected by humans and how it can be protected.

1 2 3 4 5

10. The scrapbook meets the requirements of the assignment.

1 2 3 4 5



دبیرستانهای دولتی و غیردولتی
دولت، غیردولتی

**مستوفیانی که در دبیرستانهای دولتی و غیردولتی
در رشته‌های مختلف تحصیلی، در رشته‌های
رشته‌های مختلف تحصیلی شرکت کرده‌اند**

- 1- مستوفیانی که در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند و در رشته‌های مختلف تحصیلی در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند.
- 2- مستوفیانی که در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند و در رشته‌های مختلف تحصیلی در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند.
- 3- مستوفیانی که در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند و در رشته‌های مختلف تحصیلی در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند.
- 4- مستوفیانی که در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند و در رشته‌های مختلف تحصیلی در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند.
- 5- مستوفیانی که در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند و در رشته‌های مختلف تحصیلی در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند.
- 6- مستوفیانی که در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند و در رشته‌های مختلف تحصیلی در دبیرستانهای دولتی و غیردولتی در رشته‌های مختلف تحصیلی شرکت کرده‌اند.

APPENDIX B

A Policy used by one of the Primary Schools in Male'

According to the current Departmental Excursion Policy, all excursions should be planned in advance in the scheme of work.

Things stated in the scheme are:

- Clear learning outcomes of the field trip.
- Activities carried out during the trip should be well planned. Also include questionnaire or worksheets they would be filling out or referring to during the trip.
- Follow up activities of the trip.
- Number of periods required.
- Field trip venue.
- Materials needed.

Preparation for the field trip includes:

- Following activities should be finalized at least two weeks prior to the field trip.
- Supervisors in charge of the grade should inform the respective assistant Principal.
- Get parents consent.
- Determine the number of students, teachers/adults involved.
- Contact budget, calculate the cost and arrange transport.
- Inform parents regarding necessary materials students need to take with them, e.g. hats, water etc.

Supervision of the field trip includes:

- For long distance trips there should be at least 1 teacher/ adult for every 5 students.
- For trips to the vicinity of the school 2 teachers per class is acceptable.
- Grade supervisor should appoint a teacher to be in charge of the trip, who will carry a walkie-talkie or mobile phone with him or her. Likewise the supervisor should carry a walkie-talkie or mobile phone and be in contact with the group till they return from the trip.

Transportation of the field trip includes:

- Students could be allowed to walk to the field trip made in the vicinity of the school.
- For long distance trips, students should be either taken by van or organized for parents to take and fetch students from the field trip.
- If the students are going on trips by van there must be two teachers in each vehicle. It should also be assured that the vehicle stops near the pavement and students are not allowed to get off if the vehicle stops in the middle of the road. Teachers must also ensure that the students use the pavement or side of the road when getting off the vehicle.
- If parents are taking students, teachers must be at the field trip venue 5 minutes before the students arrive and even if the grade supervisor doesn't join the whole trip he/she should also be there 5 minute before the students arrive.

Parent briefing sheet for Teachers

Preparation for the field trip to the mangroves

- Brief the parents about the objectives of the field trip.
- What needs to be achieved from the field visit?
- After briefing go through the following list with the parents who are participating in the field visit.

Guidelines for parents participating in the field visit.

Assist the teacher in charge and ensure that all necessary preparation and arrangements are made before the field trip.

It is important that the SAFETY of the students is ensured at all times.

Below are some suggestions to ensure your trip is safe, successful and enjoyable.

Setting a date

- Check if you need to ask permission from the Island Office to access the mangrove area and assist the teacher in charge to get the necessary permissions.
- Check the Tide Chart – it is important that you get there during or just before low tide. Choose a day when the low tide is around 9.00 am.
- Assist the teacher in getting more helpers such as voluntary parents or school committee members, to accompany and supervise the groups during field activities.
- Assist the teacher in inviting a local expert on the flora and fauna of the island's mangroves, to assist with identification, such as fisherman, field officers for the Ministry of Environment, Water and Energy.

Introduction to the mangroves

- Identify a person from the community to speak to the class about the importance of mangroves.
- Have students predict what they will see, hear and touch at the mangroves.
- Emphasise the importance of disturbing as little of the area as possible.
- Assist the teacher to check the Island office whether they have aerial photos of the island. If you can get photos at different times you can compare the changes over time.

Parent's responsibilities

- Assist the teacher to seek permission if required to access the area for the field trip.
- Assist the teacher to book transport if required.
- Assist the teacher to organise equipment and any other resources such as paper and pencils for the clipboards, and copies of activity sheets that may be prepared by the teacher.
- Assist the teacher to prepare a first aid kit to be taken on the trip. Ensure it has band-aids, antiseptic cream, spray for stings and bites, mosquito repellent.
- Ensure that students bring proper clothing and shoes.
- Assist the teacher to prepare a list of materials that students will need on the trip.
- Send this list to other parents together with a letter requesting permission for their children to join the field trip.
- Check the weather forecast prior to departure in case new arrangements need to be made.
- Assist the teacher to check whether students have enough water to drink.
- Clean the area of litter at the end of the field trip. Ensure no personal belongings are left behind.
- Ensure all students reach home safely.
- Check with local experts which parts of the mangrove might have mud that students might sink too deeply into. Remember to make students aware of that area and to stay away from it.

APPENDIX C

Example of a task that parents can help the students with, during the field visit:

Waste in the mangrove

Observe and record waste in the mangroves.

Item	Type of waste	Location
Old shoes	Human made. Waste from nearby communities.	Near boardwalk.
Fishing net	Human made. Waste from nearby communities.	Near beach.
Rope	Human made. Waste from nearby communities or from the sea.	Near beach.
Nappies	Human made. Waste from nearby communities.	Near boardwalk.
Plastic bags	Human made. Waste from nearby communities or from the sea.	Near boardwalk.

Sample Student recording Sheet

Students can monitor how much water is used at home in relation to the water bills their family has to pay on a monthly basis and suggest ways they can help lower the water bills.

Activity (use in litres)	Number of times a day	Total water used in litres	Water quality	How can water consumption be reduced? Can the used water be reused? How?
Cooking main meal (10 l)				
Other meals				
Drinking (0.25 l per glass)				
Washing dishes in a sink (9 l)				
Washing clothes (how many?) by hand (60 l)				
Washing with washing, machine each cycle (155 l)				
8 minute shower (120 l)				
Cleaning teeth with tap running (5 l)				
Cleaning teeth if tap is turned off (1 l)				
Flushing of toilet (11 l)				
Gardening				
Other, for example play or: _____				
TOTALS				

APPENDIX E

A sample Teacher Planning Sheet

(Name of the topic) _____

Grades: _____

Number of lessons: _____

Procedure

1. Tuning In

Purpose: _____

Time: _____

Material Required: _____

Procedure: _____

5. Drawing Conclusions

Purpose: _____

Time: _____

Material Required: _____

Procedure: _____

2. Deciding Directions

Purpose: _____

Time: _____

Material Required: _____

Procedure: _____

6. Considering, Planning and Taking Action

Purpose: _____

Time: _____

Material Required: _____

Procedure: _____

3. Finding Out

Purpose: _____

Time: _____

Material Required: _____

Procedure: _____

7. Evaluation and Reflection

Purpose: _____

Time: _____

Material Required: _____

Procedure: _____

4. Sorting Out

Purpose: _____

Time: _____

Material Required: _____

Procedure: _____

Environmental Studies Curriculum Links

	MODULE	SECTIONS	Grades 1 - 3	Grade 4 - 5	Number of lessons
1	OURSELVES	Island Environment		x	3 - 4 lessons
		Living by Traditional Knowledge		x	3 - 4 lessons
		Environmental Impact Assessment		x	4 - 6 lessons
		Common Diseases and Prevention	x		4 - 6 lessons
2	EARTH	Weather	x		4 - 6 lessons
		Safeguarding Drinking Water		x	4 - 6 lessons
		Water Quality Monitoring		x	4 - 6 lessons
3	LIFE AROUND US	Mangroves		x	4 - 6 lessons
		Coral Reefs		x	4 - 6 lessons
		Beaches		x	4 - 6 lessons
		School Gardens	x		3 - 4 lessons
4	RESOURCES FROM THE ENVIRONMENT	Energy used at Home and School	x		4 - 6 lessons
		Conservation, Management and Reuse of Water	x		4 - 6 lessons
		Managing Waste	x		4 - 6 lessons
		Reduce, Reuse, Recycle	x		4 - 6 lessons
		Composting Waste		x	3 - 4 lessons
5	INTERDEPENDENCE	Food Web		x	3 - 4 lessons
		Exploring My Atoll	x		3 - 4 lessons
		Ecological Footprints		x	4 - 6 lessons
6	SCIENCE AND TECHNOLOGY	Wind Energy	x		4 - 6 lessons
		Solar Energy		x	4 - 6 lessons

APPENDIX G – TOOLBOX CONTENTS

DRY KIT		
	Item	Details
1	Plastic vials/jars screw top	100-300ml.
2	Hand lenses	Magnification x 3, lens diameter 90mm, plastic handle.
3	Long handled tongs	Jaws corrugated inside, length 150x200mm, stainless steel.
4	Insect catching nets	Hand net for insects, overall length 1.48m, diameter 250mm.
5	Plankton nets	Plankton net, nylon monofilament netting, with tough nylon collar, diameter 300mm, overall length 900mm, brass frame with 7m tow line and a PVC filter, aperture size 0.1mm and 0.3mm.
6	Thermometers	Mercury in glass, permanent amber markings, with anti-roll clip, range -10 to 110o Celsius, 6mm diameter with reinforced bulb, in plastic case.
7	Globe of earth	Rubber ball - globe of the earth, fully numbered meridian ring, diameter of globe 30 cm.
8	Twine	Brightly coloured nylon twine (20m).
9	Measuring tape	Sturdy, length 50m.
10	Measuring tape	Length 1 meter.
11	Student microscope	Monocular head rotates 360 degrees and has a 10x eyepiece. DIN 4x, 10x and 40x glass achromatic optics on the triple nosepiece.
12	Binoculars	Magnification 7x50, waterproof.
13	Litmus paper	Red and blue.
14	pH strips	Full Range pH from 1 to 14, colour reference chart with clearly printed pH values and instruction leaflet.
15	Low cost water monitoring kit	Provides simple and non-hazardous method of testing 8 basic water quality parameters: coliform bacteria, dissolved oxygen, BOD, Nitrate, pH, Phosphate, Temperature and Turbidity.
16	Water quality - H ₂ S	Bottle with hydrogen sulphide strip (H ₂ S water test kit).
17	Compass	90 mm in diameter and 22 mm high, and graduated in easy-to-read increments, waterproof.
18	Measuring staff	Metre pole sections in red and white.
19	Jars with screw top lids	500ml with wide lid.
20	Measuring containers	Clear plastic, capacity 1000ml, show divisions every 10ml.
21	Torch	Solar, kinetic, magnetic LED, waterproof.
22	Gloves	Cloth gloves (10 small and 10 medium).
23	Safety spectacles	Clear frames, should be able to wear over prescription spectacles.
24	Sediment sorting trays (3 sizes)	Diameter or length up to 30, Plastic sieve, aperture size 0.1mm, 0.3mm and 0.5mm.
25	Stopwatch	0.1sec, 30sec, 15min dials, diameter 45mm, housed in a plastic case, water proof.
26	Garden fork	Children's garden fork with plastic handle.
27	Garden spade	Children's garden spade with plastic handle.
28	Solar cell educational kit	Comprises of Solar cell module, solar energy introductory booklet; Small DC motor, screws and nuts, wire with motor clips; colour spinner discs; paper aero plane and bird models; plastic turnables with 4 sizes, 5/82, 1.52, and 22; plastic fan spinner.
29	Weather kit	Australian Geographic Weather Watch kit, comprises of rain gauge, thermometer, wind speed indicator flap and measuring cylinder. (www.australiangeographic.com.au)
30	Coral watch kit	Coral watch reef education package, The University of Queensland, Brisbane, Australia.
31	Cubic metre set and corner inserts.	A set of three alternately coloured dm triangle metre sticks, nine blank triangle metre sticks and eight corner blocks for the construction of an accurate internal dimension cubic metre.
32	Spring balance	Spring scale, calibrated in grams (to weigh up to 50kg).

Identifications Guides:		
1	Plastic cards	Plastic card set containing pictures and names of fish and other invertebrates.
2	Field Guide	Field guide to Maldivian Birds & Beach Ecosystems (2008).
3	Field Guide	Field guide to Maldivian Plants (2008).
4	Field Guide	Field guide to Maldivian Mangroves (2008).
Flip Charts:		
1	Weather, Water, Waste and Energy	Weather, Water, Waste and Energy Flip Chart (2008).
2	Environment and Biodiversity	Environment and Biodiversity Flip Chart (2008).
Reference Books:		
	Subject	Author, year of publication, title, publisher and ISBN
1	Biodiversity	Krys Kazmierczak (2000) <i>A field guide to the Birds of India, Sri Lanka, Pakistan, Nepal, Bhutan, Bangladesh and Maldives</i> , Gopsons Papers Ltd, ISBN 81-87107-04-9
2	Biodiversity	Dr. R.C. Anderson, <i>Living Reefs of the Maldives</i> , Novelty Publishers, ISBN 99915-801-1-5
3	Biodiversity	Dr. R. Charles Anderson, (2005), <i>Reef fishes of the Maldives</i> Manta Marine Pvt. Ltd, ISBN 99915-5401-7
4	Biodiversity	National Centre for Linguistic and Historical Research, (2002), <i>Gasgahaagehi</i> , ISBN 99915-1-016-8
5	Biodiversity	National Centre for Linguistic and Historical Research, (2001), <i>Dhivehi raajjeygai hedhey baeh meyvaa</i> , ISBN 99915-1-009-5
6	Biodiversity	National Centre for Linguistic and Historical Research,(2002), <i>Maamelaameli</i> , ISBN 99915-1-025-7
7	Traditional Knowledge	National Centre for Linguistic and Historical Research, (2004), <i>Dhivehi Raajjeyga Huri Aasaaree Thanthan</i> , 99915-1-063-X
8	Traditional Knowledge	National Centre for Linguistic and Historical Research, (2002), <i>National Museum</i> , ISBN 99915-1-016-8
9	Traditional Knowledge	Naseema Mohamed and P.Ragupathy (2005) <i>Inscriptions of Maldives No 1</i> , National Centre for Linguistic and Historical Research, ISBN 99915-1-069-9
10	Traditional Knowledge	Naseema Mohamed, (2006), <i>Essays on early Maldives</i> , National Centre for Linguistic and Historical Research, ISBN 99915-1-083-4
11	Traditional Knowledge	Dr.Philos Egil Mikkelsen, (2000), <i>Archeological excavations of a Monastery at Kaashidhoo</i> , National Centre for Linguistic and Historical Research, ISBN 99915-1-013-3
12	Traditional Knowledge	National Linguistic and Historical Research, (2006), <i>Vihivana garunuge thereyga Dhivehi Raajje 1</i> , Novelty press, ISBN 99915-1-061-3
13	Traditional Knowledge	National Centre for Linguistic and Historical Research, (2006), <i>Vihivana garunuge thereyga Dhivehi Raajje 2</i> , Novelty press, ISBN 99915-1-084-2
14	Traditional Knowledge	National Centre for Linguistic and Historical Research,(2006), <i>Vihivana garunuge thereyga Dhivehi Raajje 3</i> , Novelty press, ISBN 99915-1-085-0
15	Traditional Knowledge	National Centre for Linguistic and Historical Research , (2006), <i>Vihivana garunuge thereyga Dhivehi Raajje 4</i> , Novelty press, ISBN 99915-1-069-6
CD:		
1	Hygiene and sanitation	UNICEF hygiene and sanitation TV advertisement clips
2	Biodiversity	Coral Watch Reef Education CD, in the Coral Reef Education Package (see above)
WET KIT		
1	Snorkel	Colourful, snorkelling - Ordinary
2	Masks	Colourful, snorkelling - Small 8 , Medium 12
3	Booties	Colourful, snorkelling - Small 5 , Medium 10, Large 5
4	Footwear / Gumboots	Rubber footwear, gumboots
5	Kick boards	Swimming boards for children (ages 6-13)

Environmental Studies in Maldivian Primary Schools

This series has been developed for teachers of Environmental Studies at Primary level. How to utilise these materials is addressed in this Best Practice Guideline.

