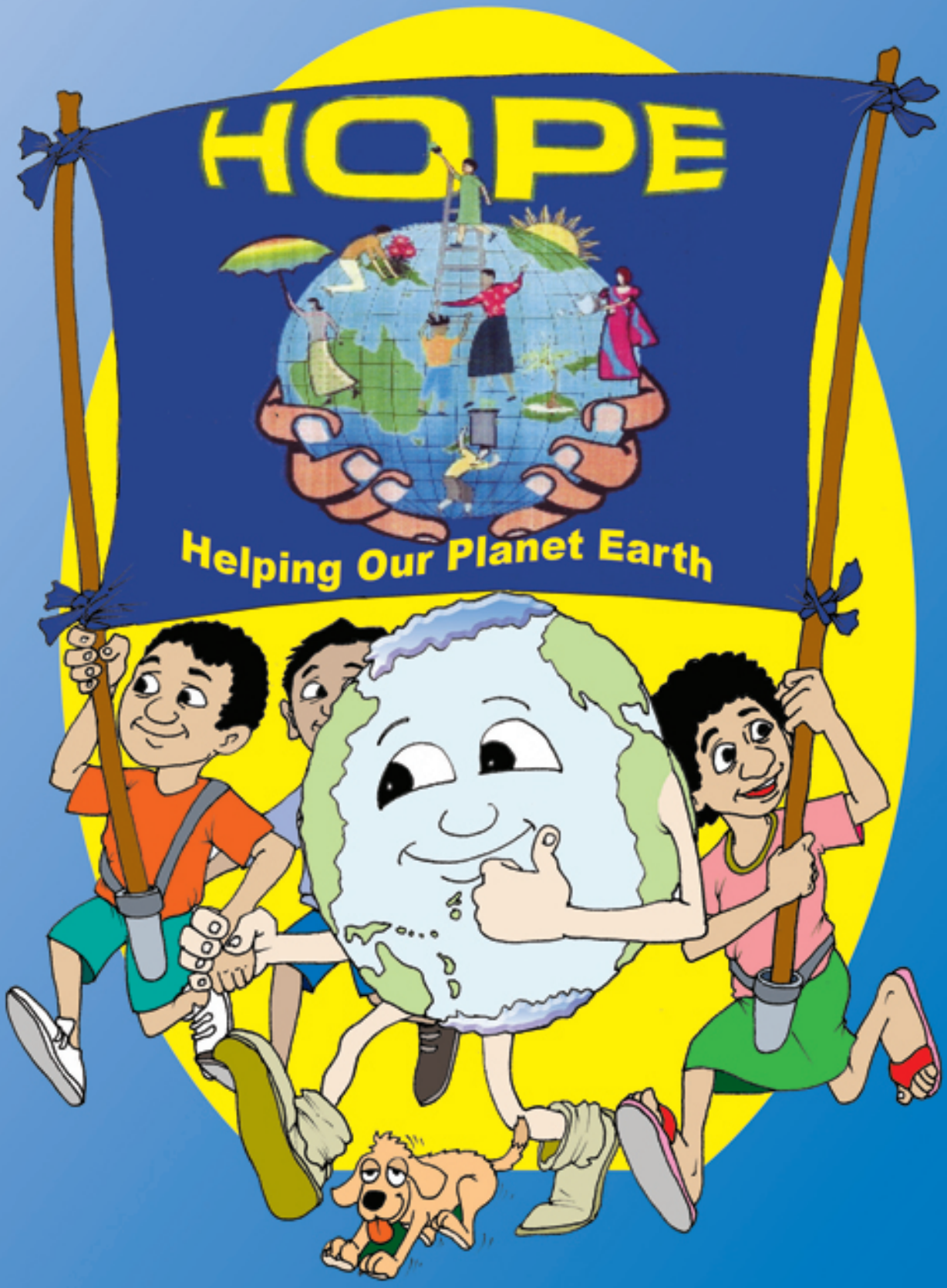

TEACHERS GUIDE

Australian Government

An Initiative of

LIVE & LEARN ENVIRONMENTAL EDUCATION

EDUCATION FOR A BETTER FUTURE

Acknowledgement

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- *Drama in Environmental Education- A Guide*; Wan Smol Bag Theatre Publication; J. Dorras & H. Corrigan; 2002.
- *Education for Sustainable Development Toolkit*; R. Mckeown; C.Hopkins; R.Rizzi & M. Chrystalbridge; Energy, Environment & Resources Centre; University of Tennessee; 2002.
- *Sharing Nature with Children II- A Sequel to the Classic Parents' & Teachers' Nature Awareness Guidebook*; J. Cornell; Dawn Publications; 1989
- *Skills for Democracy- Promoting Dialogue in Schools*; S.Preskill; L. Vermilya & G.Otero; Hawker Brownlow Education; 2000.
- *Teaching Green- The Middle Years- Hands-on Learning in Grades 6-8*; edited by T. Grant & G. Littlejohn; New Society Publishers; 2004
- *The Global Classroom- Activities to engage students in third millennium schools*; T. Townsend & G.Otero; Hawker Brownlow Education; 1999.
- *Youth Topics- The Ultimate Collection*; CAFOD; Christian Aid; SCIAF

- Thank you Project WET (Water Education for Teachers) International Foundation for permission to use the activities: The Incredible Journey (pp 161-165); A Drop In The Bucket (pp 238-241) ; Aqua Bodies (pp 63-65); Flush Bowl (Super Bowl Surge pp 353-359); and Sum of The Parts (pp 267-270); as published in the Project WET Curriculum and Activity Guide; copyright 1995 by the Project WET International Foundation. Used with permission.

Content

Welcome

Welcome to the first edition of the HOPE (Helping Our Planet Earth) Teachers Guide.

This guide has practical classroom activities for teachers to help promote student awareness on environmental and development issues!

The purpose of the HOPE Teachers Guide is to provide teachers with classroom resources to address ***education for sustainability*** *for the students of Fiji, that is linked to existing curriculum.*

It is hoped that through these activities, students will gain more skills to become active and equipped citizens in their communities.

These activities have been trialed with teachers and students in Suva, Nausori, Navua, Lautoka, Labasa, Savusavu, and Rakiraki.

The activities are designed to strengthen school existing curriculum themes; give students an opportunity to share ideas; views; and generate solutions for issues that concern them.

To share the experiences of HOPE schools and promote HOPE, a HOPE Teachers Guide and HOPE Video was developed.

Good luck teachers with the use of the HOPE Teachers Guide and thank you!

The Decade of Education for Sustainable Development

In December 2002 the United Nations General Assembly declared 2005 – 2014 the UN Decade of Education for Sustainable Development (DESD).

Education for Sustainable Development

"is a process for learning how to make decisions that consider the long-term future of the economy, ecology and equity of all communities. Building the capacity for futures-oriented thinking is a key task of education".

The basic vision of the DESD is a world where everyone has the opportunity to benefit from education and learn the values, behavior and lifestyles required for a more sustainable future.

Students are seen as future leaders and also an effective medium for bringing sustainable development into every nation. Therefore they need to expand their knowledge and civic skills like critical thinking, building dialogue, problem solving, decision making and active participation to be able to bring about the changes foreseen by the leaders of today.

Teachers play a vital role in trying to achieve sustainable development with their role as an educator both inside and outside the classroom. They are the ones that will broaden their student's knowledge about environmental and social issues. In the classroom, concerns addressed and skills taught, will help these young people to be sustainable resource users in the future.

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The HOPE Teachers Guide!

The activities in the HOPE manual take issues, values and knowledge to higher levels of understanding so students can link inter-relationships and complex issues relating to the environment and development. These issues are broad in focus and are based on social, environmental and economic themes.

The activities are designed to enable students to develop skills such as:

- communication;
- critical thinking;
- exchanging ideas;
- social development;
- creative capability;
- environmental citizenship;
- valuing nature; and
- dialogue and decision making.

Teachers can adapt these activities for use in different class levels and subject areas (Mathematics, English, Elementary Science etc).

Each activity is accompanied with '**deconstruction questions**'. These are questions that are asked during or at the end of activities to promote critical thinking and a deeper understanding of what is learnt.

Teachers are encouraged to add on to the deconstruction questions, and chop and change where necessary depending on the topic or concepts to be learnt.

Deconstruction is like peeling away the layers of an onion- you get to see what is below each layer. In the same way, you examine the issue or concept to be studied in many different ways. By doing this, students get to reason, think critically and understand different points of view.

The development of critical thinking skills helps to ask questions about the information we receive and analyse it rather than accept it all at face value.

Exchanging dialogue in the classroom can produce good student critical thinkers. Good critical thinkers have the skills of being able to weigh different sources of information, take into account all points of view and judge the value of new knowledge. In this way students develop a sharp and very open mind.

HOPE IN ACTION!

Example of 'whole school- HOPE efforts' 2003-2005

- School HOPE areas were decided by students and each Form or House was given a different area of the grounds to plan environmental activities for.
- Each student provided a plant cutting from their home garden and was responsible for looking after it in the school grounds.
- All schools made a green house for raising seedlings/propagating plants.
- Many started recycling projects, recycled wood for birdhouses, seating, green houses, recycled paper for art class, bottles for garden edging etc.
- Many schools constructed and started using composts.
- Some schools did environmental audits to reduce energy consumption.
- Reduce the amount of packaging sold at the school canteen, less plastics, less non-recyclables.
- Many schools got in touch with local plastic bottle recycling plants and started a collection scheme.
- Actions were decided by students and each form or house was given a different area of the grounds to plan environmental activities for.
- Many schools cleaned up and sorted wastes in incinerator areas.
- Some schools obtained community participation and in kind support in improving school aesthetics.
- Some non-gardening schools started growing vegetables to share with students and sell at community markets to raise money for future environmental works.
- Some schools designed different coloured bins in classrooms for different kinds of waste.
- Some students created a sensory garden with different feeling and smelling plants for younger students to explore.
- Several schools created a pleasant outdoor classroom learning area in the shade with recycled wood.
- Many schools labeled plants with their common name, and pointed out their uses (everyday, medicinal etc), in the grounds.
- Many students painted environmental messages on school walls and fences.
- Herbal medicine gardens with cuttings from community gardens and information from the community used in the garden for learning traditional cultural medicines.
- Many students kept HOPE diaries, wrote environmental poetry, designed posters, made models and did HOPE activities in class as well as outside.
- Teachers conducted participatory and exploratory sessions about the environment within the curriculum. They were able to explore development issues with their students to enable their students to learn some additional civic skills.

HOPE checklist of ideas!

Listed below are a few ideas of what the students and teachers can do in their various schools. Ideally the teacher will facilitate planning sessions with students and think about (perhaps vision) what they would like to do to Help Our Planet Earth. **It is important that all students participate in the suggesting, planning, designing and implementing**. Everything on the list below does not need to be done! The list is to stimulate thinking among teachers and students. Students' may come up with many different and more interesting ideas!

Schools should try to use recycled and reused items in HOPE actions – a budget is not required to take part in HOPE! For example, plant cuttings can be sought from home and community gardens, and things like leftover paint or old bits of wood and tyres may be found at the school, through donation or in other community places. Be innovative- you don't need a budget.

Energy Conservation

- In class, teach students about the different types of energy used in Fiji and brainstorm and research some advantages and disadvantages. From these projects, ask students to come up with ideas for saving energy or better strategies to use at school.
- In Math's class, compare energy usage and cost before and after starting HOPE energy saving initiatives.
- Put reminder notes under lights eg:"turn off lights when you leave the room."
- Nominate student light monitors.

Water Conservation

- During class carry out a water audit to identify problem areas and take action eg: fix-leaking taps.
- Install friendly positive action signs around schools near taps to remind students about water conservation e.g. 'save tomorrow's water today' or 'HOPE & Save Water' these could be designed and made in art and craft.
- Re-use run-off/hand washing water in the garden.
- Class activity - Carry out a water audit to identify the problems and brainstorm solutions.

Waste Disposal

- Set up paper recycling boxes and arrange for Waste recyclers to collect them.
- Re-use paper that is only written on one side – establish recycled paper boxes in classrooms and school offices.
- Clean up and sort wastes in incinerator areas, reduce burning of plastics and paper, the fumes cause bad health and air pollution. Grass and plant cuttings should <u>not</u> be burnt but go to compost.
- Use organic paper and paper that can't be re-used cut up very small in composts.
- Get in touch with local plastic bottle recycling plant Coca Cola and start a collection scheme using a big collection bag.
- Plastic bottles can also be reused by painting them and sticking them upside down to make a colorful garden boundary; they can also make a seedling container if you cut them in half and fill them with soil.
- Encourage a class to do a litter or rubbish audit after lunchtime. Get them to make a map of where most litter is left by students and consider putting bins in those places. This activity could be used in Mathematics to work out percentages or make graphs of litter.
- Design or color different bins for different kinds of waste.

Gardens & Grounds

- Give each form or house group a different area of the grounds to look after. Students might like to make an environmental map of the school grounds and get other students to help design plans for the future. Planning is a very important skill for students.
- Each student can provide a plant cutting from their home garden and be responsible for looking after it in the school grounds. Plant cuttings can be grown in recycled milk containers cut in half.
- Build a green house out of recycled wood for raising seedlings/propagating plants.
- Start growing vegetables to share with students and sell to the community to fund further HOPE activities.
- Plant flowers and vegetable in the same garden so it looks good and you gain produce to eat.
- Make the grounds somewhere where students feel happy and relaxed.
- Students to use recycled wood to make as benches under shade for students.
- Encourage community participation in making the school a better place to live in.
- Encourage native animals and birds to the grounds with nesting boxes made by students and hidden in trees
- Label plants in the grounds with their common name, and point out their uses (everyday, medicinal etc).
- Bring in cuttings of herbal or medicinal plants garden and encourage students to find out about their properties from their parents and grandparents. Have students share what they have learnt about traditional medicines.
- Design a weather station with information about weather terms.
- Design a welcome sign to the school.
- Encourage propagation of trees to plant later in the school grounds.
- Students may like to paint bright happy environmental murals with messages on boring brick walls.

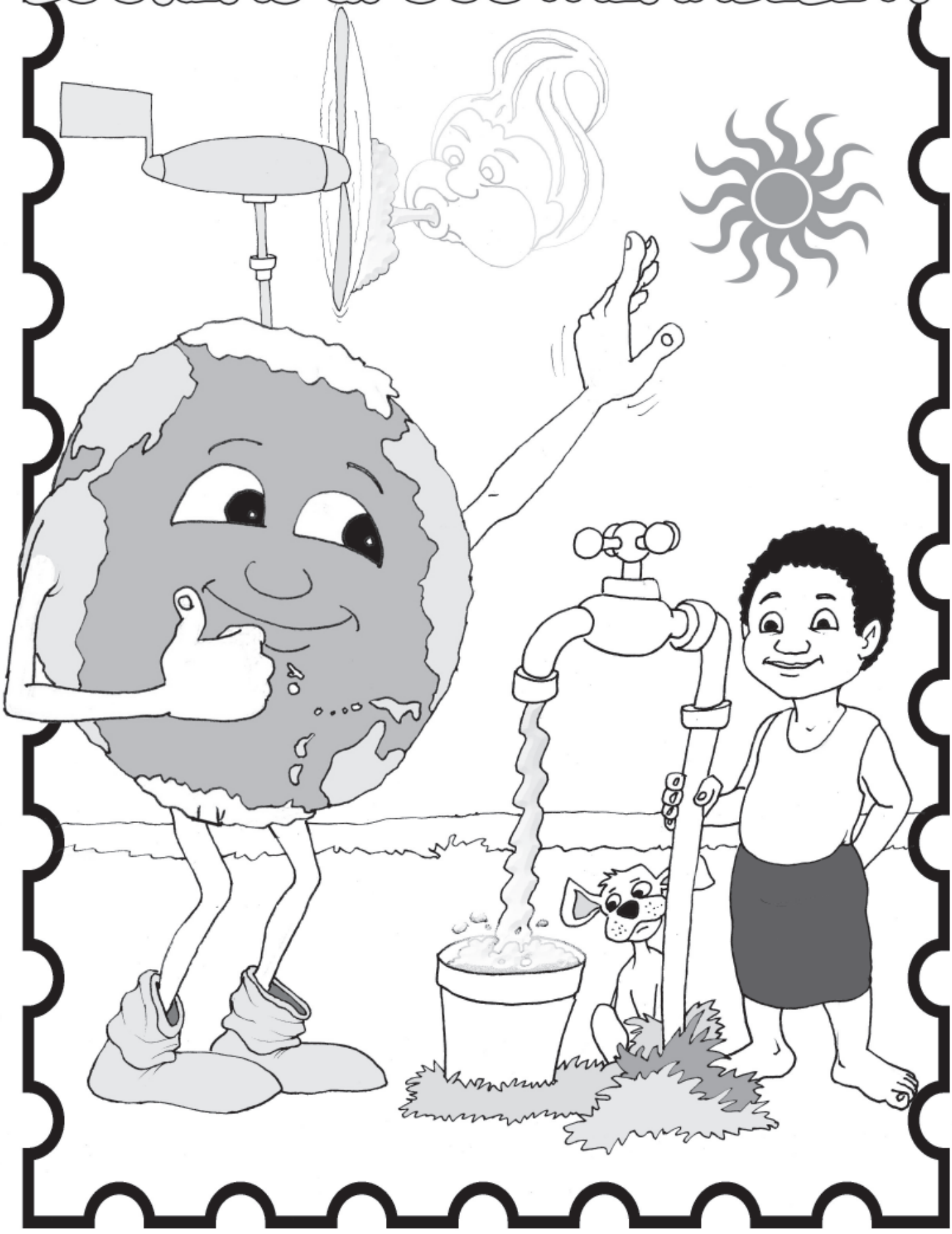
Classrooms

- Have one bin in the class for food scraps, one for paper to recycle and one for plastics. Food scraps should go into compost, paper to be reused perhaps for painting by kindergarten, and plastics bottles recycled.
- Student projects / environmentally themed lessons – Art and craft:- Designing environmental posters with important environmental messages. English: writing poems about a favorite natural place, Math's: measuring the plants outside to the nearest centimeter, making graph of plants growth over a period of time etc. Have students design some short plays or drama with environmental messages to perform in front of other classes.
- Have a HOPE notice board in the school or classrooms to display HOPE NOTES (A fortnightly newsletter that will be sent during the competition to teachers and students) to all in the school.
- Make an 'environment corner' in the classroom.
- Invite some guest speakers to teach students about how to make and look after compost or talk about how the environment of the local area has changed over time.
- Think about energy reduction (class student monitors to switch off lights and fans when rooms are not in use).

Canteen and Lunches from Home

- Reduce the amount of packaging sold at the school canteen, less plastics and non-recyclables. Serve small food items on newsprint rather than plastic.
- Make students aware of bringing environmentally friendly lunches from home with less packaging and healthy contents.

LOOKING at SUSTAINABILITY



Activity- Drain or Sustain?

Purpose:

To introduce the concept of sustainability

Time: 30 minutes.

Materials: A large number of small items- pebbles/lollies/ stones/ buttons- *use items that are easily available.*
Paper and pencils for keeping score; the blackboard or newsprint

Curriculum Connections:

English- Vocabulary development; definition of terms; comprehension;

Maths- addition & subtraction; calculation;

Social/ Health Science- place & environment; features of changing environment; resources & economic activities; resource exploitation, sustainable use & conservation; managing the family/ community environment;

Basic/ Elementary Science- the physical/ social environment & our health; ecosystems;

Skills- promote logical thinking, reasoning, knowledge of local resources, cooperation, critical thinking.

Note:

*After the activity, ask students to define the term **'sustainability' or 'sustain' or 'sustainable'**, using the lessons learnt during the activity.*

What to do:

1. Divide the students into groups with about 5 to 6 students per group. Each group represents a community.

2. Place 4 items (pebbles/lollies/stones/buttons etc) per person in a communal pile for each community (i.e. if your community has 4 members then there are 16 pebbles placed in their pile)

3. Explain the rules of the activity (you may want to write the rules on the board):

Rules

- The **items** (pebble/lollies/stones/ buttons etc) represent a **valuable** renewable resource. *Encourage discussion with students to select a local valuable renewable resource.*
- Each round of play represents one generation.
- The resource is replenished after each round of play.
- Each community member may take as much **items** as they like from the resource pile each round.
- To be able to survive, each community member must take at least one **item** in each round. Members who do not take an item during a round will not survive.

4. Choose one person in each community to observe and record the number of pieces taken by each community member in each round.

5. Begin the activity by calling out "Round 1"; then after you have renewed the resource, call out "Round 2", following this procedure until you have reached the final round.

6. After each round, count how many **items** each community has remaining in the pile and add an equivalent number of **items** to the pile. That is, if 4 stones remain, then add another 4 stones to the pile.

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

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

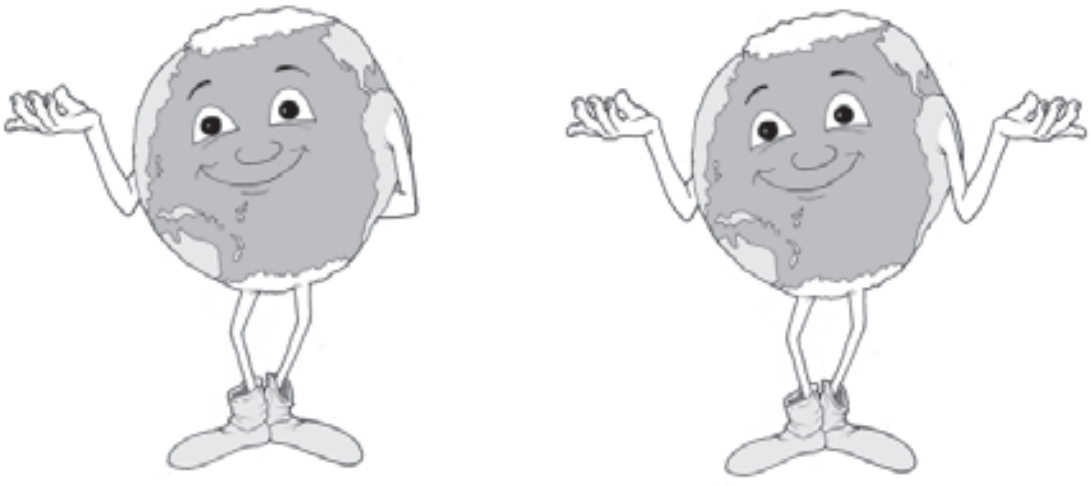
Deconstructing the Activity:

The teacher's role as a facilitator is critical during this session. It is important to discuss lessons learnt during the activity, ask questions that will promote critical thinking and guide the discussions so that students reach a clear understanding about sustainability.

Before beginning this session, put up a newsprint, or use the blackboard to note down answers/ key terms, lessons and observations made by students.

Below are suggested questions for deconstructing the activity- please adapt and add on to these.

- In which communities did everyone survive?
- Which community had the most items left in the resource pile at the end of the activity?
- Which communities are confident that they will always have enough items for everyone as long as the pile is renewed?
- How did these communities arrive at that point? What strategies were used?
- Was there a leader in these communities? If so, why did the community listen to that person? How did the leader contribute to the resource situation at the end of the activity?
- What were the students' initial reactions to the resource? Why? Can they explain why they reacted in such a way?
- Did students' values, beliefs or knowledge affect how they acted towards the resource or how they participated in the activity? In what way?
- Can this activity represent a real situation that is occurring today? In our country? Neighbourhood? Community? Give examples.
- What were the lessons that were learnt as part of this exercise? Positive/ Negative?
- What can we do to ensure that resources are available in a good state for us and our children?
- Why is this activity called "Drain or Sustain"?



Adapted from: ***Education for Sustainable Development Toolkit;*** R. Mckeown; C.Hopkins; R.Rizzi & M. Chrystalbridge; Energy, Environment & Resources Centre; University of Tennessee; Version 2, July 2002.

Activity- The Sustainability Tree

Purpose:

To critically look at the concept of sustainable development.

Time: 50 minutes.

Materials: Newsprint with the roots, trunk and branches of a tree drawn on it;
Markers, cardboard or A4 paper, spare paper, crayons/ pencils for students to decorate leaves and fruits.

Curriculum Connections:

English- Vocabulary development; learning through illustration; oral expression; linking terms;

Social/ Health Science- place & environment; features of changing environment; resources & economic activities; resource exploitation, sustainable use & conservation; managing the family/ community environment; changing world environment;

Basic/ Elementary Science- the physical/ social environment & our health; upsetting & restoring the natural habitat; changing ecosystems;

Skills- promote logical thinking; reasoning; communication skills; critical thinking; collaborative learning; identifying parts to form a total structure/ concept; concept mapping & creative thinking.

What to do:

1. Draw the outline of a tree on newsprint and pin up on the blackboard or wall.

2. Ask students to cut out and decorate a leaf and a fruit and a long strip of paper using cardboard or A4 paper.

Note: You can collect scrap pieces of cardboard from printers or reuse old test papers or letters that have only been printed on one side

3. Write the words "**sustainable development**" on the board.

4. Ask "what is sustainable development to you?"

*You may want to begin with a brain- storming session with your students on the words **sustainable** and **development** or wait until the end of the lesson to highlight their answers and link to sustainable development.*

5. Each student should write a word or short sentence on their leaf card on what sustainable development means to them.

6. Have each student read out and stick their leaf to the tree- students should try to shape the tree when sticking the leaves on.

7. In small groups ask students to think of things that can be done to develop in a sustainable way. To prompt student thought and discussion, ask: What actions might be needed to make sustainable development work? What can you do- individually or together to help with this? Who else might need to take action and what action might that be?

8. Students should draw and cut out roots. On their **root cards** they should write out one thing that may be done to make sustainable development work and by whom. They should stick the roots to the bottom of the tree.

9. Discuss the benefits of sustainable development. To prompt thought and discussion, ask: What good things come from sustainable development? How does the environment benefit? How does our society benefit? How does our economy benefit?

10. Students should then draw a fruit, cut it out and on each fruit write one good thing which comes from sustainable development.

11. Attach the fruits to the tree and discuss the class sustainability tree.

12. You now have in your class a unique concept map of your student's ideas about sustainable development, what is needed to make it work, and the benefits. Display the tree in your classroom or on the school notice board.

Deconstructing the activity:

- Have students ideas about sustainable development changed after doing this activity?
- Is sustainable development important to us? Why?
- Who should be in charge of sustainable development? Why?
- Why are roots important? What is the function of roots?
- What will happen to the tree if you remove the roots? Using this as an example, what would happen if the things needed for developing sustainability were not in place?
- Why are the benefits of sustainability represented as fruits of the tree?
- Discuss the relationship between the roots and fruit. Can these points be linked to the relationship between the things needed to develop sustainably and the benefits of sustainable development?
- Discuss examples of best practices in sustainable development in your schools, communities or country?

Activity- S.E.E the Links

Purpose:

To examine the links between society, environment and economy.

Time: 30- 40 minutes

Materials:
Three 6 sided dice of different colors for each group. The outline of the dice is attached for photocopying. Works best on cardboard. *You can buy different coloured dice from toy shops.*
Copies of S.E.E the links Activity Sheets for each group. *These are also attached for you to copy for each group or on the board for the class to view.*

Curriculum Connections:

English- Vocabulary development; oral expression; sentence & paragraph construction;

Social/ Health Science- resources & economic activities; resource exploitation, sustainability & conservation; managing the family/ community environment; changing world environment; marine life; rubbish disposal;

Basic/ Elementary Science- the physical/ social environment & our health; upsetting & restoring the natural habitat; changing ecosystems.

Skills- promote logical thinking; reasoning; analytical & communication skills; critical thinking; collaborative learning; creative thinking; interpretation of information & relate ideas clearly.

What to do:

1. Divide the students into groups with about 5 to 6 students per group.

2. Explain to the students that with the roll of the dice, they will race to discover the links between society, environment and economy.

3. The red dice represents **Society**, the green dice represents **Environment**, and the blue dice represents **Economy**. Each sector or category contains six terms. These terms are listed on the activity sheet- one for each number on the dice.

4. Three numbers are chosen by the roll of the red, green, and blue dice.

5. After each roll of the dice, the students have 1 to 2 minutes to discuss then state a sentence or two linking the three terms that correspond to the numbers shown on the dice.

6. Students can make sentences showing the links, using each of the terms in any order, or they may tell a short story which shows the links.

Example Roll

4 Society= poverty 3 Environment= land use/soil
6 Economy = markets

Example Linkage

Heavy rainfall over many days in the Tia province has caused a lot of soil erosion. The farmers who live in Tia province rely on selling cabbages and beans in the market. Because of the heavy rain and soil erosion the farmers have not been able to produce enough crops to sell in the market. The farmers have not been able to earn money for their other basic needs. Teachers in Tia province report a low turn-out of children to school. The prices of cabbages and beans have 'shot up' because there is a shortage of the crops in the market.

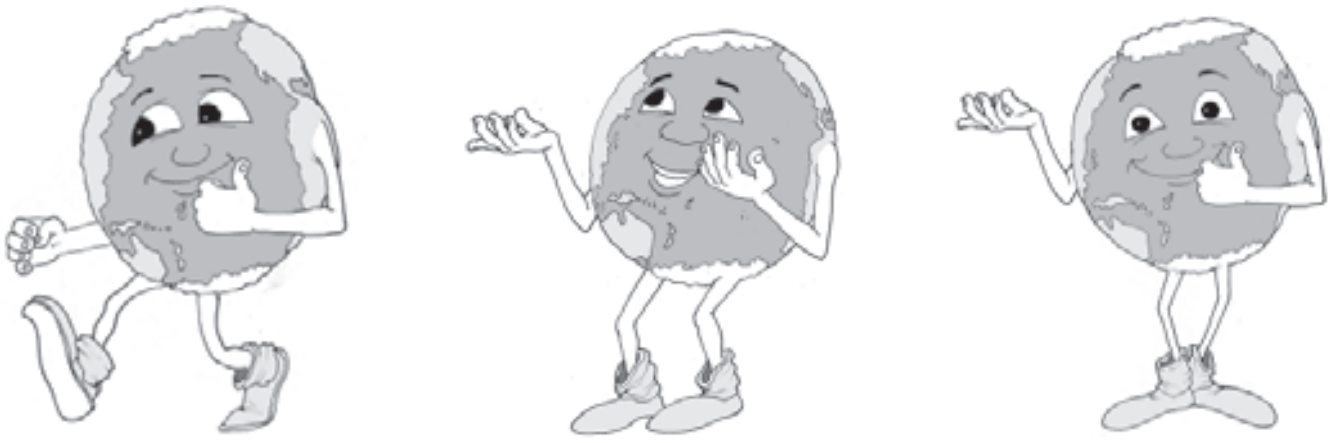
7. Each student in the group should have a turn at rolling the dice. Encourage discussion of each linkage after each round of play. After the activity, ask each group to share one or two examples of their links with the rest of the class.

Teachers from Nausori (Tailevu/ Naitasiri) area trial
S.E.E the links – training workshop 2006

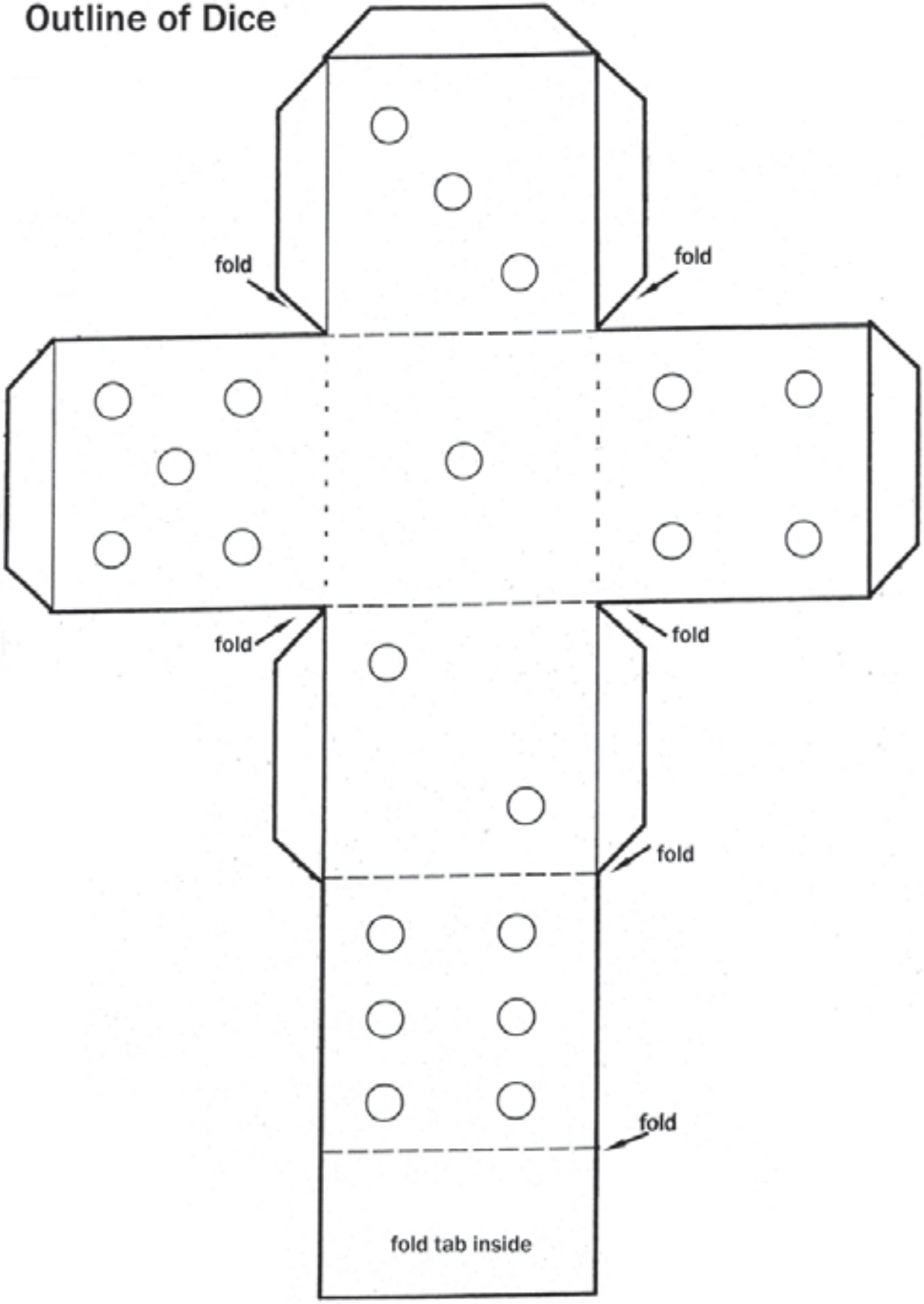
Deconstructing the activity

Many of the questions asked will depend on student feedback. Guide students through the deconstruction process to clarify, emphasise or explain certain statements made.

- What lessons are learnt through this activity?
- Is sustainable development only about the environment?
- In what way would developing resources sustainably affect peoples' livelihood?
- Explain the relationship between market demand and how resources are used or managed.
- Discuss the relationship between poverty and access to resources.

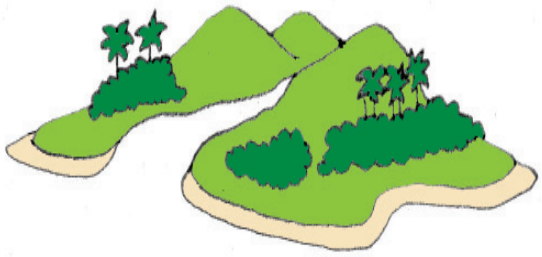


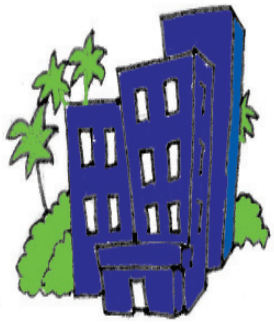
Outline of Dice



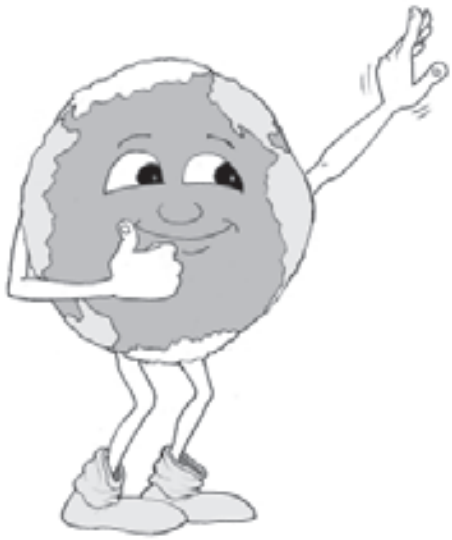
S.E.E. the Links!

Activity Sheet





SOCIETY	ENVIRONMENT	ECONOMY
1. Conservation	1. Water	1. Food/Fiber
2. Housing	2. Air	2. Business/Industry
3. Medical Care	3. Landuse/Soil	3. Local Economy
4. Poverty	4. Waste	4. Global Economy
5. Culture	5. Pollution	5. Jobs/Livelihoods
6. Politics	6. Habitat	6. Markets



Activity- The Futures Wheel

Purpose:

To share views, examine perceptions and create a broad picture of environmental issues.

Time: 45 minutes

Materials: Newsprint, markers, pens or crayons.

Curriculum Connections:

English- Vocabulary development; oral expression; link language activities- speeches & morning talks around a specific topic;

Maths- relate Mathematical concepts; probability; calculation;

Social/ Health Science- resources & economic activities; resource exploitation, sustainability & conservation; managing the family/ community environment; changing world environment; marine life; rubbish disposal;

Basic/ Elementary Science- the land environment & us; upsetting & restoring the natural habitat; changing ecosystems; earth sciences; harmful actions of people;

Skills- promote logical thinking; reasoning & application to real life situations; analytical & communication skills; critical thinking; collaborative learning; creative thinking.

Note:

Some suggested topics are: More people in the world; Less water in the world; More rubbish in the world; Less trees in the world; Polluted air; More unemployment; Less housing for the poor; Less international aid;.....and so on.

What to do:

1. Divide the students into groups of five or six.
2. Give each group newsprint and markers.
3. Ask students to brainstorm and list environmental, development or sustainability issues that are affecting them. These can be local or global issues. List their answers on the board.
4. Discuss the issues together in class. Each group should choose an issue and write it in the centre of their newsprint.
5. Groups should discuss problems, effects or consequences of the issue.
6. They are to add these consequences or effects to the diagram by using lines connecting them to the centre or to each other. Groups should continue to draw lines until they run out of possibilities. *Note teachers- you may know this activity as mind mapping, concept mapping, or word webbing.*
7. Encourage students to explain to the rest of the group their answers. Group members should agree to what is written on the newsprint.
8. Get each group to present their work to the class.

Students examine consequences of more rubbish in the world

Deconstructing the activity:

- Discuss the lessons learnt.
- Are you surprised by the amount of connections you found?
- Identify certain areas, examples that surprised you?
- Can you prove that all these connections exist?
- What were the connections between environment, society and economy?
- Were the impacts mostly positive or negative?
- How can we maintain positive impacts?
- What changes need to be made to reduce negative impacts?
- Are there any changes that you can make to improve the situation? Identify places on the future's wheel where you can intervene to make positive changes.

Note:

- Teachers should encourage students to talk or have discussions with their group members and explain consequences to each other.
- You should choose topics that suit your class, for example, lower primary classes can choose topics like, *"More rubbish in the classroom or school compound".*
- Encourage students to explain the connections they make and to ask for explanations from others.
- This activity promotes rational thinking and illustrates that each individual has ideas to contribute to group work.

Extension

Here is another way of using concept mapping to create a broad outlook of the role of humans in sustainable development.

Seeing your Community through a Sustainability Lens.

This is a hands- on group activity that helps students to view the effects of a local activity on the economy, society and the environment.

What to do:

1. Divide your students into groups of 5 to 6 members.
2. Ask each group to identify a local, annual event or activity (e.g. Tebara Festival, Hibiscus Festival, parade, sporting event etc).
3. Construct a concept map using this activity as the focal point. That is, write the name of the festival in the centre and use connecting lines out from the centre to show effects or impacts on society, environment and economy.
4. Ask the students to think of ways the activity affects the local economy, the society and the environment. They have to write these effects (primary factors) on the paper and use connecting lines and words to show relationships between the three.
5. Then they have to identify other factors that affect or are affected by the primary factors. They should continue if there are other factors beyond them and show as many linkages as possible.
6. Encourage students in the group to discuss and agree to each of the linkages shown.
7. Ask each group to discuss global linkages and to add these to the diagram using different coloured pens.
8. Each group can present their findings to the rest of the class.

Activity- The Development Planner

Purpose:

To appreciate the need for responsible development planning.

Time: 60-80 minutes

Materials: Outline map of Dari; Crayons, marker pens

Curriculum Connections:

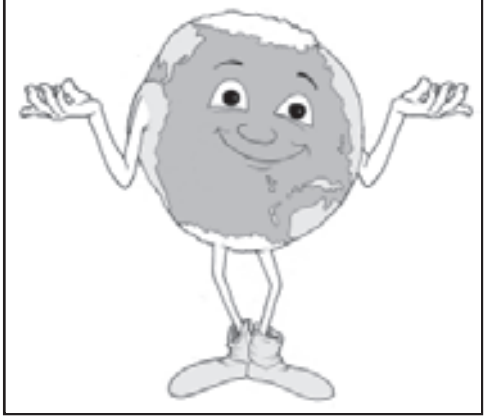
English- oral expression; role play & drama;

Maths- measurement; scale; calculation;

Social/ Health Science- resources & economic activities; time, continuity & change; sustainability & conservation; managing the family/ community environment; changing world environment;

Basic/ Elementary Science- the environment & us; the environment & our health; upsetting & restoring the natural habitat; changing ecosystems; earth sciences;

Skills- promote logical thinking; reasoning & application to real life situations; analytical & communication skills; critical thinking; collaborative learning; creative thinking; decision making; organisation & planning.



What to do:

1. Place students into groups of three to four students per group. Ask students to imagine they are town planners. They have been given the job of developing a new town called “Ripples” in the Dari province.

2. Give each group a copy of the map of Dari which shows the natural landscape of the area.

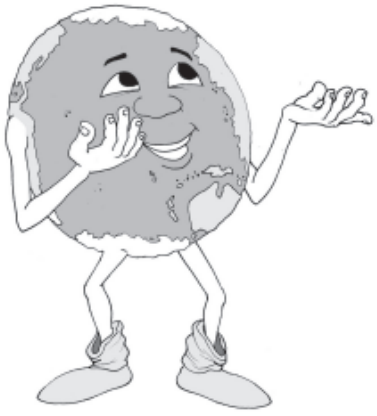
3. Tell the students to find a location for their town. They should choose a location which will cause very little damage to the environment. They should draw on their outline map a plan of their town and include the following features on their map:

- Shopping centre- central to all people living in Dari.
- Two- housing estates (residential areas) - one should have a view of the river.
- A factory- which will need to use the river water
- Roads and bridges to connect housing estates to the factory and shopping centre.

4. Inform each group that they will be presenting their ‘development plans’ to the ‘public’ (the rest of the class). As part of their development planning, they will also be required to prepare answers to the two questions:

- How does the plan help to protect the environment?
- How will building Ripples town disrupt or damage the environment?

5. Allow groups adequate time to discuss and complete their development plans. Encourage students to ask questions during presentations.



Deconstructing the activity:

- What factors do town planners have to consider when developing an area? List down the factors (budget, climate/ weather, target group, safety etc).
- Usually an Environmental Impact Assessment (E.I.A.) must be carried out as part of proposed development plans. Find out more about E.I.A. What is the value of conducting an E.I.A.?
- Sometimes, developers do not give a priority to safety, and major developments are built on low-lying areas close to rivers. Identify the problems this creates?
- Discuss the group's plans to protect the environment. Are these easily achievable? Practical? Identify the strengths/ weaknesses.
- Discuss the disruptions to the environment.
- Can the disruptions listed be decreased? What needs to be done to limit disruption?

Environment Impact Assessment (E.I.A.)

An E.I.A. is a study that is carried out:

- To predict the environmental consequences of the proposed development. The environmental consequences can include all aspects of the natural and human environment, for example, the plants and animals, soil, human health, urban migration, employment, etc. That is, all natural, social and economic impacts.
- To compare alternatives available for any project or programme.
- To look at problems, conflicts or natural resource constraints that could affect or hinder the project from being successful.
- To find out how the project might cause harm to people, their homelands, their livelihoods or to other nearby developments.
- To be able to make a decision by giving the 'decision- makers' a clear picture of the potential problems, measures to minimize the problems and ways to improve the suitability of the project for its proposed environment.

Extension: Conducting a SWOT analysis

Teach students how to conduct a SWOT analysis of their development plans.

For the site the students have chosen, list down the strengths, weaknesses, opportunities and threats.

S- strengths- what are the positive points, benefits, of the site; how do these contribute to the success of the proposed development.

W- weaknesses- what are the limitations or problems associated with the site; how do these contribute to the success or failure of the proposed development.

O- opportunities- positive effects of the proposed development; opportunities to do other things; other ways to use or expand the site; possibility of other developments.

T- threats- things that could happen to hinder the proposed development; possible threats to the site and developments including flooding, landslides, etc

Students are required to plan the layout of Ripples Town using this map of the Dari District.
1. Layout of Ripples town shopping centre central to people living in Dari District.
2. Layout two housing estates in the town. One should have a view of the river.
3. Factory industrial area near river.
4. Roads and bridges to link housing estates to factory town shopping centre.
Student groups will present their development plan to the rest of the class.
Groups are also required to prepare answers to the following questions:
1. How does your plan help to protect the environment?
2. How will building Ripples Town disrupt the environment?
KEY TO DARI MAP
Wetlands
Forests and mangroves
Sand dunes
When planning this project groups must carry out an Environmental Impact Assessment (E.I.A.)
DEVELOPMENT PLAN FOR RIPPLES TOWN IN DARI DISTRICT.

Activity- Classroom Community Visioning

Purpose:

To discover possibilities and opportunities for student action by drawing two 'views' of our school community:

Vision 1: A vision of an ideal school community in the future

Vision 2: What's real in the school community today

Time: 50 minutes

Materials: newsprints, crayons, marker pens

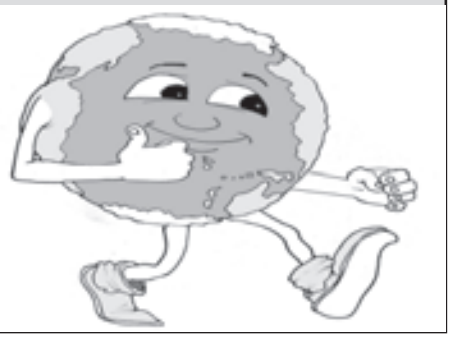
Curriculum Connections:

English- oral expression; paragraph development;

Social/ Health Science- resources & economic activities; time, continuity & change; managing the community environment; changing world environment; mapping; learning to live with changes; culture & heritage; civic responsibility;

Basic/ Elementary Science- the environment & us; the environment & our health; changing ecosystems;

Skills- promote logical thinking; reasoning & application to real life situations; analytical & communication skills; comparative & critical thinking; collaborative learning; creative thinking; promote empathy & positive thinking.



What to do:

1. Divide students into groups of 5 or 6 members. Sit the group members in a circle- ask them to close their eyes and imagine what they would like to see in their ideal school community in 20 years time. Ask members to remain silent and vision this for the next 3 minutes.

2. Give out 2 newsprints per group, with markers and colours/ crayons.

3. **Vision 1:** Ask each group to work together cooperatively to draw their vision of an ideal school community. They should discuss with each other and agree on how they will arrange all their visions on the newsprint.

4. **Vision 2:** Ask each group to draw what is real today in the school. Have them show the 'real' school community.

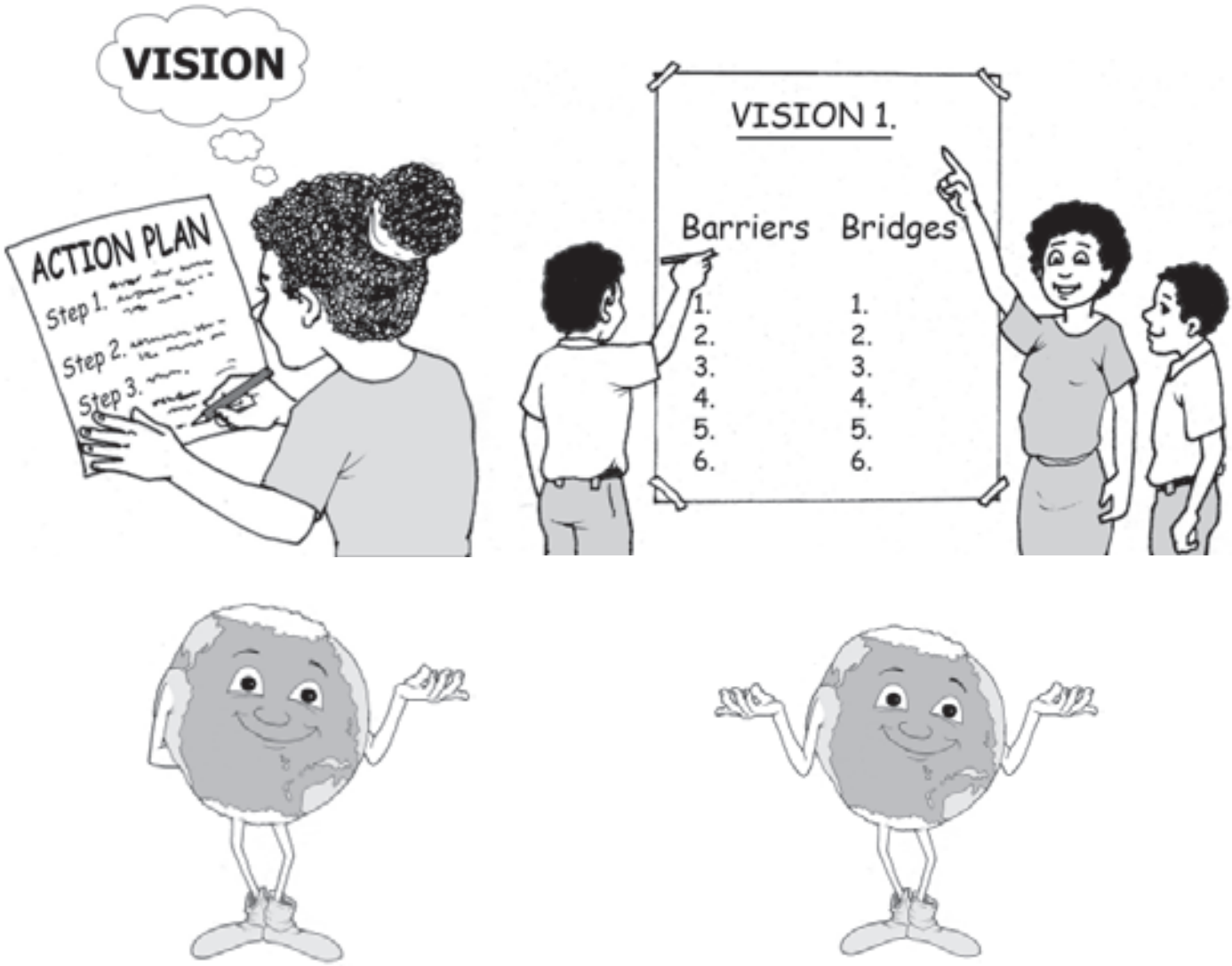
5. Once the groups have finished with their drawings, they should paste them side by side around the room. Ask the students to move around and observe all the drawings.

Classroom or school community visioning

Deconstructing the activity:

Bring everyone together in a circle and discuss:

- What did they notice? What are the main things students think of when visioning the future?
- How many of these things relate to sustainable development? In what way?
- What maps did they enjoy? Vision 1 or 2? Why?
- What practices in Vision 2 may be listed as unsustainable?
- What obstacles stand in the way of reaching the visions for an ideal school community? (Make a list of these obstacles on the board under the heading: **Barriers**)
- Make a list of possible actions that can be taken to overcome the barriers. (List these under the heading: **Bridges**)
- What is one action that could be taken- using the resources available- to move toward the future vision?
- What are the steps to taking this action? Will it cost us anything? Are we willing to take these steps? How will we benefit from this?
- Wrap up the activity by encouraging students to take one action that may contribute towards achieving their visions of the ideal school community.



Sustainable Schools

International Primary School students discussing and visioning the future development of a new school building.

Students from Nabekavu Primary School showing their map of Vanua Levu, using old tin cans & bottles.
Parents have been involved in school HOPE projects and next year they will aim for community involvement!
HOPE activities have focused on waste management, water conservation, nature, cropping and classroom learning. The school liaised with the District Agricultural Office to provide them with pineapple shoots and farming advice, and as the main part of their HOPE drive, they planted 700 pineapple plants. Sales from the crops harvested from school gardens have gone into funding additional projects & students who need assistance. HOPE has been implemented at a minimum cost to students, teachers and the community.

Valebasoga Public School HOPE actions included the development of the school vegetable gardens using waste water & composts and developing a green house and environmental murals.

HOPE pond at Lautoka Central School. A HOPE bure was also constructed as part of HOPE 2005!

A futures wheel on the topic of too many people in the world

S.S.M Primary school included HOPE in the curriculum!

Lautoka Methodist Primary School encouraged re-using materials for art & craft lessons; poems & drawings for English lessons.

Naleba Bhartiya Primary School launched HOPE 2005 with the planting of a 'HOPE' tree and constructing HOPE benches for students. The school focused on waste management and made many different artifacts using paper mache'.

"Environmental Hopes and Comments from students in Labasa"

- *For Vanua Levu to be the best Green Island*
- *To care for the various species of birds*
- *Recycle and reduce the use of plastic bags*
- *If everyone living on this planet be educated on the aspects of HOPE, we will have a bright healthy future*
- *One tree will give thousands of matchsticks but one matchstick will kill thousands of trees*
- *Hope the HOPE Programme is continued*
- *Make good choices for a better future*
- *Be helpful for a peaceful future*
- *Appreciate water because it is God's gift*
- *Nature is a treasure, it is also a teacher*
- *Our planet will be even healthier if we plant a tree each*
- *To have more HOPE Schools in Fiji*
- *HOPE our future planet earth will be clean, healthy and happy*

EXTRA! EXTRA!

Do you know that PLASTIC BAGS ARE BAD FOR OUR ENVIRONMENT?

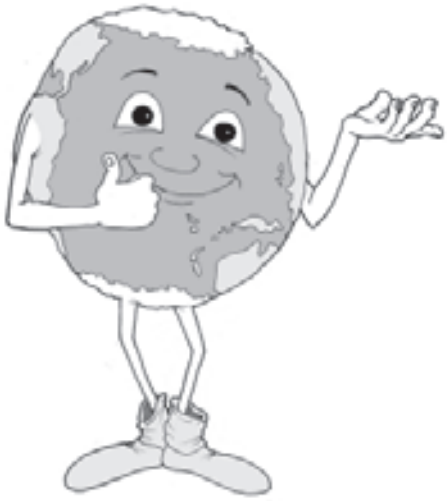
A study that was conducted by the Department of Environment said that more than 60 million plastic bags are used by people in Fiji each year. We also know we have a big plastic bag pollution problem in Fiji.

Why say 'NO' to plastics?

- When plastic is burnt it releases poisonous gases that can cause cancer. You may have smelt the bad smell of burning plastic.
- Plastic takes too many years to break down.
- Plastic is a visible litter that we see thrown everywhere.
- Plastic bags are ingested and can kill livestock and sea animals such as turtles. ***Turtles swallow floating plastic bags which they mistake for their favourite food- jellyfish!***
- Plastics are dangerous to little children.
- Plastics clog sewerage systems and drains.

Deal with the 'Plastic Bag Syndrome'!

- The problem begins with the user so the solution must come from YOU!
- Do we really need to use as much plastics as we do? Can we reduce our consumption at source? Ask yourself some of these questions:
  - Do I need to take as many plastic bags in supermarkets?
  - Do I need a plastic bag for an item purchased which is already well packaged by the manufacturer?
  - Could I bring and use my own shopping bag?
  - Can I use the cardboard boxes instead of plastic bags for shopping?
- **Use cloth** bags, card board boxes or natural baskets for shopping.
- **Tell** the cashier you don't need a plastic bag! And tell them why not!
- **Do not** burn plastics in incinerators.
- **Re-use** plastics you already have.
- **SPREAD the word that plastic bags are bad news!**



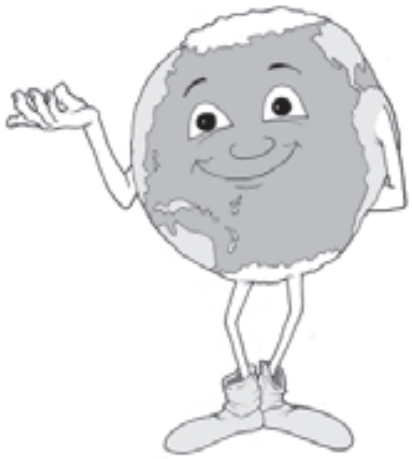
Beat the waste bug! Act sustainably!

In the Garden

- Pull weeds instead of using pesticides
- Use natural pest controls like marigolds to keep insects away.
- Compost your leaves and grass clippings.
- Re-use old bottles, milk cartons even plastic bags as pots.
- Use local plants in your gardens; they will always grow well too!!
- Save water by using run-off water.

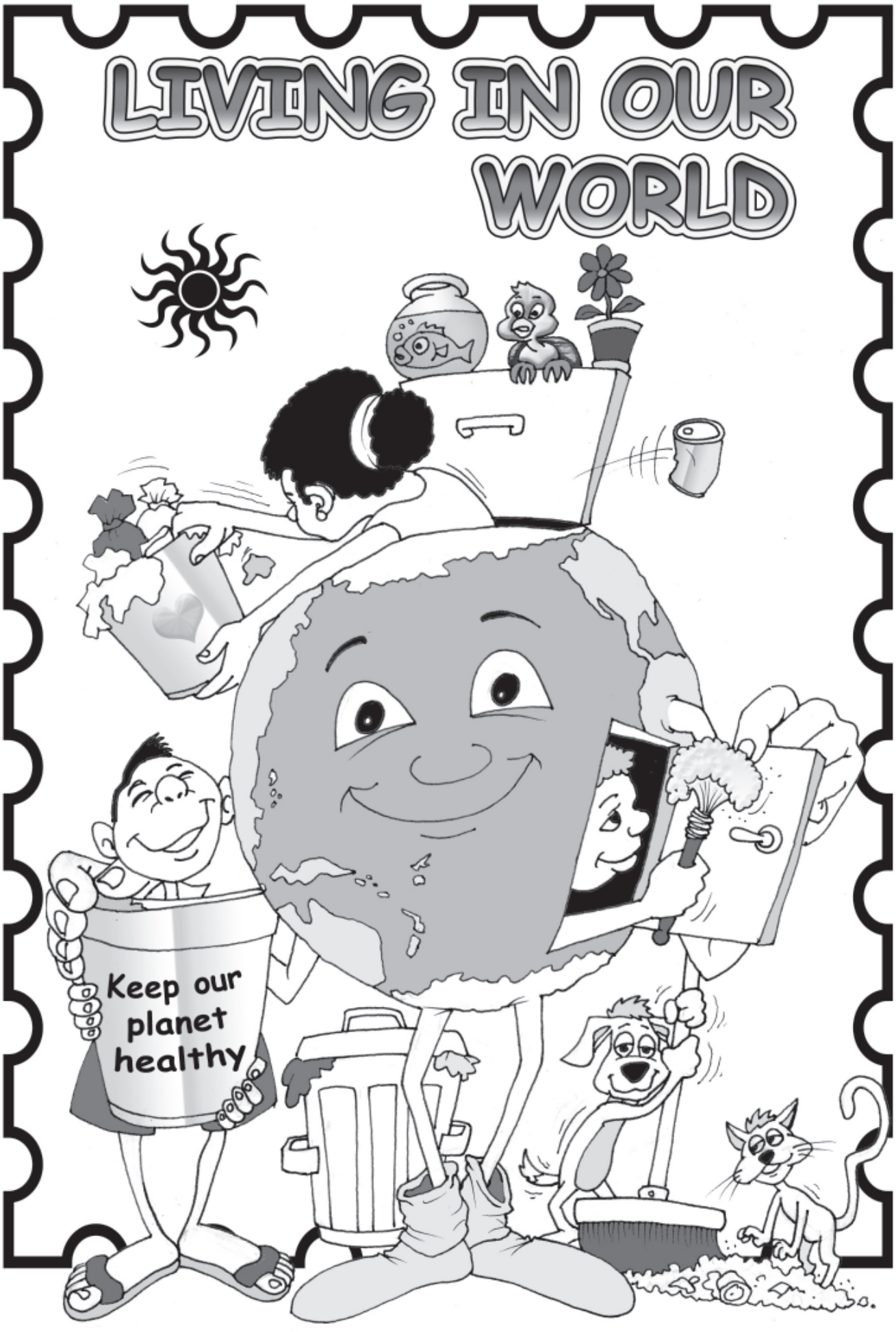
At school and home…

- Re-using is a big part of the solution for the waste problem. Ask yourself if you can repair your shoes, clothes or bag rather than buying a new one.
- Turn off the lights when you leave a room.
- Turn off the tap when you brush your teeth and use a water bottle to drink from during the day.
- Refuse plastic shopping bags at the supermarket – take your own reusable bag.
- Save bottles and jars for storing things e.g. pencils, rubber bands, food etc.
- DON'T put hazardous substances down your drain or in your rubbish e.g. paint, petrol, bleach, paint thinner etc. Find out how to dispose of these different things in the most environmentally friendly way.
- Pack a green lunch for school. Use re-usable containers so you throw no rubbish away.
- Take your rubbish to the proper collection point and make sure animals can't open the bags causing rubbish to flow to our rivers, gardens and roads.
- Catch the bus or walk if you can to reduce vehicle fumes.
- Stop burning by composting and recycling.
- Spread your knowledge so that everyone can help save our planet Earth and make a better future for us all.



An example of Acting Sustainably by reusing materials as shown by these students

LIVING IN OUR WORLD



Activity- Cooperative Squares

Purpose:

To understand the importance of working together.

Time: 45 minutes

Materials: Six envelopes labeled A, B, C, D, E, and F. In each envelope is a square cut into 5 pieces- use hard cardboard to cut the patterns.

Note: This is for a class size of 30 students. If you have over 40 students, increase the number of squares or cut pieces per square.

Curriculum Connections:
English- oral expression; pre-writing activity;

Maths- geometry; basic shapes; making shapes; position & movement; spatial concepts; using geo-boards; symmetry;

Social/ Health Science- considering others; noise; relationships & attitudes; managing the family environment; class meeting; social/ civic education;

Basic/ Elementary Science- upsetting & restoring the natural habitat;

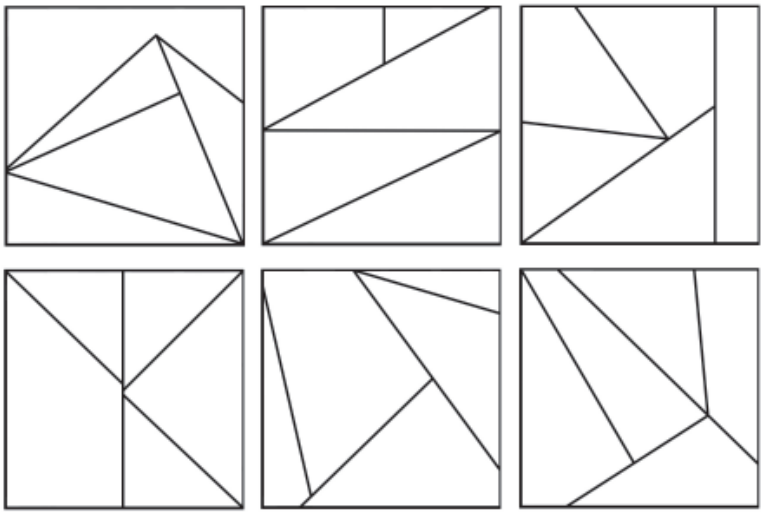
Skills- promote logical thinking; cooperation; collaborative learning; sharing; sorting & linking shapes; reasoning; appreciation of other perspectives or ideas.

Note:
To make the activity simpler or easier to do:
-cut simpler patterns;
-give each group an uncut square to 'fit' their pieces on;
-indicate the top and bottom of each piece.

What to do:

1. On each square card, draw and cut out a pattern of 5 or 6 pieces. *This should be prepared before the class.*

Example patterns



2. Form 5 groups (or more depending on the number of students in your class). Ask students in each group to choose an observer for the group.

3. Read the instructions to the whole group: "Each group has an envelope, which has pieces of cardboard in it. Open the envelope and distribute the pieces of cardboard to each member of the group. All group members (except the observer) must have at least one piece of card. The role of the observer is to 'observe' and take note of what is going on in the group during the activity."

4. The task for each group is to put the pieces of card together to form a square. There are two important rules each group member must follow:

- *No one should speak or signal during the exercise.*
- *The piece of card belongs to the person holding it. He/ she decides what to do with it!*

5. The task is completed when each group has completed the square.

6. Repeat the activity, but this time allow group members to talk to each other.

7. Ask the observers from each group to comment on what happened or what they noticed during the group activity.

Deconstructing the activity:

It is important for the teacher to spend time facilitating the deconstruction as students will have their own interpretations and lessons they have learnt from the activity. Questions that could be asked to prompt thought and responses:

- What happened? Was the task achieved quickly? Why or why not?
- What did each group do to be able to put the squares together?
- Did the group members cooperate?
- How does it feel to work without talking?
- Did anyone feel frustrated? How did you deal with this?
- What does this show us about communication?
- Did anyone break the rules? How?
- What were the differences between the first time the activity was done and the second time?
- Is this similar to what is sometimes experienced in the real world? In our communities, schools, homes? Discuss the different behaviour types experienced during the activity and relate this to real- life situations.

Students involved in a fun group activity

Activity- Where do you stand?

Purpose:

To think critically about an issue and clarify individual values.

Time: 20 minutes

Materials: Three old cardboards or A4 sheets- to be used as signboards with either '*Agree*', '*Disagree*' and '*Don't Know*' written on;

Statements to use for the activity.

Curriculum Connections:
English- oral expression; dialogue; debate; pre-writing activity;

Social/ Health Science- considering others; relationships & attitudes; effects of change; resolving conflicts; cultures & communities; resource use;

Basic/ Elementary Science- upsetting & restoring the natural habitat; changing ecosystems; water cycle;

Skills- promote logical thinking & decision making; critical thinking; express ideas & accept different viewpoints; communication & rationalising;

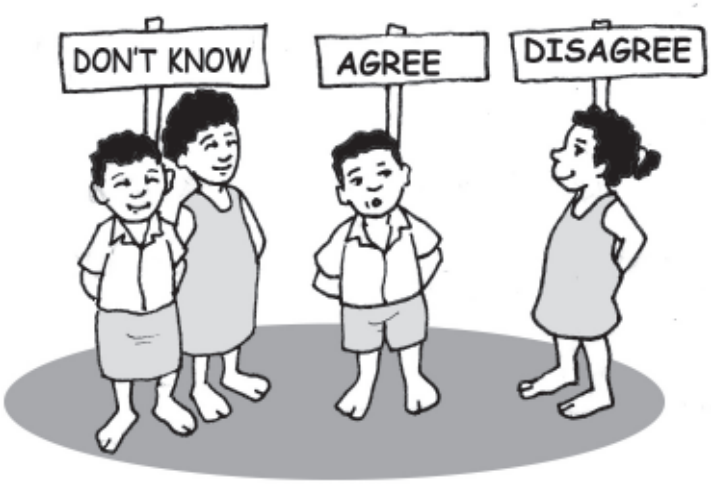
Example Statements:
** Water pollution doesn't involve me;*
** I put all my rubbish in the bin;*
** I tell other students at this school why they should not throw rubbish on the ground;*
****** *Logging is bad for the environment!*
****** *Plastic bags should be banned!*
****** *Big families are good!*
****** *We shouldn't eat turtle eggs!*
****** *Chiefs should put more taboos on reefs!*
****** *Dogs are better than cats;*
** Boys are stronger than girls;*

What to do:

1. Place the signboards- Agree; Disagree; Don't Know- in different corners of the classroom.

2. Ask the students to stand in the middle of the room.

3. Read out a statement and ask them to move to whichever side they choose. If they agree with the statement, then they move to the agree side; if they disagree they move to the 'Don't Know' sign.



4. Explain to students that the point of the exercise is not to see how many people agree but to see why students are standing where they are. *The goal is to exchange student ideas and stances on topics and for students to challenge other student's point of view in a non-threatening atmosphere.*

5. Try and choose or think of statements that include local, national and global topics. Some statements might include e.g. *More tourism would be good for Fiji* or *Everyone in the world should only have one child.*

6. Once the students have positioned themselves and decided where to stand, choose a few students to explain why they chose to stand where they are. Do not assume that all students take a stand for the same reason- ask questions to get a broad range of responses for students taking a stand on an issue.

7. After a few explanations, ask if there are any students who would like to change their stand. Allow them to take new positions if they change their mind.

'Where do you stand?' is a great way for students to exchange ideas and question each other's views on a range of topics. The activity is very simple to conduct, yet can lead to some in- depth discussion and sharing of differing points of view.

Deconstructing the activity:

- What lessons were learnt when conducting the activity?
- How does it feel to take a stand?
- What did you do or what did you have to consider before you decided where to stand?
- Was it useful to listen to other points of view? Did they differ greatly from your own?
- Were you able to understand the issue better from the different view points raised?
- Was there a student or a small group of people standing alone? How did they feel?
- Were there students who followed friends to the same signboard? Is this really how they feel about the issue or is their stand different?

Reflective skill

Deconstructing the activities is very important so that activities gain deeper meaning and students receive messages that they themselves have discovered.

Here is an example of a quick (ten minute) activity to reflect on how the students felt about the activity.

TEMPERATURE CHECK!

This activity has students talk constructively about their experiences. The purpose of a temperature check is to give each person an opportunity to say what is on their mind or in their heart after a new experience.

- Tell students you want to take a temperature reading, not of the outside, but of the inside of each person in the class. If the class is very big, have ten students volunteer themselves to form a circle sitting in the class with the other class members in a large circle around them.
- Let students know that they can talk about how much they enjoyed what another student said, talk about what still puzzles them and bring up unanswered questions from the activity, make recommendations for the future, or hopes and aspirations gained from the activity or for action from what they have talked about.
- In our experience students feel uncomfortable about the temperature check when it is first introduced. Yet it is a great way to cultivate open-minded confident students. After using the activity a few times we have found the students get the feel of the activity and begin to enjoy it and lead to good discussions.



Activity- Ranking

Purpose:

To develop cooperative decision-making and communication skills.

Time: 40 minutes

Materials: Ranking cards, cello tape, newsprint

Curriculum Connections:
English- dialogue; pre-writing activity; poetry writing;

Social/ Health Science- relationships & attitudes; effects of change; cultures & communities; managing family/ community resources;

Basic/ Elementary Science- upsetting & restoring the natural habitat; man and changing ecosystems;

Skills- promote logical thinking & decision making; critical thinking; express ideas & accept different viewpoints; communication & rationalising; prioritising.

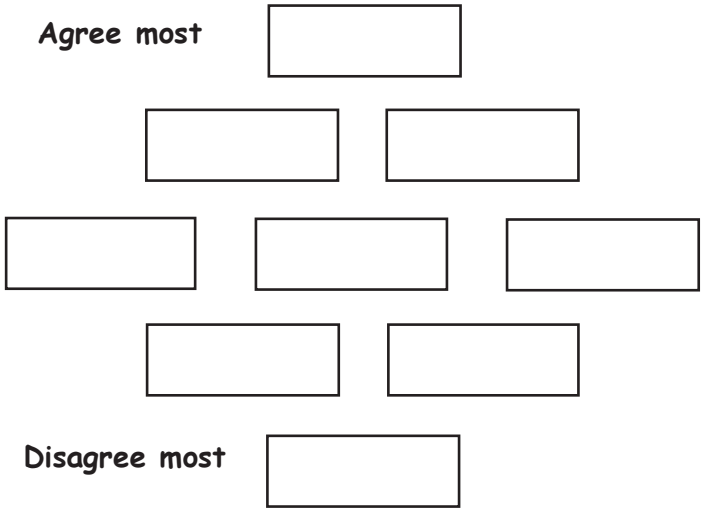
Note:
The nine statements can cover any issue;

Example Ranking Cards:
This example focuses on gender in schools. The discussion itself is the most important part of the activity.

* Boys and girls should line up separately.
* Girls are smarter than boys.
* Male teachers always teach older children in schools.
* Girls enjoy writing stories more than boys.
* Boys are better at Maths.
* Girls talk just as often as boys but don't get told off as much.
* The school soccer team should include boys and girls.
* Boys and girls should be treated equally
* Boys spend more time doing homework than girls.

What to do:

1. Construct a diamond of squares on newsprint (as below) for the students to place their cards.



2. Use old cardboard to write the statements. Example statements are given.

3. Divide the students into groups and give out the newsprint and ranking cards. Explain that they have nine cards that need to be arranged (ranked) on the newsprint.

4. Ask them to read all the statements on the nine cards, discuss and put the one that they agree most with in the top box and the one they disagree most with at the bottom.

5. Once they agree on the placement of cards as a group, they will then present this to the whole class with their reasons for the way they have ranked the issue.

Deconstructing the activity:

- How did the group decide where to place the cards? Was this done easily? Was everyone involved equally?
- Which was the hardest and easiest decision to make?
- What skills did students have to use to arrive at a decision? Do they use these skills at home, at school, in the community? How?

Activity- Planet for Sale!

Purpose:

To express attitudes and values towards the environment.

Time: 30 minutes

Materials: newsprint, coloured card for bids

Curriculum Connections:
English- vocabulary; jargon; oral expression; role play;

Maths- money; shopping; problem solving; profit and loss; cost price; sales;

Social/ Health Science- relationships & attitudes; important places in the environment; resources; shopping skills; family and social living;

Basic/ Elementary Science- upsetting & restoring the natural habitat; man and changing ecosystems; why organisms live in certain places;

Skills- promote values; competitive skills; bargaining; decision making; critical thinking; logical & conscientious thinking; communication & rationalising; prioritising.

Note:
In this activity the teacher (facilitator) takes on the role of an auctioneer.

And the Planet is for sale!

Teachers in Savusavu found this activity very lively and fun. We were able to deconstruct it in many ways, looking at how and why different people place higher and lower values on parts of nature. The activity encourages participants to publicly express their attitudes and values towards the environment in an enjoyable way.

What to do:

1. Write a list of planet items for sale on newsprint or on the board. Encourage students to add some items to the list. Ask: 'What are items of the earth- our planet that we can sell?'

2. Place students into groups of four or five students per group. Explain the activity to the class. In this activity, you will be selling items of the Planet Earth. The items will be auctioned. Ask students if they know what an auction is. *You may want to spend a few minutes explaining the function of auctions and what happens at an auction.* Students will pretend that they are bidders and can buy the items if they wish and can afford to. The bidding teams will need to decide what items to buy and how much they would like to spend.

3. Each team has $1000 to spend. This is the amount of money that they have to bid with. Ask teams to select one student to act as the **'bank'.** The bank keeps a record of how much has been spent and lets members of the group know how much is left.

4. The teams can decide to combine with or borrow from another bidding group to purchase planet items.

5. You may wish to give each bidding team a coloured card to raise if they would like to bid, or each team should choose a team member to raise his/ her hand if the team would like to bid.

6. Give the teams a few minutes to discuss before beginning the auction. Remind students that the items for sale are listed on the board.

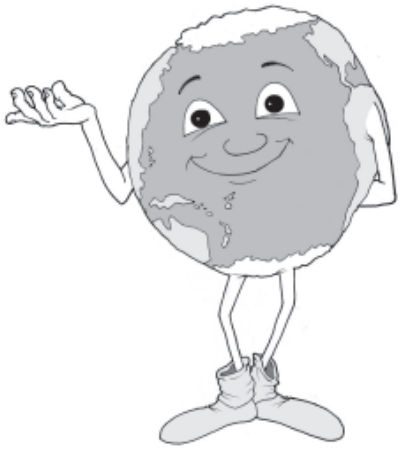
7. Set the scene by welcoming 'bidders' to 'The Sale of the Century!!' and go through the items for sale. Bidders are encouraged to bid for those items they would most like.

8. The **auctioneer** needs to remain lively, you may say (for example), *"Okay ladies and gentleman, today I welcome you to 'THE SALE OF THE PLANET', yes! That's right! This is a once in a lifetime opportunity to buy a piece of the planet! After this nothing will be left to purchase! Roll up! Can I have a starting bid for all the forests in the world? Yes Sir, What's your bid? Ok, we are starting at 400 for all the forests, can anyone raise that bid? Yes, they can, we have 600 in the back corner, going once, going twice, going three times (pause and see if there are anymore bids) – sold to the man at the back! Congratulations sir!'*

9. The auction finishes when a number of bidders run out of money.

Deconstructing the activity

- Discussion can begin by reflecting on what price people were willing to pay for different items.
- You may ask why such a high price was put on one item and not on another.
- Rank the items in order of highest to lowest according to the price they sold for.
- Was there intense competition for some items and not for others? Why?
- Did the auction atmosphere push up the price for some items? Can they give examples?
- Do they think a price can or should be put on an environmental resource (item)? Why or why not?
- Do we take nature too much for granted unless we think about putting a price on it?
- As a variation for older students you may like to randomly distribute cards with differing amounts of money on them. This will change the atmosphere of the game and promote follow-up discussion about the relationship of wealth to power and control over the planet.



This lily pond is in the shape of the World map

Example of planet items for sale!

Sahara Desert
The Sahara desert, the largest desert in the world, covers almost one-third of Africa. The Sahara has barren rocky plains and rolling sand dunes, extreme heat and scarce water. Most of the people of the Sahara are nomads who move their camels, sheep and goats around the desert in search of water and pasture.

River Nile
The Nile is the world's longest river, about 6,600 kilometres long. Many types of fish live in the river along with crocodiles, monitor lizards, soft- shelled turtles and a wide variety of snakes.
Most of Egypt's population lives around the valley and delta of the Nile, which provides the region's water. The river also provides irrigation for local crops such as cotton.

Congo Rainforest
The Congo River (also called the Zaire) and its tributaries flow through the dense tropical Congo rainforest. Chimpanzees, gorillas, monkeys, snakes, elephants, buffalo, antelopes and all kinds of birds live in the forest.

Victoria Falls
Victoria Falls is located on the border between Zambia and Zimbabwe. The mighty Zambezi River drops 128 metres down at Victoria Falls, creating a very loud roar and a cloud of spray that can be seen and heard 40 kilometres away. Because of this, locals refer to the Victoria Falls as "the smoke that thunders".

Kalahari Desert
The Kalahari Desert is home to the San Bushmen, one of the few groups of hunters-gatherers left in Africa. The San Bushmen roam the Kalahari Desert and are skilled hunters. The Kalahari Desert has some tree covering, low scrub and grasses and is home also to elephants, antelopes, giraffes, zebras, suricates (Meerkats) and ostriches.

Madagascar
Madagascar is the fourth largest island in the world and lies in the Indian Ocean, off the Southern Coast of Africa. Madagascar has a range of unusual and unique animals such as lemurs.

The Amazon Basin
The world's second longest river, the Amazon River and its tributaries (over 200!) flow through lush tropical rainforests of the Amazon Basin. The Amazon rainforest covers about 6 million square kilometres, and is home to more wildlife (plants and animals) than any other part of planet Earth! At least 1000 species of birds live in the forests, and more than 3,000 species of fish swim in the rivers. A single tree may be home to as many as 400 animals!
The rainforest is a noisy place, especially at dawn when it is filled with the cries of brightly coloured birds and shrieking monkeys!

Andes Mountains
The Andes Mountains is the longest mountain chain in the world, sweeping down the western edge of South America. Slopes and highland plateaus of the Andes are home to llamas, alpacas, guanacos, and vicunas (relatives of the camel) - valued for their wool.
The Andean Condor is one of the largest flying birds alive. It soars above the mountains on its huge wings!

Atacama Desert
The Atacama Desert in northern Chile is one of the hottest and driest areas in the world. Rain hardly ever falls here. In some areas of the Atacama Desert rain has never been recorded! The desert however, is rich in copper deposits!

Saguaro Cactus
The Saguaro cactus is only found in the deserts of north- western Mexico and south- western United States. It grows very slowly, taking 25 years to reach a height of 30 centimetres. But it can live for 200 years and grow as high as a four- storey house! The saguaro survives on water stored in its stem. A fully grown saguaro may contain enough water to fill 100 bathtubs!

Grand Canyon
The Grand Canyon is the world's largest gorge, 446 kilometres long; 16 kilometres wide and up to 1.6 kilometres deep. The Grand Canyon was carved out of the Colorado River and the rocks are very, very old!

Great Lakes
The Great Lakes- Lake Superior; Lake Michigan; Lake Erie; Lake Ontario and Lake Huron are the largest group of freshwater lakes in the world. The Great Lakes contain a fifth of the Earth's fresh water.
Several large cities are located on the shores of the Great Lakes, including Chicago- a leading industrial and financial centre, and third largest city in the U.S.A.

Rocky Mountains
The rugged Rocky Mountains stretch south through western Canada into the U.S.A. They attract visitors who enjoy walking, hiking and canoeing.
Many of North America's great rivers such as the Missouri; Rio Grande and Colorado start in the Rockies. The Rockies are home to the grizzly bears; black bear; elk; moose; mountain lions; goats and bighorn sheep.

Other examples: Pacific Ocean; Atlantic Ocean; Indian Ocean; Great Barrier Reef; Himalaya Mountains; Ganges River; Kangaroo; Giant panda….or use items from Fiji and the Pacific. Rewa River; Sigatoka River; Dreketi River; Colo-I-Suva Forest Park; Savura; Crested iguana; Fiji Parrot finch; Dakua; Vesi; Sigatoka Sand dunes; Lake Tagimoucia etc etc. Find out information on items for sale before the auction or collect pictures of the items for sale and display in the classroom. The 'buyers' can walk around and view the items and will then be able to make informed choices!

Activity- Simulation on Basic Needs

Purpose:

To highlight the challenge of meeting basic needs with limited resources.

Time: 50-60 minutes

Materials: large manila envelopes, 4 pairs of scissors, 2 glue sticks, 2 rulers, 3 pencils, 60 toothpicks or ice- cream sticks; sheets of colored paper (6 green, 6 pink, 4 gold or orange, 7 white, 3 yellow, 4 blue); 7 copies of Basic Needs Chart (or write on board)

Curriculum Connections:
English- vocabulary; role play;

Maths- money; budgeting; calculation; problem solving;

Social/ Health Science- relationships & attitudes; sharing of resources; family and social living; roles & responsibilities; making a living; role as a consumer; basic needs;

Basic/ Elementary Science- food and nutrition;

Skills- promote values; collaborative learning; dialogue & decision making; logical thinking; empathy; reasoning; survival skills.

Note:
This simulation activity is designed to enhance student's understanding of the uneven distribution of resources and how this affects families. The aim is to develop empathy for other families and their situations and to promote social responsibility and action in ensuring the welfare and fair treatment of all families.

The key underlying values are care, concern, cooperation and commitment.

What to do:

1. Prepare seven envelopes containing the resources for seven families. Attach a Basic Needs Chart to the outside of each envelope, and label the envelopes- Family 1 to Family 7. Put the following materials into the correct envelopes.

Family 1: 1 sheet of green paper, 3 sheets of gold paper
Family 2: 2 pairs of scissors, 1 ruler; 1 pencil, 1 glue stick, 1 sheet of pink paper
Family 3: 1 pair of scissors, 1 glue stick, 2 sheets of green paper, 2 sheets of white paper; 2 sheets of pink paper
Family 4: 1 ruler, 2 pencils, 2 sheets of yellow paper, 2 sheets of white paper, 2 sheets of pink paper
Family 5: 30 toothpicks, one pair of scissors, 2 sheets of white paper, 2 sheets of pink paper
Family 6: 30 toothpicks, 2 sheets of blue paper, 2 sheets of green paper
Family 7: 5 sheets of paper- one of each of green, gold, white, pink, yellow.

Basic Needs Chart

You must attempt to satisfy these five basic needs.

Food:	Make a pattern to represent the three basic food groups. Each food group must be a different colour. Each food group pattern must be at least 10 x 10 cm (4 x 4 inches).
Clothing:	Make patterns to represent a piece of clothing for each family member. Each piece of clothing should use at least one- quarter of a sheet of paper.
Shelter:	Make a three- dimensional shelter- no smaller than 10 x 10 x 10 cm (4 x 4 x 4 inches).
Water:	Use a piece of white or blue paper to represent a water source.
Education:	Make a four-page book to represent the education available to your family. Each page should be a different colour and should be at least one-quarter of a sheet of paper.

2. Divide the class into seven groups to represent the seven families (Families 1 and 2 should have the biggest numbers and Families 3-7 should have less members depending on the number of students in the class). For example 7 members in Family 1, 5 in Family 2 and 3 or 4 in Families 3 to 7.

3. Explain to the students that they are part of a group representing a family that has to satisfy basic needs to survive. In this activity, the basic needs required for the well-being of each family member are food, clothing, shelter, water and education. In the real world resources vary from family to family. In this simulation, they are to satisfy their basic needs as best as they can, with the resources available to them.

Students form groups that represent families, either various families from within one country, or typical families from various countries, rich and poor. They get to understand the uneven distribution for resources available to families in meeting basic needs; describe some of the effects of this uneven distribution on families and society and suggest actions to improve the ability of families to meet their basic needs.

4. Instruct the groups not to open their envelopes until you give them a signal. Distribute the envelopes and have students read the Basic Needs Chart attached to the envelope.

5. Emphasise that students must meet the requirements on the Basic Needs Chart but can only use the resources provided in their family's envelope.

6. Give the signal to begin and instruct the families to notify you when they have satisfied all their basic needs. Observe the students' interactions. Note whether students cooperate within and between families.

Option: At some point you can stop the simulation and check with the various families to see how they are doing. You could ask how this process could be changed. If students suggest sharing or trading, then that can be allowed. You could explain how people in real communities often work together to provide the basic needs for people other than their own family, and that this practice is acceptable for this activity.

7. Once the families have satisfied their basic needs, have each family explain how it managed to do so. Highlight creativity and cooperation. If any family was not able to meet its basic needs, ask the members to give reasons why.

Note: This activity may not be suitable for a class with a number of students living in poverty. You will need to be sensitive to the feelings of such students- how can you undertake the simulation without subjecting them to feelings of inferiority?

Deconstructing the activity:

Discuss the student's reactions to the simulation.

- How did you feel when you discovered that resources differed from family to family? How does it feel to have plenty? How does it feel to have next to nothing?
- Were you able to satisfy your basic needs without getting resources from other families? Why? How did this make you feel?
- Why do resources vary from family to family?
- Did you have resources that were wasted? Were any resources left after your family had satisfied its basic needs? What could you have done with these resources?
- In what way does cooperating with others help families?
- Can you suggest actions in real life that can be taken to ensure greater fairness in resource distribution? What can governments do? What can community groups do? What can students do?
- This activity concentrated on physical needs. Are there other physical needs that might also be considered?

Extensions:

- Have students' research organisations in their community that work to ensure that people's basic needs are met. i.e. Red Cross, St. Vincent de Paul, Salvation Army, Habitat for Humanity etc.
- Students could brainstorm reasons why people might be unable to meet their basic needs- e.g. unemployment, illness, family breakdown, war, lack of access to land or other resources, water or soil pollution.
- Invite guest speakers from community groups to explain the work they do locally or in other countries to help people.

Interdisciplinary Connections:

- Developing vocabulary - look at the difference between needs and wants; look at the difference between needs and wants in a rich country and contrast with those in a poor country.
- Science - research environmental impacts of human use of natural resources. Link this activities with ways in which animals in the wild cope with uneven allocation of resources.
- Social studies - research the various ways that people of the world meet their basic needs, depending on availability of resources, cultural traditions and other factors.
- Maths - gather and graph statistics on resource use, and then write a summary of the patterns that emerge.
- Family/ Health studies - students could assess their food and clothing choices. They could organise a group to recycle, reuse or repair clothing.

Adapted from: ***Teaching Green: The Middle Years; Hand on Learning in Grades 6-8***
Edited by Tim Grant and Gail Littlejohn; 2004; (pp 89-91)

Activity- What Kind of People Were They?

Purpose:

To create a vision of the future and look at the reality of what is occurring in the world now.

Time: 30- 40 minutes

Materials: newsprints, crayons, markers

Curriculum Connections:
English- vocabulary; oral expression; sentence construction; pre- writing activity; poetry;

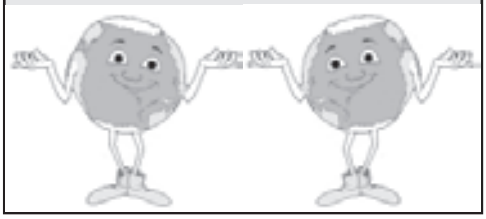
Social/ Health Science- values & attitudes; time, continuity and change; learning to live with changes; civic education;

Basic/ Elementary Science- man and the changing ecosystems;

Skills- promote values; imagination; guided visual imaging; interpretation of visions; comparative learning; promote relaxation and empathy;

Note:
This activity prompts students to reflect upon today's lifestyles and priorities and how we can make positive changes. The activity can result in a class action plan to think about the school environment and personal lifestyles with a new perspective. You will need to provide some paper to draw on and some relaxing open space. This is good for an afternoon class under some shady trees!

The guided visualisation can be a powerful way to offer a constructive imagination process through which students can realise their ideals and dreams.



What to do:

1. Ask students to get comfortable and relax (maybe lying down in their own space or placing their heads face- down on their desks).

2. Once there is silence, read the following passage in a gentle, slow paced voice, pausing at times to allow thought.

Deconstructing the activity

- On newsprint divide the page in two with a line. On one side write the heading **'future'**. Under the heading ask students to reflect on the emotions they felt when they viewed the future.

- Write down dot points under the heading of all the things they saw. Write down what the people were like, how the world looked, if people cared for the environment etc.

- On the other side of the line put the heading **'present'**. Again write down the emotions they had looking back to the present, how people lived, their mood, how the environment looked etc.

- Compare and contrast both sides of the newsprint. Ask the students which place they like better, the present or the future vision (it will most probably be the future vision).

- Ask the students if they would like to make a plan of how to change some of the things that exist now, to a better place like the one they imagined. Perhaps suggest they can start by making the school a nicer, friendlier place to be (as students spend most of their time in school).

- From here the students may like to develop a plan of action to take small steps to make the school a more pleasant environment. They may also like to make a promise to themselves to change their actions in some ways.

- The last part of this activity prompts students to reflect upon today's lifestyles and priorities. The plan may include things like making less rubbish through a commitment to consuming foods with less packaging on a certain day of every week.

'I would like you to get into a very comfortable position and try to relax... close your eyes gently……. now listen to the sounds of nature you can hear and listen to your own gentle breathing……let all the sounds go away in to the background……listen only to your own breathing and just let yourself relax……be aware of your toes…squeeze them hard together……keep squeezing ……and let your toes relax……do this a few times……now relax your whole body……from your toes to ankles……to your knees……your legs……up through your middle and into your arms……squeeze your hands tight……keep squeezing……and let them relax……do this a few times……let the feeling of relaxation go up your arms into your shoulders and your neck……squeeze the muscles of your face……keep the squeezing going and let your face relax.'

'Imagine yourself being taken up from this place by a big wind……you are lifted up like a leaf and much higher you are carried along what seems like a tunnel……there are light colors all around……yellows, pale blues, greens and oranges……patches of each color swirling around……you notice too that you are slowing down and that all the colors stop and become one bright beautiful white light. (longer pause).

'You come out of the tunnel of lights and see below your Planet Earth……you see the planet as astronauts see it……you enjoy the view of the beautiful blue and green planet……the home that you have left behind……your only home……you slowly come closer……and you begin to see continents, countries, and islands……but as you come closer you realise that the planet has changed……it looks the same but somehow it is different……as you come closer you see mountains, valleys, forests, communities, schools, children playing and you realise you have gone far into the future……and that future shows the planet of all your hopes and dreams'

'In this planet look around…see how the people live……how do they look?……Have a good look at them……are they happy?……How do they interact with each other?…….What things make their life good?……What are their surroundings like?……do they care for the environment?……Can you guess how they see their future?' (longer pause).

'Think about your vision of the planet of the future, the planet of your hopes and dreams……what the people are like, how they act and what the surroundings look like?……Imagine you are one of these people in the far future; how do you feel being one of them?

'Imagine that one day in the future you are taking a walk and you come across a time capsule buried long ago in the 2000's. …..think about what kind of people were they in 2006?……were they happy? What were their problems?……what did the world look like back then?……How did they treat the environment?.... (longer pause).

'Do you prefer to live in the future with all your dreams or in 2006?'…….

'When you are ready, very slowly, return to this time zone and open your eyes'.

Extension: Special Forever Poems!

Here's a wonderful way to get to know your students. It can be used to create a calm and reflective classroom atmosphere. It may be used as a 'cool down' activity to settle the students after lunch break.

- Ask each student to close their eyes and to think of something in their life when they did something amazing that made them feel great or sometime that made them really happy. In this reflective time get them to think back.
- On the board write the following phrases, I saw……. I heard…… I learned…..I was……
- Have each student privately finish the sentences based on what they were remembering.
- Ask if any students would like to share their moments.

This is a good way to have students express themselves though writing about something of their own choice.

Deconstructing the activity

- Ask the students how they felt remembering these times and ask how they can channel these good thoughts into making their school a happier place.
- You can also have them write down a list of things that make them feel really happy and talk about how you can incorporate some of these things into the school environment.

Students showing environmental messages


WORLDLY SCHOOLS
PROTECT US FOR FUTURE
Murals are very popular in HOPE schools to create awareness about living in our world. Students enjoy painting murals and school walls look much nicer!
THINK GLOBALLY
ACT LOCALLY
Gospel Primary Class 7 students made beautiful displays on a cloth background using three different canvases; earth, sea, sky.
JOIN HANDS FOR PEACE
WATER FOR LIFE.
Some HOPE schools place signs around the school yard with sayings to remind children about good values and attitudes to have.
ENVIRONMENT
CONSERVE
MANAGING OUR RESOURCES
At Swami Shradanand Memorial Primary School (SSM) "students are educating the community, children are reporting that they are doing things learnt at school, at home....Smaller children have really broadened their knowledge of plants and herbal medicines". SSM has a wide range of murals which has transformed school walls into fantastic learning tools!


HOPE actions make a big difference!
Qawa Primary School students have learnt to make good use of their environment. School HOPE gardens have been grown on volcanic rock foundation and available space used effectively for cropping.
HOPE pond at St. Augustine's Primary School showing a map of the world!
Students participate in HOPE Student Leadership workshops to develop skills to lead effectively, create, discover, think critically and solve problems.
HOPE diaries record student actions!
WELCOME TO HOPE FAIR DAY
Students get together at HOPE Fair days to share and celebrate ways in which they have made a difference!
HOPE welcome banner at Labasa 2005 and students perform a drama for Lautoka HOPE Fair Day 2005.

Extra! Extra!

Getting students to participate:

The Fish Bowl

- Gather students in a circle sitting in chairs.
- Choose 5 people to take their chairs to make a smaller circle in the middle of the big circle.
- The little circle in the middle is the only people allowed to speak during the activity.
- The people on the outside circle must be quiet and only listen to the inside circle of speakers.
- The teacher facilitates the topic of discussion by writing on a piece of paper an engaging discussion topic and drops it on the floor in the center of the middle circle.
- The inner circle must read out aloud the topic and discuss it as a group, the teacher can write further probing or controversial questions on the topic and drop them in the center of the inner circle to guide the discussion, keep it moving and fresh. But the teacher does not talk during the discussion.
- If the students on the outside circle wish to join the conversation in the middle, they need to pat a person in the middle circle on the shoulder, the person who has been touched must then go to the outside circle and the new person can enter the talking circle in the middle.

- If you choose topics that students have different and strong views about, you will find that the students on the outside find it difficult to just listen – they want to get in the talking circle too!

Deconstructing the activity

In deconstructing the activity the facilitator may consider the following:

- Ask the students how it felt to be on the outside listening circle.
- What was difficult about just listening?
- What did it feel like to be on the talking circle?
- Which do they prefer, to be on the talking or the listening circle?
- Which circle is most important if they want to learn things about a topic, listening or talking?(Hopefully they will decide they need both).
- Do you gain more information from listening to just five people or more people? Why? (Hopefully they will decide the more information they hear the more knowledge they can collect. They can choose to discard some views and collect others).

At first students may be shy to participate, as these activities are different from what they usually experience. But after a few times, students will be keen to have their say!

To encourage participation you could give each student two small pieces of colored card. Every time they participate you could take back a piece of card from them. At the end the winners are those that have given you all their cards (participated the most). After a few rounds you will not have to use this card system as students will want to be involved!

The most important thing to stimulate student thought is to make sure that as the facilitator you do not impose a particular point of view or limit opportunities for students to express themselves.

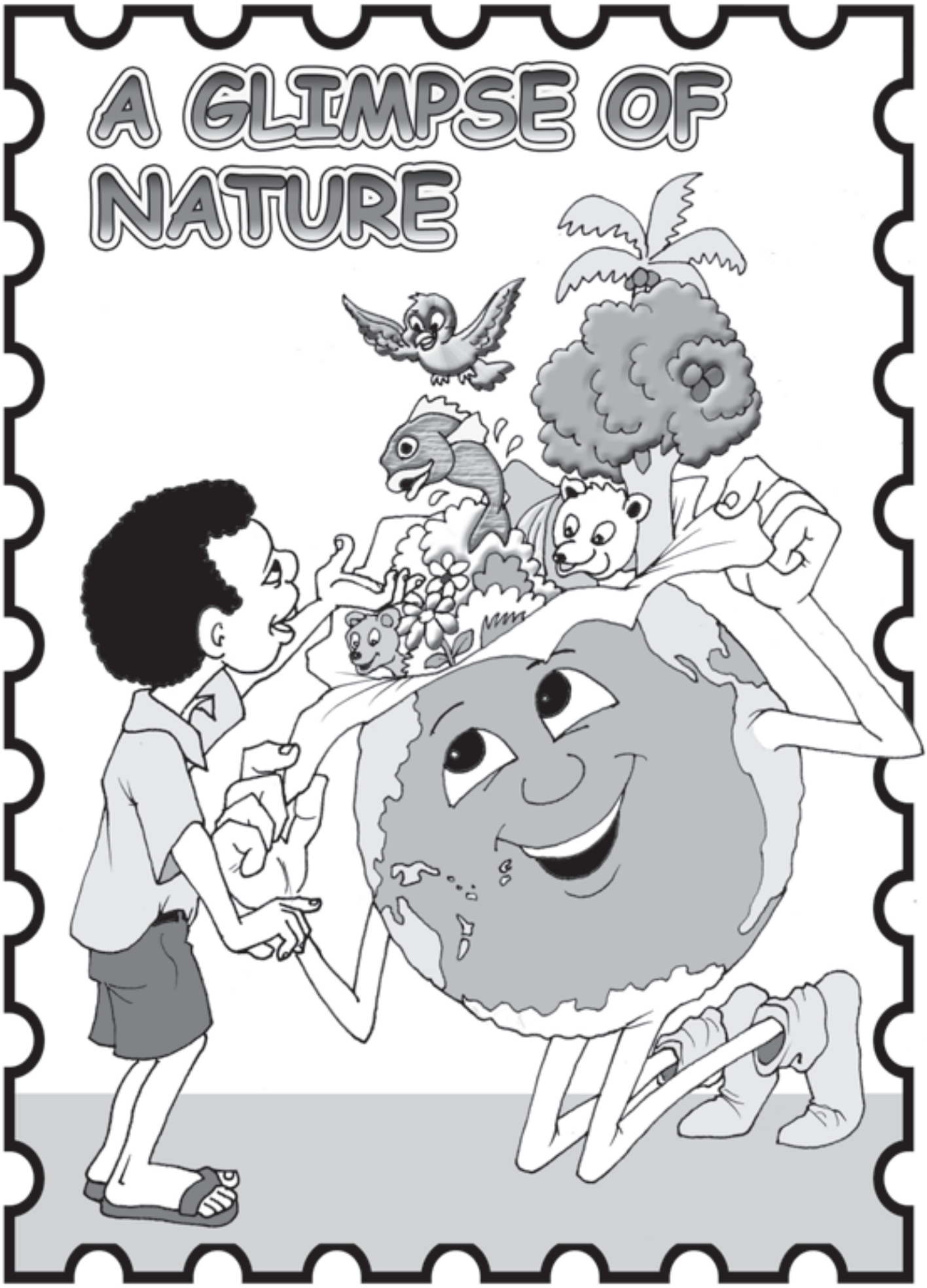
Use this technique to discuss any topic, in planning for class activities or even during staff meetings when planning school activities or discussing issues.

***Discussion Partners**:* After asking a question, get everyone to find a partner and discuss the question for a few minutes. Have partners report on what they talk about.

***Toss Salad**:* Place an empty cardboard box on the table. Give out small slips of paper and ask people to write down the answer to a question. Pass the box around for everyone to put their slips in the box then ask someone to 'toss the salad'. Pass the box around again for people to pick out a slip and share the idea/ answer they picked out.

Pass the Envelope: Give each person an envelope filled with blank slips of paper. Ask the question and then have everyone write down as many answers as they can on the slips in the envelope. Pass the envelopes, either to the next person or to anyone else. Put everyone in pairs to discuss the ideas in their envelope. What are the positive and negatives of each idea? Then ask the pairs to present their discussions to the whole group.

A GLIMPSE OF NATURE



Activity- Environmental Words

Purpose:

To introduce words linked with the environment and ecosystems.

Time: 10-20 minutes

Materials: Enough chairs for everyone, except the teacher or team leader.

Curriculum Connections:

English- pre-writing activity;

Social/ Health Science- places & environment; forests & marine ecosystems; resource use; conservation and sustainability;

Basic/ Elementary Science- upsetting & restoring the natural habitat; changing ecosystems; the land, environment and us; where organisms live; importance of trees;

Skills- stimulates attention & concentration; factual recall; knowledge of local ecosystems & names of species;

Example Ecosystems:

Coral reef; Rain forest; Mangrove; Sand dune
Mud flats; School garden
Flower garden; Pond; Lake; Stream; River

Note:
Adapt your questions to suit the topic you are teaching and students' ability to grasp the concepts.

If there are not enough chairs available, you can use a large concrete area or sandy area and draw circles to represent the chairs or use floor mats or old rice bags and specify how many people can sit on each mat/bag.

This is a good motivational activity!

What to do:

1. Ask the class to choose an ecosystem. For example, mangrove, coral reef, stream, rain forest, ocean etc.

2. Once they have chosen an ecosystem, ask students to identify different creatures or things found in that ecosystem, and choose two items/ creatures from the list. For example: Ecosystem- coral reef. Creatures: fish, clams.

3. Place the chairs in a circle. Remember to clear space for this activity. The team leader stands in the middle of the circle, with everyone else sitting on a chair.

4. Go round the circle giving everyone a name for example, fish, clams, fish, clams, until everyone in the group is either a fish or a clam.

5. Make everyone with the name fish, stand up and then the people in the clams group. This is to make sure that everyone is clear about which group they are in.

6. Explain the game:
   - When the person in the middle says 'clams' all the people in that group must change chairs.
   - If the person in the middle says 'fish' then all the people in that group must change chairs.
   - If the person in the middle says 'coral reef' then everyone in the circle must change chairs.
   - The person in the middle must try and grab an empty chair.
   - ***The aim of the game is to find an empty chair and not to be left in the middle!***
   - The person who is left in the middle begins the game again by saying 'fish', or 'clams' or 'coral reef' and then everyone runs again.
   - The game finishes when everyone is exhausted.

Deconstructing the Activity:

- This activity can be done to begin or complete a topic. For example if you are going to teach about the marine environment, you may want to use this activity to introduce the ecosystem and get students to think of things that are found in the marine environment.
- In an ecosystem, what could the chairs represent? For example food, habitat etc?
- What could the person standing in the middle represent? A predator? Pest? Disease? Human?
- Is this a real situation in an ecosystem? Is there a lot of competition for space? For food?
- What factors lead to competition in an ecosystem?
- What are other problems that could be encountered by living things in an ecosystem?

Adapted from: ***Drama in Environmental Education- A Guide***; Wan Smol Bag Theatre Publication; J. Dorras & H. Corrigan; 2002

Activity – The Animal Clue Game

Purpose:

To discover the identity of different animals.

Time: 20- 30 minutes

Materials: Animal Clues

Curriculum Connections:

English- pre-writing or follow-up activity for literary works that contain animal characters;

Social/ Health Science- places & environment; living things; natural habitats; caring for domestic animals; our pet;

Basic/ Elementary Science- the land, environment and us; why organisms live in certain places; life science; study of a mammal, cats and birds;

Skills- stimulates attention & concentration; knowledge of local, native & endemic/ endangered species & features; selecting information & drawing conclusions;

Note:
Children who can't read well or who are unfamiliar with the animals should be given the easiest clues.

Choose animals with distinct and easily identified characteristics. If a clue fits two animals, add a distinguishing characteristic.

You can adapt the Animal Clue Game by using local, native, endemic animals (and also plants).

You can also adapt the game for very young children by using very simple clues and drawing pictures on the card. For example, draw a hole in a tree with the clue "My Home" or a duck's feet, with the clue "My Feet".

What to do:

1. The Animal Clue Game will require some preparation. There are four animals, each with ten clues to help students identify the animal.

2. Prepare forty cards- write a single clue on each card until you have forty animal clues.

3. To play the game, shuffle the clue cards and hand out one or two cards to each student. It is okay to give each student clues to more than one animal.

4. The students should be standing so that they mingle freely.

5. Explain to the students that the aim of the game is to discover the identity of each of the four animals and gather all ten clue cards that describe each animal. They should wait until you give them the signal to begin.

6. The students should look at their clue and call out the name of the animal they think the clue describes.

7. The students who are calling out the same names should move towards each other and appoint someone in their group to collect their clue cards. When they have collected ten cards, they are complete.

8. The teacher can mingle with the groups giving help as needed, but the students should be encouraged to rely on each other as much as possible.

9. Check each group's cards only after they have collected all ten clues. When all the animals are identified and the clue cards gathered, have each group read two or three of their most interesting clues aloud.

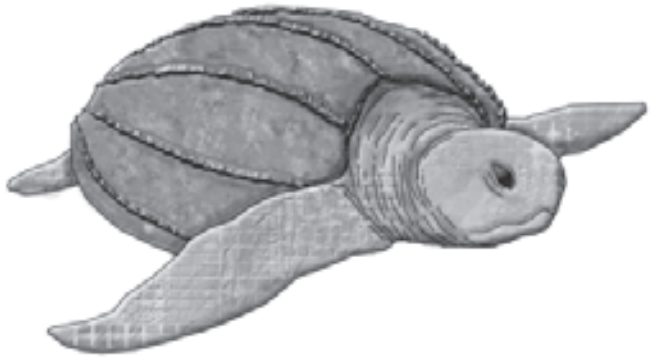
Deconstructing the Activity:

- Were the students able to find all ten clue cards?
- What did they need to do to find all ten clue cards?
- How are we able to identify different plants and animals?
- Were students surprised at some of the clues? Why?
- What are some of the benefits of understanding the characteristic features of plants and animals?

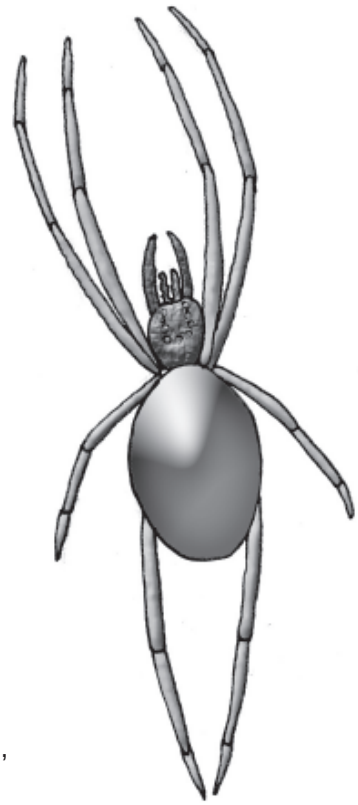
Animal Clues

THE LEATHERBACK TURTLE

- There are only a few of us left, and in Fiji, I am protected.
- Apart from the saltwater crocodile, I am the largest surviving reptile and may reach a length of 2 metres and weigh 500kg.
- The scientists call me *Dermochelys coriacea*, but I am more commonly known as ika dina or ika bula.
- I am often mistaken for an over-turned boat floating in water.
- I am easily distinguished from my relatives by my smooth leathery skin, which is black, spotted with white.
- I live in the deep sea and travel widely over the ocean. I like to nest in tropical areas such as in Fiji.
- I love to eat jelly fish!
- I have a big problem with plastic bags. I often ingest plastic bags because I think these are jelly fish. My stomach becomes full of plasticbags and I die from malnutrition or become very weak and sick.
- My shell is used for decoration and to make jewelry.
- My back has seven lengthwise ridges. Underneath, I have five ridges.



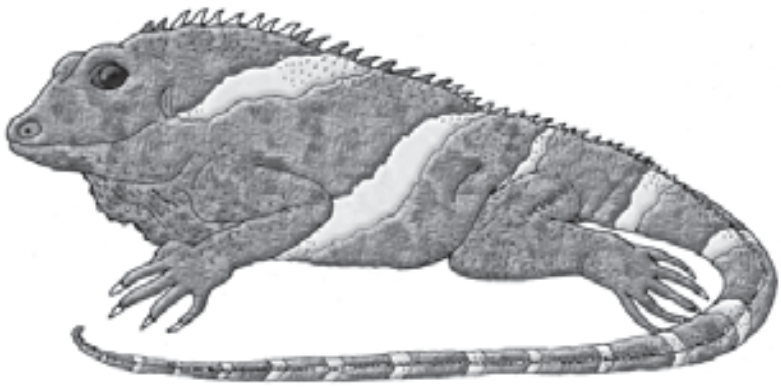
SPIDER



- Usually I'm brown, gray or black, but I can also be red, green or yellow. I do not have two or four legs, and really, I'm not such a bad fellow.
- I wear my skeleton on the outside of my body.
- I catch a lot of insects with a trap I make. I eat lots of insects, many of which carry diseases, or are harmful to plants.
- I change my skin often as I grow larger and larger. This process is called molting. I molt 4 to 12 times before I'm a full- grown adult. I never change my looks, just my size.
- Scorpions, ticks, mites and crabs are some of my relatives.
- My eight simple eyes help me to see the front, behind, above, below, and to the sides. I also have eight legs.
- I have poison fangs to paralyze my prey. I suck out their insides and discard their empty shells.
- Most of us spin our own silk which we use to make egg cocoons, construct webs and traps, line our burrows, and wrap our prey up before we eat them.
- When I am born, I look like Mum and Dad- eight eyes, two body sections, and quite a few legs. I don't have any wings or antennae though.
- There are 50,000 species of my kind. We are very adaptable and live in many different places. We have been around for a very long time, and many of us live with you in your house.

CRESTED IGUANA

- I am a reptile, otherwise known as the vokai. You can call me an indigenous Fijian.
- I live in islands off the north-western side of Viti Levu with the largest population residing on the island of Yadua Taba. These are the only places you can find me.
- I am heavily built, with powerful claws and may reach a length of 1 metre. I have a yellow nose.
- I spend most of my time high up in the branches of trees, where I am well camouflaged.
- When I am frightened or angry, I turn a very dark green, almost black in a few minutes.
- I lay eggs which I bury underground and cover them with soil.
- My body is green and I have white bands circling my body.
- I prefer living in forested areas; yeah, not much rain and with a lot of sunshine. I need the sun to boost my energy; that's why you can find me on canopy tops and on exposed rocky areas basking away in the sun.
- I look a little bit like a stegosaurus. My cousins are geckos, skinks, and even turtles.
- I am a vegetarian and I love to eat. My favourite plants are vau, cevua, kauloa, vesiwai.



FROG

- I am able to breathe and drink through my moist skin. I have two webbed feet.
- The males of my kind sing to attract the females. But neither males nor females build nests or care for our babies.
- I am an amphibian. I have four legs, two eyes, and a backbone.
- I'm green and live in and out of water.
- When I'm young I breathe through gills. Later as an adult, my body changes and I develop air-breathing lungs.
- My tongue is located at the tip of my mouth. I flip it out to catch insects.
- I'm cold- blooded, swim and lay my eggs in water.
- If it is cold, I'll spend my winter in the mud on the bottom of a pond.
- I find safety in water from those who might try to eat me.
- When I'm young I eat plants, but as I grow older I change to a diet of insects.

Extra clues for frog:

- I sometimes leap at flying or crawling insects and catch them in my mouth.
- When threatened I puff myself up with air.

Extra clues

When I am born I race to the ocean to find safety. To lay my eggs I return to the same beach I was born.

…….Sea Turtle……..

Many of us will place algae, or other dead or living on our hard backs to disguise ourselves. Fish, birds, seals, and octopuses eat us. A few of us live in fresh water.

……..Crabs……

I have fins. I have to keep swimming or I sink. I don't have an air bladder that keeps afloat, like fish do. That's why you'll always see me cruising around. (Some people think I am a fish, but I am not.)

…….Shark…….

I open my shell and move part of my stomach into the shell. Then I pour juices into the shell to help me eat. My cousins are either blue, red, orange, or yellow.

…….Star Fish…….

When I am a baby I weigh seven tons and I'm about 24 feet long. I gain 200 pounds everyday. That's nine pounds an hour. As an adult, I may eat three tons of food everyday. I eat a shrimp-like animal called krill.

…….Whale…….

Adapted from: ***Sharing Nature with Children II- A Sequel to the Classic Parents' & Teachers' Nature Awareness Guidebook***; J. Cornell; Dawn Publications; 1989; U.S.A.

Activity- My Mangrove Home

Purpose:

To understand the importance of mangroves and how human activities disrupt the mangrove ecosystem.

Time: 30-40 minutes

Materials: role play scenes

Curriculum Connections:

English- pre-writing activity; script writing; role play; drama skills; vernacular;

Social/ Health Science- places & environment; resource use & conservation; marine ecosystems;

Basic/ Elementary Science- the land, environment and us; why organisms live in certain places; living things; natural habitats;

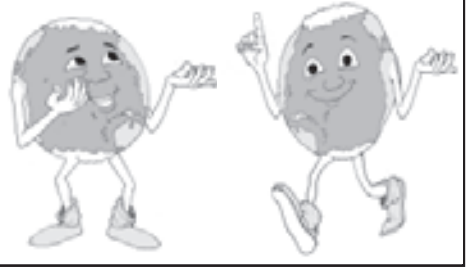
Skills- drama skills; empathy; communication & dialogue; planning & decision making; creativity & imagination; linking abstract to concrete.

Note:

Students can use statue poses to show each scene. They can do each scene without talking or they may decide to develop the script.

This role play could be performed as a little drama activity for the school concert. Develop costumes and invite other classes or parents to the show 'My Mangrove Home'.

Use this activity before or after a field visit to the mangroves.



What to do:

1. Discuss the following questions with your students:
   - o Why are mangroves important?
   - o What creatures can be found in mangroves?
   - o What are the different trees found in mangrove areas?
   - o What happens when you remove mangroves?

2. Explain to students that they will be conducting a role- play to learn more about a mangrove ecosystem and to find out what happens when the mangrove forest is being cut down.

3. Divide students into the following groups to represent different parts of the mangrove ecosystem:

   - o The mangrove trees;
   - o Fish, crabs, other creatures found in the mangroves (students can name these);
   - o Fisher folk (two students);
   - o Developers with chain-saws;
   - o Two big sharks;
   - o One or two students to represent the sea water;
   - o One student or the teacher to be the storyteller.

4. Give the role play 'picture' scenes to each group to discuss and agree to their roles in the scenes. Explain to the students that they will all need to work together to role play each picture scene which shows what happens when a mangrove forest is cut down. Encourage the crabs, fish, sharks, trees etc to 'fit into' their role.

5. Allow the groups a few minutes to prepare before gathering them together. Create space in the classroom to conduct the role play.

Scene 1
Storyteller: My mangrove home is wonderful. The beautiful dogo and tiri trees spread out, almost in neat rows from the land to the sea. I have a lot of cousins, relatives and friends who live in my mangrove home. Sister Fish, The Crab family- Soroa, Uca, Mana, my best friends Worm, Mud Skipper, Anty and Spider and many others all live in my mangrove home. Some live in the roots, in the stems, in the pools, in the mud, and also high up in the trees. We stay away from the deep sea though!! There are big fish and sharks out there that can eat us. Even human beings seem to like my mangrove home. They fish everyday and try and catch some crabs and……Life is good.

Picture: *In this picture, students who are the mangrove trees arrange themselves in rows from the land out to sea. Fish and crabs and other creatures in a mangrove ecosystem swim around the trees, staying away from the deep ocean where the big fish and sharks are found. Fisher folk are happily fishing and collecting crabs from the mangrove. The water flows in but is blocked by the trees so do not reach land.*

Scene 2
Storyteller: Until……what is that noise? It is very LOUD! Oh my gosh! Some of the trees are falling. What's happening? The developers are carrying the trees off- oh no! they have taken my home- what shall I do?

Picture: *In this picture the developers move through the mangrove and cut the trees in rows beginning from the land. The 'trees' fall to the ground and are carried off by those cutting. The fish and crabs and other mangrove creatures move from tree to tree trying to find a home. Some die out as they fight for food and shelter. They keep moving as more mangroves are cut and there is almost nowhere else for them to shelter.*

Scene 3
Storyteller: My home has been cut down. My friends and I have nowhere else to shelter. The water has flooded all the mud flats and rocky pools. The only tree that is left has a group of crabs who will not share their home with us. We will have to move out to find a new home. Oh no! That big Monster Shark is coming for us. There's nowhere to hide! Ahhhh! Ssswisssh……. (sound of waves washing in).

Picture: *Whatever small fish are left move out to the deep water because there is nowhere for them to shelter. They are eaten by bigger fish. The water continues to move inland as there are no mangroves to stop it.*

Scene 4: (silence for this scene…to emphasise 'no life')

Picture: *This could show the empty water without life. People walking through the water looking for fish and crabs but finding nothing.*

Deconstructing the activity:

- What happened?
- How can the harvesting of the mangroves be done in a way that will not destroy the mangrove ecosystem?
- *Discussing feelings:* How did they feel? The trees? The mangrove creatures? The fisher folk? The sharks? The Developers? The water? List the feelings down and discuss each in relation to feelings people experience in everyday life or different situations. (i.e. *'bring it home'*).
- Ask questions: Is this a good feeling? Why? Is this a not so good feeling? Why? What can you do to change this into a good feeling? How do you cope with this feeling- good or bad?
- Complete the activity with students writing a letter as below, or a poem or drawing a picture.

A Fishy Tale

- Ask the students to imagine they are a fish who lives in a very dirty and polluted mangrove or river. Ask them to close their eyes for a few minutes and imagine what their surroundings look like and what life is like in their dirty environment.

- Encourage the students to write a letter to another fish that lives in a clean healthy mangrove or river. Have students describe the place where they live and how they feel about all the rubbish that people throw in their home.

Example letter:

Dear Charlie,

Hi, how are you? Hope you are fine. Forget about me because my fins are losing its color. My friends Mary, Chris, Tim and Joe are all gone forever. Oh! Not forgetting my cousin Mere who left this place a few months ago.

You might be wondering why I am writing this letter. This is because Fiji Sugar Cooperation Factory wastes are dumped in my home. People and children who go past me cover their noses because they can't bare the smell of my home.

If it is ok with you, can I come and stay with you for a while. Bye for now because I have a lot of cleaning to do.

Your friend,
Mary Ann

From Bethel Primary School Student, Labasa, Fiji as part of the HOPE Initiative 2004

Activity- Environmental Statues

Purpose:

To use body statues to examine environmental issues.

Time: 30-40 minutes

Materials: None.

Curriculum Connections:

English- pre-writing activity; script writing; role play; drama skills;

Social/ Health Science- places & environment; resource use & conservation; marine ecosystems;

Basic/ Elementary Science- the land, environment and us; why organisms live in certain places; living things; natural habitats;

Skills- drama skills; empathy; communication & dialogue; planning & decision making; creativity & imagination; linking abstract to concrete.

Note:

Students use statue poses to show each scene. This is similar to miming except students pose without moving.

Each scene could have students holding their pose, and then slowing relaxing their pose to move to the next scene; i.e. pose- melt- pose!

For example, a forest group may pose first as trees, then lift their hands as birds, then flow as rivers etc.

Two or three students can join together to make a part of the reef or stand with arms outstretched and fingers touching to show trees in a forest.

Use this activity before or after teaching about habitats or ecosystems.

What to do:

1. Form groups of 6 to 8 students per group. Explain to students that each group will be acting like statues to describe an environment. That is, they are to pose, without moving and talking.
2. Give each group a topic, (or you may decide to give the same topic to all the groups). For example:

- o What makes up a forest?
- o What makes up a reef?
- o What makes up a river system?
- o What makes up a mangrove system?

3. All the members of the group must work together to make a picture. They should decide how they will pose as statues to represent things in their environment.
4. Other students act as birds, animals etc. Or all the students in the group may form a series of pictures of what makes up a forest, or reef etc.

Using drama at HOPE student leadership workshop Lautoka

5. Encourage students to use their imagination and remind them that they must use poses- statue figures to represent different things found in the environment.

6. Give groups enough time to prepare their statues. Each group then must show their picture to the others. The class must guess the ecosystem/ environment and what everyone in the picture represents.

7. Once the first set of 'statues' are completed, groups can then work on the second set. For example:
o What do people use the forest for?
o What do people use the reef for?
o What do people use the rivers for?
o What do people use the mangroves for?

8. Explain to the groups that when they present their pictures they should first stand as statues to show Picture 1, and then move 'gracefully' to form Picture 2.

9. Follow up with a discussion about why the forest or reef or river or mangroves are important.

Deconstructing the Activity:

- Discuss the role plays with the class. Note different things that each group presented and ask questions. For example, what was the bird doing? In what way did that action represent the tree?
- Why are these ecosystems important? How do humans benefit? What are the cultural, social, economic and natural significance of the resources in these ecosystems?
- In what way is the environment used? What was shown? What problems are caused by using this resource in such a way?

Students taking part in an environmental dance

Adapted from: ***Drama in Environmental Education- A Guide***; Wan Smol Bag Theatre Publication; J. Dorras & H. Corrigan; 2002

Activity- Variety of Life

Purpose:

To introduce the concept of biodiversity.

To appreciate the differences in biodiversity between different ecosystems.

Time: 45 minutes

Materials: Newsprint, markers, cello tape or blu tac

Curriculum Connections:

English- pre-writing activity; vocabulary;

Social/ Health Science- places & environment; resource use & conservation; marine ecosystems;

Basic/ Elementary Science- environment and us; where organisms live; why organisms live in certain places; living things; natural habitats; importance of trees;

Skills- communication & dialogue; planning & decision making; collaborative learning; research; data collection; record keeping; inventory.

Note:

Invite a community elder to talk to the class about how the ecosystem has changed over time, the plants and animals that were present before, and the effects these changes have had on the community.

The elder or community member/ forester etc may be talking about a piece of forest that is now a farm, or sugarcane plantation, or a mangrove area that is now a hotel site, or other relevant examples.

What to do:

1. Divide the students into small working groups with about 5 to 6 students per group.

2. Ask the students of each group to select a recorder and a group leader. The *recorder's job* is to write down everything the group members contribute during the discussion. The *leader's job* is to maintain order in the group.

3. Brainstorm with students different ecosystems on earth. These can be both natural and man- made. Make a list of different natural and man- made ecosystems on the board.

4. Instruct the students to divide the newsprint into two columns. Students should choose two different ecosystems- one for each column.

Teachers in Sigatoka trialing 'Variety of Life'

5. Under the heading of each ecosystem type, ask students to write the names of the various animals and plants found in the two ecosystems.

6. Give the students twenty minutes to complete their plant and animal inventories under the two headings.

An example of the table outline is shown below:

Tropical Rainforest	**Sugar Cane Plantation**
Plants: 1.Dakua tree Animals: 1. Kula bird	Plants: 1. Para grass Animals: 1. Toad
Total Number of Plants: **Total Number of Animals:** **Total Biodiversity:**	**Total Number of Plants:** **Total Number of Animals:** **Total Biodiversity:**

7. Once they have completed their animal and plant inventories, ask the students to tally the number of plants and animals found in the two different ecosystems.

8. Finally ask the groups to present their work to the class.

Deconstructing the activity:

Write student answers on the board for all to view. List key terms and ask students to elaborate further where needed.

- Which ecosystems had more plants and animals? Can students explain why this is so?
- Which ecosystems had more plants than animals (and vice- versa)? Can students give a reason for this?
- Compare the man- made and natural ecosystems. Which has more plants and animals? Why is this so?
- Which ecosystems are currently being threatened? In what way?
- What can we do to prevent this? As individuals, or as a class, or as a community or as a nation?

Activity-The Investigator

Purpose:

To investigate traditional uses of some common plant and fruit trees.

Time: 30-40 minutes

Materials: Notebooks, pencils

Curriculum Connections:

English- research assignment;

Maths- calculations;

Social/ Health Science- places & environment; resource use & conservation; sustainability; ceremonial customs;

Basic/ Elementary Science- the land, environment and us; why organisms live in certain places; living things; natural habitats; importance of trees;

Skills- research; collaborative learning; data collection; record keeping; inventory.

Note:
This is a good opportunity to invite some parents or grandparents to school to help students learn about traditional ways of life and medicines.

The students may wish to educate other students in the school by using left over wood to name trees in the compound, using vernacular, scientific and common names and uses.

Encourage your students to collect herbs and plant a class herbal garden. Herbs such as dhania or mint can be taken home for cooking.

What to do:

1. Identify some common plants in and around the school compound.

2. Brainstorm with students to list down the common name and vernacular names of these plants, fruit trees and herbs.

3. Ask children to list their findings in a table as shown below.

4. Discuss the past and present values of the plants listed.

An example of the table outline is shown below:

Name of Plant / Fruit	***Current Use***	***Traditional Use***
Guava (Quwawa, amrud)	Fruit is eaten	Leaves crushed and mixed with warm water as a drink to treat diarrhoea.

Deconstructing the Activity:

- What values do these plants have? Economically, Socially or Traditionally?
- Are there plants that put back nutrients into the soil or benefit the soil in some way? Can students identify these and explain how?
- What is the value of herbs?

	Name of Medicinal plant	Part of plant	Used for	Comments on application
1	Batimadramadra	Leaves	▪ As Cripe water for babies ▪ Head ache ▪ Skin ulcer ▪ Fever ▪ Wounds/cuts	Squeeze the juice from the leaves and mix with water and drink. Apply the juice directly on affected area.
2	Botebotekoro	Leaves	▪ Mixed with above for babies ▪ Constipation ▪ Boils ▪ Wounds/cuts	Squeeze the juice from the leaves and mix with water and drink. Apply the juice directly on affected area.
3	Kaukamea	Leaves	▪ Wounds and cuts	Apply the juice directly on affected area.
4	Mile-a-minute	Leaves	▪ Wounds/cuts ▪ Stomach ulcer ▪ Cleaning eyes	Apply the juice directly on affected area. Squeeze the juice from the leaves and mix with water and drink.
5	Totowiwi	Leaves	▪ Cleaning eyes ▪ Treatment of "macake"	Squeeze the juice from the leaves and mix with water and drink.
6	Lawere	Leaves	▪ Used during child labour in women	Squeeze the juice from the leaves and mix with water and drink.
7	Vicks	Leaves	▪ Severe headache	Squeeze the juice from the leaves and mix with water and drink.
8	Tukituki Yadre	Leaves	▪ Fever ▪ Body pains	Squeeze the juice from the leaves and mix with water and drink.
9	Banana shoots	shoots	▪ Stomach aches	Squeeze the juice from the leaves and mix with water and drink.
10	Chilly plant	Leaves	▪ Running stomach	Squeeze the juice from the leaves and mix with water and drink.
11	Egg plant	Leaves	▪ Wounds/ cuts	Apply the juice directly on affected area.
12	Lantana	Leaves	▪ Lowers sugar level	Squeeze the juice from the leaves and mix with water and drink.
13	Kavika	Stem	▪ Stomach ache	Grind the bark, and mix the powder in water. Use for drinking.
14	Warusi	Roots	▪ Strengthens muscles and tendons	Grind the roots and mix with water. Drink.
15	Pandanus	Roots	▪ Curing fish poisoning	Grind the roots and mix with water. Drink.
16	Lemon	Roots	▪ Strengthen the joints	Grind the roots and mix with water. Drink
17	Basil (Tomole)	Leaves	▪ Cough ▪ Fever ▪ Steam bath	Squeeze the juice from the leaves and mix with water and drink.
18	Guava	Leaves	▪ Diarrhea ▪ Stomach ache ▪ Sore throat ▪ Sore tongue	Squeeze the juice from the leaves and mix with water and drink.

The above are responses from teachers, who attended a Live & Learn Teacher Training Workshop at Vunimono Arya Primary school on the 28-30th of May, 2002.

NATURE SCHOOL

Sharing nature with children! HOPE school activities include:

- Working with parents to use old timber to build birdhouses & place in trees;
- Labeling trees and plants around the school compound with common names, vernacular names & uses;
- Constructing greenhouses;
- Developing outdoor learning areas;
- Growing fruit trees, food crops, flowers & herbal gardens;
- Making artifacts from readily available materials – some schools made items out of coconut timber & pine needles!

Indira Gandhi Memorial Primary School used bamboo to grow plants in. The bamboo is hung from the balcony during the day to catch the rain and sunlight. At Nabekavu Primary School, different types of herbs are also grown in a trough that is hung outside the classrooms.

Compost heaps are now found in all HOPE schools!

Painting Murals on school walls has been an action for most HOPE schools. At Rishikul Nadera Primary School for example, murals on endangered species, marine life, pollution and gardening have been painted on school walls. According to the school HOPE coordinator,
"The students really enjoyed the painting exercise. Being exposed to the information on the murals each day increases their awareness and understanding of their environment."

Garden projects, establishing herbal & medicinal gardens have also been outdoor activities for HOPE students. According to the HOPE Coordinator at Bethel Primary School,
"Students have a more positive attitude to taking care of plants. They make an effort to ensure plants are not damaged. This is a great change in attitude and behaviour!"

HOPE schools grow cabbages, lettuce, tomatoes, pineapples, dhania, okra, beans, lemon trees, pawpaw trees, guava trees, dalo, cassava,...and many more!!

Students have used old bottles, tins and plastic containers & bags for potted plants. In many HOPE schools, these have been sold to fund more school activities.

Extra! Extra!

Adapted From 'Drama in Environmental Education- A Guide!'

1. There's Always a Good and a Bad Side!

Very often with environmental issues, the aim is to make people think and to start a discussion. Often we are dealing with *sensitive* or *controversial* issues. ***Good and Bad Sides*** is a very simple exercise using statues, which allows people to look carefully at issues and to see that everything has two sides!

What You Need!

- Groups of six to ten people.
- A topic for each group.
- A piece of paper for each group.
- A space for each group to work in.
- An area to perform their statue work.
- About an hour for this work.

What You Do!

- Each group is given a topic. They must discuss as many good sides and bad sides of the topic as they can think of and write them down.
- They must then choose up to ***three good things*** and ***three bad things*** from their list.
- They must make statue pictures to show their idea. There is no speaking. They can announce what their topic is and that these are good sides and these are bad sides.
- They stop for a second between each new idea so people can see they are changing. When they have shown all their good sides, people could guess what they are then they can see the bad sides and guess what they are too. If the group cannot guess, the statues can be performed again.
- When the pictures are finished, the whole group can discuss the ideas raised by the pictures. Does one side outweigh the other?

Suggested Topics

- Logging
- Re-afforestation
- Harvesting Beche-de-Mer
- Harvesting Coral
- Mining
- Live Fish Trade
- Hotel developments
- Disposing of rubbish in the sea/ on land/ by burning
- Big families
- Building of Dams
- Chiefly taboos
- You should use topics that are relevant to your community or class.

2. Five Line Plays!

Five line plays are a simple method of play making that is very interactive and involves everyone in the groups of five in discussions of the issues, characters, and in what direction the play will take. You can adapt the methodology for any topic.

What you need

- Groups of five people.
- Space for the groups to work in.
- Enough sets of five lines for the number of groups you have.
- 30 minutes to an hour for the exercise.

What you do

- Divide your group into groups of five.
- Give each group of five people a five liner card.
- The group must look at the card and think about where the story is taking place, who they are, and what they are doing.
- They can start moving before any lines are spoken. *For example in the five liners about fishing, you can start with someone throwing a line into an imaginary sea.*
- Each person has one line which they must say. They must decide how they are going to say the line. Are they cross, happy, sad? Where are they standing in relation to the others? Are they still or do they move as they speak or after they speak.
- The team leader can walk round and help them to decide what is happening in the story.
- The group practices the five lines together and makes sure they all can be seen when they show their lines to the other groups.
- When everyone is ready each group performs their five line stories!

What you do next!

- Now you can ask each group to add five new lines to the story to see what happens next.
- You can carry on until you have fifteen lines and the story is finished!

Students showing their talents in role play

Examples of Five Line Plays

1. You can't cut it down! I need it for leaf medicine!
2. Get out of the way, you stupid old woman!
3. Leave her alone! You'll hurt her!
4. If she doesn't move, we won't get the money!
5. You better move now, or we'll cut the tree down on top of you!

1. I didn't know they'd cut down everything!
2. Where will we get wood for making our houses!
3. We've got money now we can buy anything we want!
4. We can plant gardens here too!
5. You shouldn't have let them do it chief!

1. Let's cut the bush here…
2. But it's too close to the river!
3. What else can we do? We need to make a garden!
4. Come on! Cut down those trees!
5. Stop! We can't do it! You know what will happen!

1. Don't shoot it!
2. You fool! You made it fly away!
3. Look it's landed over here! In that tree!
4. If you come over here quickly you can get it.
5. Don't kill me! Don't kill me! I can help all of you!

1. Haven't you caught anything yet?
2. He's been there for two hours and he hasn't had a bite!
3. When I was a young man, we caught a fish every time we threw in our line!
4. You're lying! It was never like that!
5. Hey! I've got something! I've got a bite!

1. Come this way!
2. Are you sure it's safe?
3. We'll be alright…. Look out it's a net!
4. Oh my! They nearly got us!
5. Dive down before it's too late!

1. Hey! What do you think you're doing?
2. I'm not doing anything wrong!
3. You can't just drop it there!
4. Ah you guys are always telling us what to do!
5. Yeah! You pick it up if you're so worried!

1. Turn right here driver!
2. The fumes from all those cars… they make me cough!
3. Put a handkerchief over your mouth like me!
4. We'll never get across! There are too many cars
5. I'm walking! I can't stand sitting in this car any longer!

- ***Write each of the sets of 5 –liners onto cards and give one set per group. If your class size is small then you have more five liners to work with.***


WASTE NOT, WANT NOT
RECYCLE
REUSE
REDUCE
WASTE

Activity- 'Dramatic Connections'

Purpose:

To highlight the links between waste and social/ economic and environmental impacts

Time: 40 minutes

Materials: List of 'dramatic connections'.

Curriculum Connections:

English- pre-writing activity; literature; short story or novel; oral expression; vocabulary;

Social/ Health Science- places & environment; resources & economic activity; adapting to & caring for the natural, social and cultural environment; my role as a consumer; rubbish disposal and sanitation;

Basic/ Elementary Science- upsetting & restoring the natural habitat; changing ecosystems; the land, environment and us; the physical, social environment and our health;

Skills- presentation of ideas; linking concepts; collaborative learning; critical thinking; promoting synthesis, creativity & imagination.

Note:
Adapt the list of dramatic connections to suit the topic you are teaching and students' ability to grasp the concepts.

'Dramatic Connections' is a teaching strategy- you can use this approach for other topics in other subject areas.

For example, you may use it in an English class to look at characters and events in a short story; or in Basic Science to dramatise a process such as photosynthesis or the water cycle.

What to do:

1. Divide students into groups of six.

List 1	List 2	List 3
A supermarket	A baby	A drain filled with litter
A dead Marine Turtle	A well	An angry Headmaster
A happy Jelly fish	A person drinking	Very bad smell
A plastic bag	Several dirty nappies	Junk food
A person shopping	An empty rainwater tank	Happy canteen lady
A sad old man	A person with diarrhea	Child not feeling well

2. Provide each group with one of the three lists (above). Ask each group to prepare a short drama/ role play that must include each of the six objects or people on their list.

3. Explain that the list can be arranged to tell a story that shows relationships between the environment and peoples lives. There is no right or wrong order to use the objects or people in the drama.

4. Allow 15 minutes for the groups to prepare a drama performance, and 5 minutes for each performance.

Deconstructing the Activity:

- After each performance ask the class: *what was the message in the performance?*
- *Do you agree with the links that were made between people and the environment?*
- Ask the performers, *did you get your message across?*
- *What were the relationships that you were trying to show? Is this a realistic scenario in your community?*

Activity- Shop 'til you Drop!

Purpose:

To look at how our consumer habits may have contributed to the problem of excessive waste!

Time: 20-30 minutes

Materials: Shopping list (copy this out on the board or provide each group with a list).

Curriculum Connections:

English- pre-writing activity; literature; short story or novel; oral expression; vocabulary;

Maths- calculation; addition & problem solving;

Social/ Health Science- our money; attitudes & values; my role as a consumer; resources in communities; shopping skills; rubbish disposal;

Basic/ Elementary Science- earth science; environment; reduce, reuse, recycle;

Skills- prioritising; decision making; critical thinking; empathy; understanding consumer habits; sorting; clarifying values & attitudes.

Note:
An alternative to playing the game is to divide the class into many teams and provide each team with the shopping list. ***BUT, let each team make their own decision regarding what they would like to purchase!***

Change the deconstruction questions to suit how you decide to facilitate the activity. For example, you may ask:
Who was able to enjoy what they had bought? Why was this so? What teams were very 'stressed'? Why was this so? What can the teams do to decrease the amount of stress and be able to enjoy life?

What to do:

1. Divide the students into 2 teams and give each team a copy of the shopping list.

2. Explain how the game will be played. To buy an item, the entire team must run across the classroom and back the amount of times shown beside that item on the list. *Clear a space in the classroom to conduct this activity or take your class outside to the playgrounds and mark the boundaries where the teams will need to run back and forth.*

3. Give each team the following instructions:
   - Team 1: the aim of the game is to buy as much as possible.
   - Team 2: the aim of the game is to decide what you need to be happy, but once you have the items, to sit down and enjoy them.

4. Give the teams a short time to look at the shopping list before starting. Stop the game a few minutes after team 2 has sat down.

5. Once students have settled down, facilitate a discussion on the activity.

Deconstructing the Activity:

- Compare experiences. What did Teams 1 and 2 decide they needed?
- Does having more flashier things make us happier?
- Team 1 rushed around earning money to buy things. What might they miss out on in life?
- Look at the shopping list and divide the items according to needs and wants.
- How much of what you buy do you really need?
- Is this game realistic of what goes on in societies today?
- How have people's consumption patterns changed over time. For example, what goods were available to your parents 30 years ago? Did they buy more goods or less? How much waste did they produce then? Compare this to the amount of waste being produced now.
- What kinds of packaging are used for the things you buy? What happens to the packaging?
- Would it be better to be like Team 1 or Team 2? Why?

Shopping list

Basic house	3
Healthy food	1
Decent clothes	2
Bus pass/ Fares for public transport	2
TV and stereo	2
Occasional restaurant visits	3
Latest manufactured products	4
Latest computer games	5
Latest video games	5
Up- to- date fashion wardrobe	6
Fantastic hi-fi system	6
Small car	6
Fantastic house	8
Swimming pool	8
Flashy car	8
Regular meals at the restaurant	8

Activity- Blowing Up Your World

Purpose:

To illustrate how a person's everyday decisions and behaviour affect the environment.

Time: 40-50 minutes

Materials: 1 balloon, pencils, paper and safety glasses.

Curriculum Connections:

English- pre-writing activity;

Maths- calculation & addition;

Social/ Health Science- resource exploitation, sustainable use & conservation; my role as a consumer; civic education;

Basic/ Elementary Science- earth science; environment; reduce,reuse,recycle; energy;

Skills- critical thinking; reasoning & decision making; clarifying values & attitudes.

Note:

The Blowing Up Your World activity can be used or adapted as a quick introduction to a variety of environmental topics, or as an opener for discussions on personal responsibility for protecting the earth's resources.

It can also be used to demonstrate the concept of carrying capacity and our potential to exceed the earth's limits.

It is important during the activity that you release air from the balloon for good environmental behaviour. The balloon is only a model; it is unlikely that our collective behaviour could blow up the world- but it shows how we can do a lot of damage.

What to do:

1. Select one student to put on the safety glasses, stand in front of the class and blow up the balloon to its ordinary full size. *Ask the student to hold the balloon closed with his/her fingers.*

2. Tell the class that the balloon represents the earth. Students should note that it is already tight with environmental stress that their parents and grandparents have put on it. *The planet we all depend on for survival is being stretched beyond its limits by our growing population's over-consumption of resources and pollution of air, soil and water. We need to see how we, as individuals, are doing.*

3. Ask each of the questions below. With each response to a question, count the number of hands up and the number of hands down. *For every 3-5 students whose behaviour damages the environment, blow one big breath of air into the balloon. For every 3-5 students whose behaviour is good for the environment, let some air out of the balloon.*

4. With each question, ask the students to record their points (if any) on paper. *The points are in brackets after each question.*

Suggest that students listen carefully to each question before deciding to raise their hands. To discourage the students from completely raising their hands to blow up the balloon, a hands-up response sometimes indicates good environmental behaviour and sometimes bad.

Questions:

These are sample questions, feel free to change them, add more or have the students make up some questions.

1. How many of you leave your bedroom (or any room) lights on when you are not in the room? *(Hands down get 2 points)*

Discussion: *Turning off lights saves energy as well as money. Where does electricity come from? More electricity means that more rivers are dammed and more fossil fuel is burned. This causes air pollution and increases levels of carbon dioxide- CO_2 in the air which contributes to global warming, i.e. the greenhouse effect.*

2. How many of you walked, cycled or took public transport to get to school today instead of coming by private car? *(Hands up get 3 points)*

Discussion: *Our reliance on cars that burn fossil fuels is one of the major causes of increased levels of carbon dioxide in the air and is the primary cause of urban smog.*

3. How many of you when you drink a soft drink, throw the container (bottle or can) into the normal garbage? *(Hands down get 3 points)*

Discussion: *Throwing away containers of any kind wastes energy and resources and increases our waste problem. Many towns are running out of landfill space. Is a landfill site a good use for land? What are some of the effects of landfills on the environment?*

4. How many of you eat vegetables grown in your own family's garden or by local farmers instead of mass- produced, canned or frozen vegetables? *(Hands up get 4 points)*

Discussion: *Vegetables that are mass-produced often use a lot of pesticides and inorganic fertilisers. How does this affect the environment? Some pesticides are linked to cancer. Transportation adds to pollution problems and packaging creates waste.*

5. How many of you use a hairdryer or any energy- consuming convenience appliances such as electric toothbrushes, irons and electric kettles especially in the morning? *(Hands down get 2 points)*

Discussion: *In the morning, so much demand is put on our electrical supply. What can we do to decrease the pressure on electrical plants?*

6. How many of you when you go to a store, get a plastic bag for your purchases, even if you have only one or two small items to carry? *(Hands down get 3 points)*

Discussion: *Making paper and plastic bags uses energy and resources. The bags add to our litter and wastes problems, and plastics are not biodegradable. Recycling is not the best answer, because collecting and recycling materials requires energy. Instead carry a reusable cloth bag or a knapsack with you.*

7. How many of you take your lunch to school in a lunch-box or reusable container? *(Hands up get 3 points)*

Discussion: *Taking your own lunch to school in a lunch box or reusable container decreases use of foam containers and plastic or paper wrappers and thus results in less waste produced. If buying lunch from the school canteen, students can take empty lunch boxes to have lunch placed in, or canteens can give food on plates, or in containers that can be returned, washed and reused.*

8. How many of you eat take-out or cafeteria food that is found in foam or plastic containers? *(Hands down get 10 points)*

Discussion: *Polystyrene (foam) and other plastic containers are made from petrochemicals. They do not decompose in landfills, and release toxic gases when they are burned in incinerators.*

Rubbish dumps- a growing problem in Fiji!

9. How many of you use cloth towels instead of paper towels to clean up a mess? *(Hands up get 2 points)*

Discussion: *Paper comes from trees. The more of it we use, the more trees are cut down. Why is it important to conserve our forests?*

10. How many of you have belongings that you do not use or need? *(Hands down get 2 points)*

Discussion: *Before you purchase something, think carefully about whether you need it or are likely to use it for a long time. Shopping wisely and reducing our consumption are the first lines of defence in protecting the environment.*

11. Is your sewage treated before it flows into the river, lake or the ocean? *(Hands up get 6 points; 0 points to those who don't know.)*

Discussion: *Raw sewage running into a body of water pollutes it. Water is one of our most valuable resources, yet many towns still do not have waste treatment facilities. When we dump raw sewage, we are using lakes, rivers and oceans as our toilets. Think of this the next time you drink a glass of water, milk or soft drink. Less than 1% of the world's water is drinkable and is constantly being recycled. Every glass of water contains two molecules of water that at one time were part of someone else's body!!*

Kinoya Sewage Treatment Plant

Scoring: Have students add up their scores, and then tell them how they did.

31-40 points:	Very good! You're living an environment-friendly lifestyle!
21-30 points:	Good! You're starting to save the world!
11-20 points:	Lots of room for improvement!
1-10 points:	Change now! Help our planet earth!

Deconstructing the Activity:

- Did your balloon blow up? *Point out to students that the earth is very resilient and will survive. It is ourselves- human beings- and other species that we endanger by damaging our environment.*
- Discuss with the class what each of them can do personally to protect the environment.
- Ask the students to choose one behaviour where they did not receive points. Can they change this behaviour within a given amount of time?

Adapted from: ***Teaching Green: The Middle Years; Hand on Learning in Grades 6-8***
Edited by Tim Grant and Gail Littlejohn; 2004; (pp77-78)

Activity - What a Waste – "Reduce Your Rubbish"

Purpose:

To visualise how much solid waste is generated by each person in the school;
-to understand the problems of waste disposal;
-and to develop an action plan to reduce waste.

Time: This activity has 4 parts, 40-45 minutes each.

Materials: Gloves, a large piece of plastic, the classroom rubbish bin, note book, pen, newsprints, and Waste Reduction Plan templates.

Curriculum Connections:

English- pre-writing activity;

Maths- calculation & addition; problem solving; data collection & presentation;

Social/ Health Science- care for school property; living in a town; places & environment; resources & economic activity; rubbish disposal;

Basic/ Elementary Science- earth science; environment; reduce, reuse, recycle; living things;

Skills- research; sorting; collaboration; communication; reasoning; clarify values & attitudes.

Note:
Hopefully by the end of the activity, students will come to the conclusion that the best thing to do is to try and create less rubbish.

We suggest that teachers and students together find ways to use their on-going classroom discussions as an opportunity for some kind of action in the school or community.

Action ensures that activities & plans are not 'stand- alone events' but are fruitful in making desired changes.

What to do:

Part I: What is Rubbish?

1. Ask the students to define what rubbish is. Carry on asking, 'What qualities does an item have, to make you decide it is rubbish?'

2. Divide the students into groups. Ask them to brainstorm and make a list of things they think people throw away.

3. Give each group newsprint. The students should draw a table with the following headings: ***can be recycled; cannot be recycled; can be re-used; can be composted; can be burnt***.

4. Ask groups to sort out their rubbish list and put them under the correct heading. Display their group work.

What is rubbish and what can we do about it?

Part II: A Waste Audit

5. Together in class, place a sheet of plastic on the floor and empty a days worth of rubbish collected in class onto the sheet of plastic with the students standing in the circle around it. *Place a garbage bag or bin in class the day before the activity to collect all rubbish thrown in one day. Let students*

know that they should put all their rubbish during the day in the class garbage bag or bin, for the activity. They should not throw their rubbish in the general school bin. This is to get a fair result of the rubbish produced by the class in one day.

6. Wear a pair of gloves and ask the students to direct you to sort the rubbish on the plastic into the groups above. Ask questions to get students to think critically about which category to place the rubbish. *For example: In Fiji can this be recycled or not?*

7. Ask the students: *Does this seem like a lot of rubbish for one day? In schools, what is the most common type of rubbish? What would the most common type of rubbish be for households?*

8. Do some calculations to work out how many bins there are in the school. How much rubbish do students make in a week at the school? (i.e. based on the amount you have collected x total bins x number of school days per week). In a month? A year?

9. Have the students imagine how much rubbish they personally make in one year. Also imagine how much rubbish their family makes in a year.

10. Ask the students: *What would you do with your family's rubbish if there was no truck that came to take it away? Would it affect the amount of rubbish your family makes? What can you do to reduce the amount of rubbish at home?*

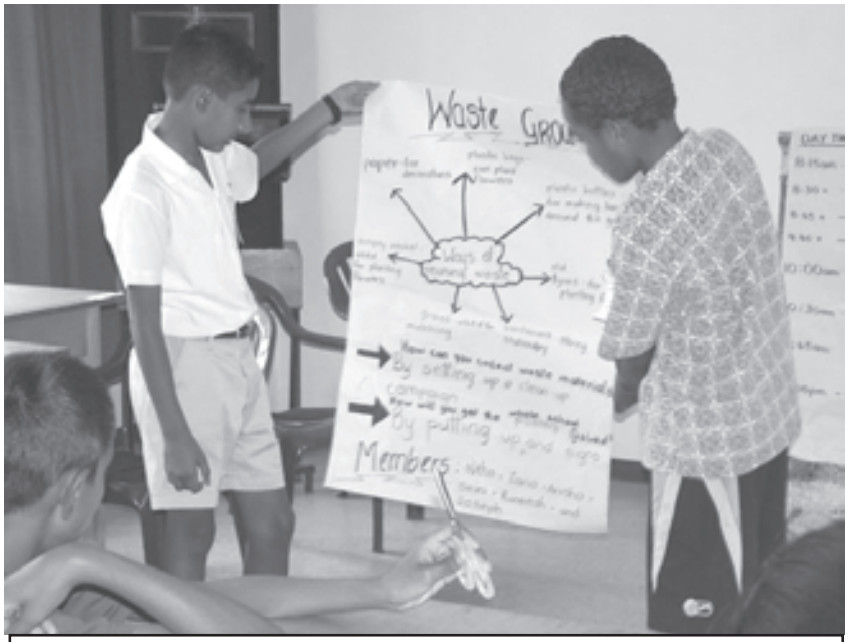
Part III: Developing a Waste Reduction Plan

11. Put the students back into the same working groups. Explain that in this activity, students will identify actions that they can take to reduce, reuse or recycle waste. *Remind students that they should come up with actions that are practical- something that they can do. Everyone can make a difference. It is up to them to identify how they can make a change to the waste that is generated.*

12. Provide each group with a copy of the Waste Reduction Plan templates provided.

13. The whole group should participate in developing their waste reduction plan.

14. Provide support and advice to the groups as they work. When each group has completed their plans, ask them to present their plan to the class.



Lautoka students look at ways to reduce waste

15. Reflect on this activity. This is a model of how they can develop a Waste Reduction Plan with their friends, school groups, class, school, families or even communities.

16. Discussion: Why is it important for everyone concerned to participate in developing the plan? Who does the plan belong to?

Part IV: Deconstructing the activity

- What relationship might exist between an increasing population and the amount of rubbish generated?
- Has the amount of rubbish a family generate been influenced by the changes in lifestyle over the past 50 years? In what way?
- How has the increase in number of people in cities and rubbish, affect the environment?
- What predictions can you make about the amounts of rubbish that we'll produce in the future?
- Where will we put the rubbish when we run out of land space?
- Would you like a landfill in your backyard?
- What are the long term benefits of reducing rubbish, reusing and recycling?

You can sort out your rubbish in order to reduce it

Waste Reduction Plan Templates *(Make copies for all the groups).*

Individual Actions: What each student/ person can do. Actions we can take on our own.

Actions to REDUCE the amount of waste:

Actions we will take	What are our targets? How will we know it is successful?

Actions to REUSE 'waste':

Actions we will take	What are our targets? How will we know it is successful?

Actions to RECYCLE 'waste':

Actions we will take	What are our targets? How will we know it is successful?

Collective Actions: Actions we can take as a group.

Actions to REDUCE, REUSE, & RECYCLE:

Actions we will take *together*	What are our targets? How will we know it is successful?

Activity- How to Make Recycled Paper

Purpose:

To be able to make recycle paper from old newspaper

Time: 1 hour

Materials: A blender, a whole section of newspaper, 2 and a 1/2 single newspaper pages, 5 cups (1.2 liters) of water, a pan 3 inches (7.6cm) deep, a piece of screen to fit inside the pan, a measuring cup, a flat piece of wood the size of a newspaper's front page, waxed paper.

Curriculum Connections:

A good activity for art & craft that addresses waste reduction and promotes eco- friendly values & attitudes.

Note:
Wood pulp, the raw material used in most paper production, comes from trees. More than 1 billion trees are cut down each year to make disposable diapers!

Recycling efforts are increasing worldwide because of our concern over the deforestation of the earth. Discarded items, such as computer paper, grocery bags, milk cartons, boxes, and newspapers, are now collected, cleaned and recycled.

Paper that has been used and treated for use again is recycled paper. Paper from homes, offices, and schools can be collected, sent to special recycling centers, and remade into usable paper. This process can take place over and over.

Every year we cut down more trees to meet the world's demand for paper. Recycling will help save trees from being cut down.

What to do:

1. Tear the two-and-a-half pages of newspaper into tiny strips.

2. Place the strips in a blender with 5 cups of water. Cover the blender and blend the newspaper and water. Ask permission to use the blender. An adult should supervise this step.

You can soak paper first to soften before blending

Be careful when using the blender. This is not a toy!

3. Pour about 1 inch (2.5cm) of water into the pan. Pour the blended paper pulp into the measuring cup.

4. Put the screen into the pan. Pour one cup (240 ml) of pulp over the screen. Spread the pulp evenly in the water with your fingers. Lift the screen and let the water drain off.

5. Open the newspaper section to the middle. Put the newspaper on a waterproof surface. Place waxed paper in the center of the newspaper. Place the screen with the pulp on the waxed paper. Close the newspaper.

6. Carefully flip over the newspaper section so the screen is on top of the pulp. THIS STEP IS VERY IMPORTANT.

7. Place the board on top of the newspaper and press out extra water. Open the newspaper and take out the screen. Leave the newspaper open and let the pulp dry for at least 24 hours. When your paper pulp is dry, peel it off and write on it

Now you know how to make recycled paper!

Schools Against Waste!

HOPE actions against waste include reducing the amount of waste produced, recycling and re-using waste. School actions include use of different coloured bins for plastics, paper and cans; double-sided use of paper; making toys, decorations, recycled paper and other products from recycled materials; creating awareness and education with students, parents, the school and nearby communities…and many more!

HOPE notice board at Vunimoli Islamia Primary School! "…the activities and initiatives we have undertaken have really helped us to create a better learning and living environment. We aim to create a pollution-free environment by creating more awareness with children and the community and involving the active participation of parents. As part of HOPE, we would like to see more awareness programmes and workshops for parents and the community."

At Bulavou District School recycled paper and plastics are used effectively in art and craft such as this great fish mobile.

A waste P.E.T bottle at Guru Nanak Primary School is used to grow mint in the classroom. Since the school began to participate in HOPE, littering has been minimised! Children take active part in using waste materials to create something. The school HOPE coordinator said,

"Before we used to have a litter problem. Now the children chase litter! They run after ice block plastic packs that are used to stuff cushions and toys and also collect snack packs and tins for craft. Students also report water leaks and 'water wasters' to prefects and teachers."

Taking responsibility!

Ami Chandra Memorial School is slowly in the process of retiring the incinerator!

Previously Korowiri Tovata Primary School burnt tonnes of grass and leaves. Since HOPE started, all burning of leaves and grass stopped - these were put in a compost heap. When the compost was ready to be used in the gardens, the children were very surprised to see what happens in a compost! The development of the compost was used by the teacher as a practical lesson to learning about decomposition in Elementary Science.

Head Teacher and staff at Naleba Bhartiya School 'showcase' masks made by students using paper mache'.

"There has been a positive change in students' attitudes. Students are using their own initiative to address waste problems." Draiba Fijian School HOPE Coordinator.

"....The school looks good!" Suva Muslim Primary School Head Teacher

Extra! Extra!

Making Compost in 8 simple steps

WHAT TO PUT IN

Kitchen waste, fish bones, garden waste such as grass cuttings, leaves, sawdust, shredded paper, crushed egg and a little soil.

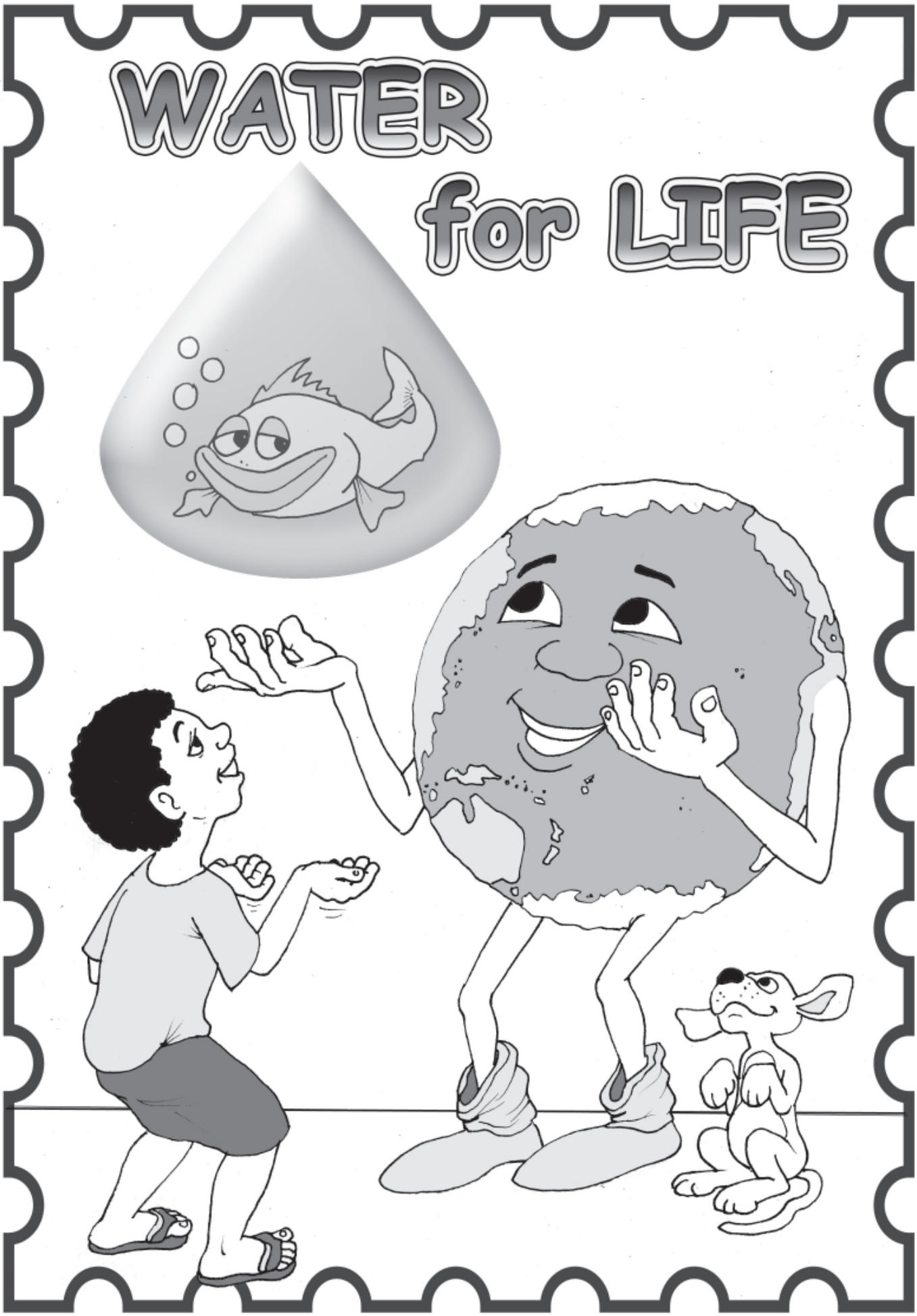
WHAT TO KEEP OUT

Meat, grease, fat, dairy products, large bones, food packaging, diseased plant material, and noxious weeds.

1. Take an old garbage bin, wooden box or just make a compost hole in the ground.
2. It's best to locate it away from students, teachers and the main buildings.
3. Layer your compost with alternate layers of waste and soil.
4. Layers of waste should be no more than 10cm thick.
5. Alternate layers between garden clippings, soil and vegetable waste. Repeat this layering until the pile is no more than 1.5m high.
6. Don't compact the layers, as air needs to be able to circulate freely for composting to take place.
7. Make sure the compost does not become soggy or dry out and turn it with a garden fork once a week.
8. The compost is ready when it looks like dark soil or potting mix.

Now you can use it in the garden or package it and sell it to raise funds

Examples of composts in different schools


WATER
for LIFE

Activity- The Water Cycle!

Purpose:

To simulate the process of the water cycle.

Time: 60 minutes

Materials: Water cycle drama cards. Prepare the water cycle cards before the class. The cards represent a stage of the water cycle- *evaporation, precipitation, infiltration, the sun, condensation, clouds*

An Incredible Journey Board Game and copies of the water journey map.

Curriculum Connections:
English- pre-writing activity;

Maths- probability;

Social/ Health Science- places & environment; weather; where rivers come from;

Basic/ Elementary Science- earth science; weather; the water cycle;

Skills- empathy; creativity & imagination; identifying components & relationships interpreting & mapping.

Note:
Make your own mini- water cycle by using a big glass jar with a screw-top lid, soil, sand, plants, a bottle cap with water in it and small pebbles and rocks. Fill the jar with the small rocks and pebbles first. Add the sand and soil and add a small plant to the soil. Fill the bottle cap with water and place in the jar. Finally, put the jar in a sunny place and observe, record and discuss results.

Part I: Water Cycle Drama

What to do:

1. Start with discussions about the water cycle; discuss the different components of the water cycle, importance and what it involves.

2. Distribute the water cycle cards. Each student should get one card and should not show their card to anyone.

3. Ask students to imagine themselves as water molecules at different stages of the water cycle. They must imagine what they are experiencing as a water molecule and act it out. They should find other 'water molecules' at the same stage of the water cycle and move towards them.

4. Give the signal to begin. Encourage "water molecules" i.e. students, to move around the classroom, making actions and trying to find those that belong to the same group (doing similar actions). They should not talk.

5. When water molecules have found each other, ask all the groups to arrange themselves according to the different stages of the water cycle. Where does the cycle start from? Discuss their experiences as water molecules- keep the students standing in their groups during the discussion.

Deconstructing the Activity:

- How did water molecules find each other?
- Ask students to explain their actions as water molecules- give reasons for posing or acting the way they did.
- Did the water molecules manage to arrange themselves according to the different stages of the water cycle? Discuss.
- How do human actions disrupt the water cycle?
- You can repeat the activity allowing students to act out different phases of the water cycle.

Part II: The 'Incredible Journey' Board Game

When children think of the water cycle they often imagine a circle of water, flowing from a stream to an ocean, evaporating to the clouds, raining down on a mountain-top and flowing back into a stream. The Incredible Journey board game should help students understand that the water cycle is more than a predictable circular path.

1. Divide the students into groups and give each group the board game-*An Incredible Journey* - to further examine how a water droplet travels through the water cycle.

2. Read through the instructions with students, and get students to collect the materials needed to be able to play the board game.

3. Make copies of the '*Water Journey Map*', and handout a map to each student- they are to mark (using lines) the locations they travel to as water molecules when playing the Incredible Journey board game.

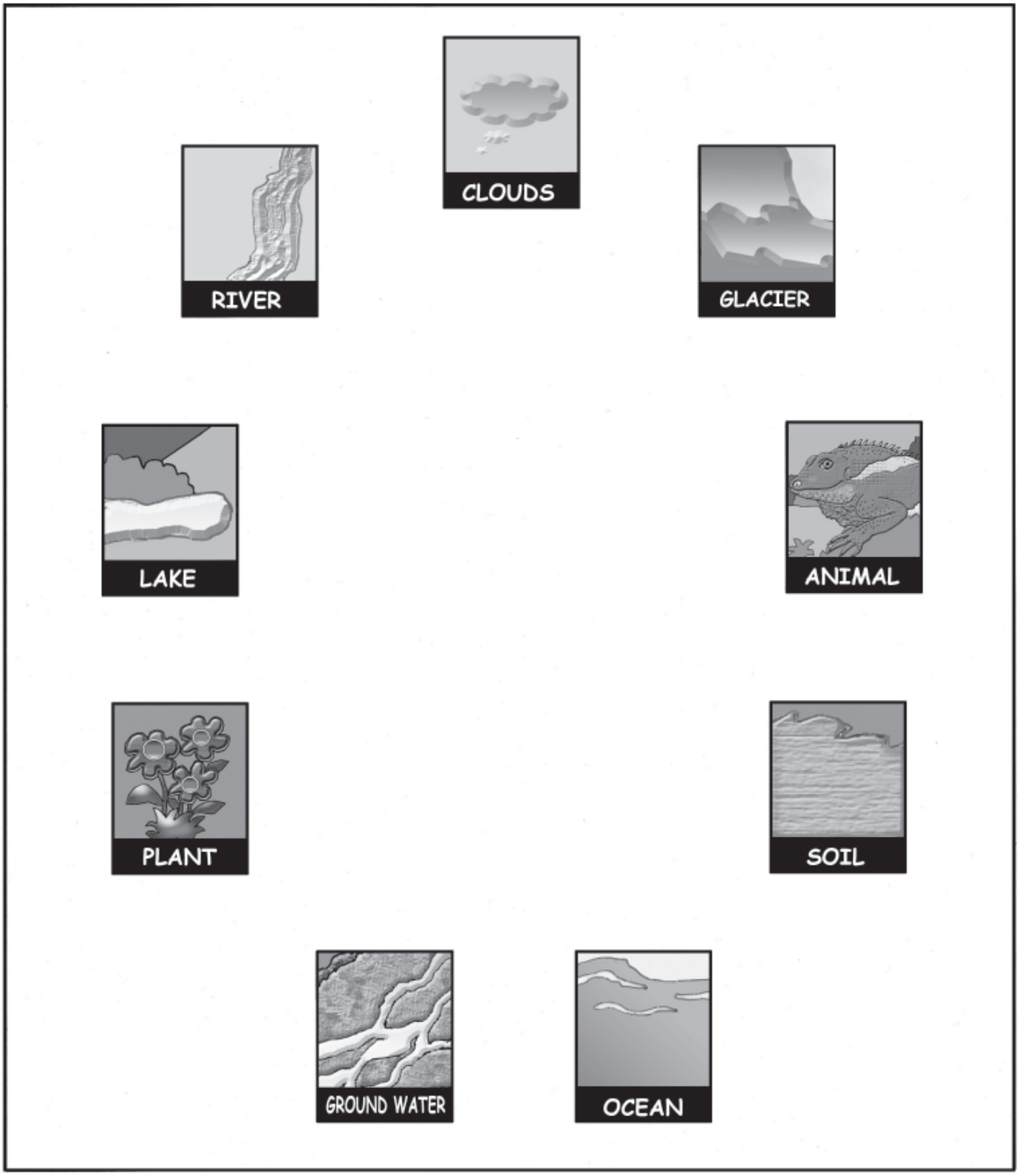
Deconstructing the activity:

- Ask students questions relating to the game. For example, name the locations a water droplet can travel to? Where does ground water come from? Does water filter or flow into groundwater? Etc.

Students working together to raise environmental awareness.

Name:

Water Journey Map



Activity- A Drop in the Bucket!

Purpose:

To calculate the amount of fresh water on Earth.

Time: 40 minutes

Materials: 1000 ml;100 ml &10 ml beakers or measuring containers; dropper; paper lips & cardboard to make spinners; copies of the Water Chart.

Curriculum Connections:
English- pre-writing activity;

Maths- probability; graphs & statistics; measurements, mass & volumes;

Social/ Health Science- places & environment; weather; rivers & wells;

Basic/ Elementary Science- earth science; environment; weather; the water cycle;

Skills- gathering information; observing; calculating; organise & interpret data; drawing conclusions.

Note:
Students may know Earth is covered mainly by water, but they may not realise that only a small amount is available for human consumption. By calculating the percent of available fresh water on Earth, students learn that water is a limited resource and appreciate the need to use water resources wisely.

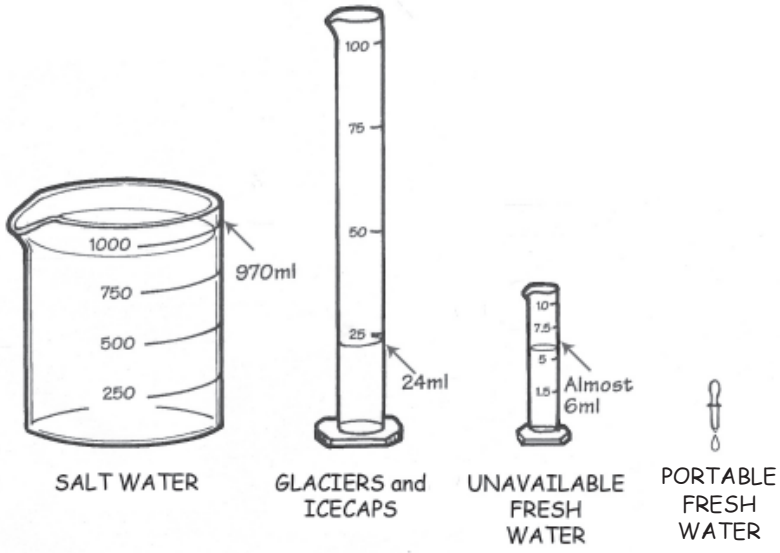
On a global scale, only a small percentage of water is available, but this percentage represents a large amount of water per person. The paradox is that, for some, water is plentiful, but for others, it is a scarce resource.

Why are some people in need of more water?

What to do:

1. Tell students they are going to calculate the proportion of freshwater on Earth and compare it to the rest of the water on the planet.

2. Prepare a 1000ml (1 litre) beaker; a 100 ml beaker; a 10 ml measuring container and a dropper. Fill the 1000 ml beaker with water. *Use bottles or jars if you do not have the beakers and mark the correct measurements on the jars. Droppers and measuring containers are available at pharmacies- usually given with medicine for children.*



1. Show the class the 1000 ml beaker of water and tell them that it represents all the water on Earth.

2. Ask where most of the water is located. Refer to a globe or map. Pour out 30 ml of water from the 1000 ml beaker into the 100 ml beaker. This represents Earth's fresh water, about 3% of the total.

3. Put salt into the remaining 970 ml. This is water found in oceans, unsuitable for human consumption.

Ask the students what is at the Earth's poles? Almost 80% of Earth's fresh water is frozen in ice caps and glaciers. Pour 6ml of fresh water (from the 30 ml resh water) into the 10 ml measuring

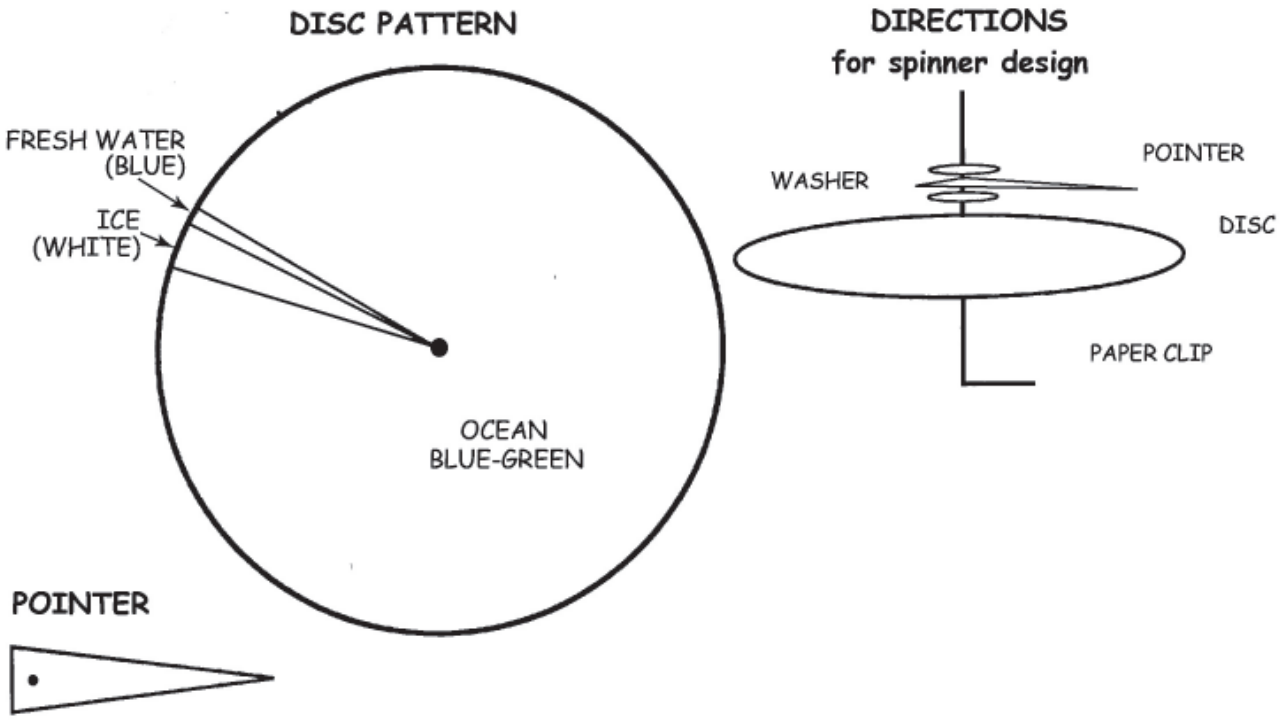
container. The remaining 24 ml represents fresh water that is frozen in ice- caps and glaciers.

7. The 6ml of water represents non- frozen fresh water. Only 1.5 ml of this water is surface water; the rest is underground water.

8. Use a dropper to remove a single drop of water, 0.003 ml- from the 6ml of water. Release this one drop into a small metal container. Make sure the students are very quiet so they can hear the sound of the drop hitting the bottom of the bucket. This drop represents clean, available, fresh water that is not polluted- about 0.003% of the total of water on Earth! This precious drop must be managed properly.

9. The following wrap- up part of the activity is designed to help students further appreciate the proportions of water on Earth.

10. Divide students into groups. Get each group to make a spinner (see diagram). The disk, pointer and washers can be made out of strong cardboard.



11. Give each student a copy of the *Water Chart*.

12. Students should spin the pointer. Where the pointer lands, students should colour a box in the appropriate row to indicate where the pointer landed. For example, if the pointer lands on ocean, than colour a box in the row 'ocean water' on the water chart.

13. Which row of the chart do students think will fill up first?

Water Chart diagram for students.

Deconstructing the Activity:

- Is there enough water available for everybody?
- If the amount of usable water on Earth is divided by the current population, there will be over 8 million litres of water available per person. This exceeds the amount of water a person would require in a lifetime. So, why does one- third of the Earth's population not have access to clean water?
- Discuss with the class the factors affecting water distribution on Earth.

Extension:

- Get students to develop a TV commercial outlining reasons why water is a limited resource.
- Students can keep a daily record of how much water they use. They can also calculate the amount of water their family uses and work out ways to conserve water.
- Students can do some research to identify areas on Earth where water is limited, plentiful or in excess and discuss the factors contributing to these conditions.

Activity- Aqua Bodies

Purpose:

To appreciate water as the main ingredient of living organisms.

Time: 60 minutes

Materials: Newsprint, crayons

Curriculum Connections:
English- pre-writing activity;

Social/ Health Science- places & environment; weather; where rivers come from;

Basic/ Elementary Science- earth science; weather; the water cycle;

Skills- empathy; creativity & imagination.

Note:
People drink water everyday, but they rarely think about the proportion of their bodies that is composed of water. Learning how much of their bodies are composed of water encourages students to appreciate life's dependence on water.

Active living organisms are composed of at least 50% water. This is true whether they live in a desert (certain cacti have 90% water) or in the oceans (body water content of many whales is 75%).

The human body is about 65 to 70% water. If humans lose more than 8% of their body water, they will die.

Where is this water located within the human body?
About 67% is located within cells; about 25% is located between cells and the rest, about 8% is located in the blood.

What to do:

1. Present students with the following situation: *two people are stranded in a desert. One person has a basket of food including canned meats, cake, bread etc- enough to last a month. The other person has only a supply of water to last one month.*

2. ***Which of the two will survive the longest?*** Compare how long we can go without food (about one month) to how long we can go without water (approximately three days).

3. Explain that bodies of most living organisms are made up of at least 50% water. Display samples of fruit or vegetables and compare the water content in each. (See table below)

Water content in selected foods

Food	Percentage water
Potato chips	2
Pizza	49
Ice cream	61
Beef liver	70
Bananas	74
Grapes	81
Oranges	87
Carrots	88
Tomatoes	94
Lettuce	96

4. Demonstrate the percentage of the fruit or vegetable that is water by cutting off a representative piece. For example carrots are 88% water so cut off about 88% of the carrot. Emphasise that the 88% of the water in carrot is in tissues and cells and therefore the water did not spill out when the carrot was cut.

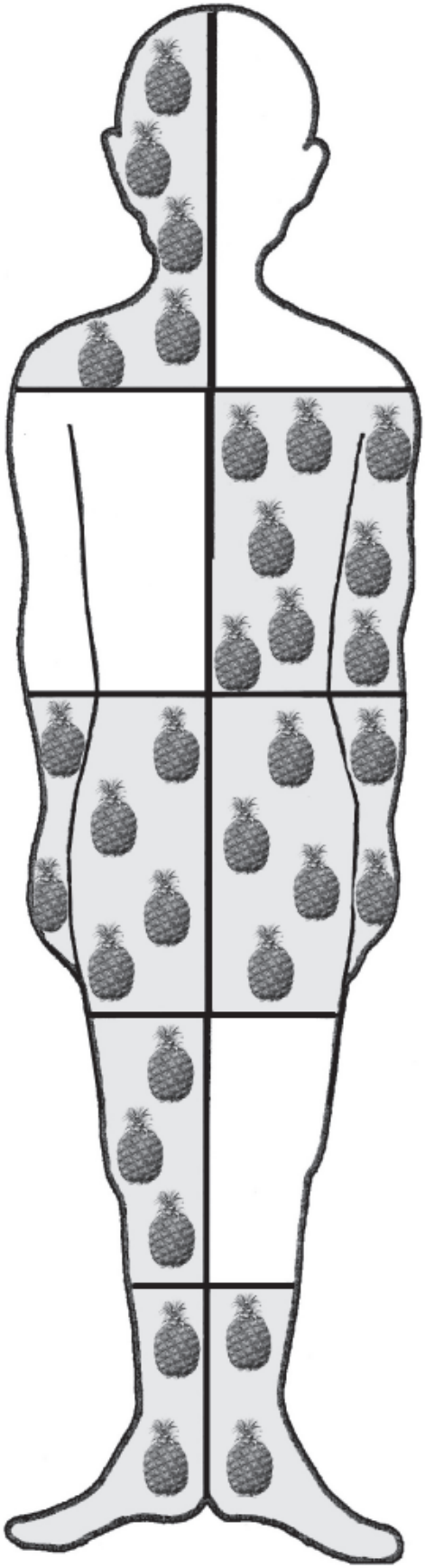
5. Do students think humans have water in their bodies? Ask students to guess the percentage of their body that is made up of water.

1. Put students into pairs. Give each pair two newsprints that are taped together (should be long enough to fit the outline of a human body). Have students work with their partner to trace their partners' body shape onto the newsprint. *Or you may decide to trace an outline of a human body onto an A4 sheet of paper and photocopy to give out to each child in the class.*

2. Explain to students that the percentage of water in their bodies is approximately 65-70%. For this activity, 70% (about ¾), will be used. For younger students, demonstrate ¾ by showing them a circle or a block divided into four equal parts, and remove one of the four equal pieces.

3. Ask students to show how much of the human body is water by colouring in 70% of the figures they have traced onto the newsprint. Students might fold their drawing into ten equal parts and colour seven of the ten sections. Or they may decide to fill up their body figures with 70% of different objects- fruit, vegetables, food, drinks etc.

4. Once students have coloured 70% of the body figure, cut in out for display on the class wall or in their exercise books.



Example of a body outline

Deconstructing the Activity

- Were students surprised by the amount of water found in food items? In their body? Discuss student responses to this question.
- Where is water located in the human body?
- What conditions may lead to loss of water in the human body? A loss of water or dehydration can be deadly. Why is this so? What can students do to keep healthy?
- Do all people have the same access to water? List or discuss different ways people in Fiji or in other parts of the world get water to survive.
- How would environmental or social or economic factors affect access to water?

Adapted from: ***Project WET (Water Education for Teachers) Curriculum and Activity Guide***; Project WET (Water Education for Teachers) International; 1995; (pp 63-65).

Activity- The Story of a River

Purpose:

To examine how human actions affect water quality.

Time: 30 minutes

Materials: large clear container filled with water; pollutants; labels; Story of a river;
Healthy Water Board Game

Curriculum Connections:
English- comprehension;

Social/ Health Science- where rivers come from; changing world environments;

Basic/ Elementary Science- earth science; types of pollution;

Skills- developing imagination; decision making; critical thinking; interpreting information.

Note:
The quality of water in a river or lake is, to a large extent a reflection of how the land is used and the natural factors affecting the river. When humans settle and develop land, water quality is affected.

Watershed managers who investigate land use practices that might affect the quality of water, are concerned with two general sources of pollutants: point & non-point.

Point source pollutants are discharged from and can be traced back to an identifiable point or source, such as a discharge pipe from a factory.

Non-point source (NPS) pollution occurs when the source of a contamination is unidentifiable. That, is, the pollutant can come from one of many places, such as runoff of fertilisers & pesticides from agricultural land, or motor oil from urban areas filtering into rivers.

What to do:

1. Read the story and prepare the following materials before you begin the lesson:

   - Collect a large clear container and fill with clean water (this represents the river).
   - Prepare the pollutants: these are the items in bold in the 'Story of a River'. Use small jars or bottles with liquid solutions for liquid wastes & bags with solid wastes. Liquid soap solution, food colouring, flour, curry powder mixed with water make 'good' pollutants.
   - Label the bottles & bags- oils; paints; detergents...

2. At the start of the lesson, distribute each of the small bottles and solid wastes among participants.

3. Place the large container filled with clean water in front of the room.

Advise students that as you read the **Story of A River**, they are to empty their bottles into the container of water when their 'labels' are mentioned.

The Story of A River

Once there was a beautiful stream situated not far from here. This was a lovely stream and it flowed down from the hills to the sea, winding through a green, dense forest and tumbling over rocks and pebbles. In the stream lived lots of tiny plants, little insects and even some fish. Sometimes birds fed on the fish. The waters of the stream were cold and fresh; it was sparkly clear and very clean.

If it were a really lovely hot day, would you like to swim in the stream?
Would you like to sit down and enjoy a picnic beside it?
Would you eat fish that were caught in this stream?

Occasionally **leaves** and **bits of grass** from the trees fell into the stream. But this was good as it was food for the insects that lived in the water. They ate the dead leaves and kept the stream clean. Sometimes **old twigs** and bits of rotting tree would fall into the stream, but the insects or macroinverterbrates would eat these too. One day a small group of people came to live near the stream. They caught fish from the river using rope nets. Sometimes the rope nets broke and bits were left in the stream. This kept the macroinverterbrates (insects) happy because they were able to eat the nets, which were made out of **flax**. The people were very careful to look after the river as they saw it as being very special.

If it were a really lovely hot day, would you like to swim in the stream?
Would you like to sit down and enjoy a picnic beside it?
Would you eat fish that were caught in this stream?

After many years settlers from far away arrived in the area where the stream lay and began to build a town nearby. The town was bigger than the little village and soon rubbish had built up. Some of this rubbish like **paper** and **rotting vegetables** ended up in the stream.
As the town grew, the settlers needed more food so they started to clear a lot of the bush around the stream to make farms. The soil was turned over and disturbed, there were no trees to hold the **soil** together and a lot of it washed into the stream. They raised goats and cows on the farm and sometimes **goat's poo** and **cows poo** would end up in the stream. The farmers put **fertilisers** on the soil so that more food could grow for all the new people in the town, and sometimes they sprayed **herbicides** to kill the grasses growing on the hills. This would often wash down into the stream.

If it were a really lovely hot day, would you like to swim in the stream?
Would you like to sit down and enjoy a picnic beside it?
Would you eat fish that were caught in this stream?

As the town grew, more houses and shops were built. Each time something was built more **rubble** fell into the stream. Sewer pipes were constructed to remove waste from the bathrooms and toilets of these new houses. But sometimes there were spills from the sewers and **toilet paper** and **waste** would end up in the stream flowing out to the sea. Many factories were built providing jobs and goods for the people. But sometimes they had accidents and things like **oils** and **paint** were spilt and washed into the stream. The macroinverterbrates (insects) could no longer live in the stream- they couldn't eat the oil and paint.

If it were a really lovely hot day, would you like to swim in the stream?
Would you like to sit down and enjoy a picnic beside it?
Would you eat fish that were caught in this stream?

Still the town continued to grow. By now many people were using cars to drive around from one place to another. Cars were useful but sometimes they leaked **petrol** onto the road. The petrol would wash down the storm drains and into the stream. The people also washed their cars using detergents. These **detergents** also washed down the storm drains and into the stream. As more things were made in the factories, more rubbish was created and soon there were bits of **old plastic bags** drifting into the stream. And then one day a truck carrying **toxic chemicals** crashed onto the road near the stream and lots of horrible yellow yucky stuff poured onto the ground, into the storm drains and down into the stream.

If it were a really lovely hot day, would you like to swim in the stream?
Would you like to sit down and enjoy a picnic beside it?
Would you eat fish that were caught in this stream?

Deconstructing the Activity:

- What is happening to the water? How did this occur?
- How did you feel about the water while it was being polluted?
- What would be some of the effects on people or other forms of life swimming, drinking and living in the water at different stages of the pollution?
- Who is responsible for the pollution?
- Who is responsible for cleaning up the water?
- At the end of the activity, play the game **Healthy Water Hopscotch** to find out how water collects and loses pollution as it moves down a river or through a watershed. Ask more questions related to the game such as: what actions contribute pollutants? How does the river filter out pollutants?

Murals of waterways and HOPE.

Activity- Flush Bowl

Purpose:

To understand the causes and effects of sewage overflow.

Time: 40 minutes

Materials: Waste tokens (dry leaves, paper, beads etc.), chairs, bucket or a box, chalk.

Curriculum Connections:
English- pre-writing activity; vocabulary;

Maths- calculation;

Social/ Health Science- places & environment; living in a town; resource use & conservation; sanitation; family & social living;

Basic/ Elementary Science- earth science; people & their harmful actions;

Skills- imagination; reasoning; interpretation of information; drawing conclusions.

Extension:
Ask students to illustrate how a sewage treatment plant could overflow.

Describe how overflow from a sewage plant could affect community members.

In groups, ask students to develop a plan of action to reduce the demands on a treatment plant.

What to do:

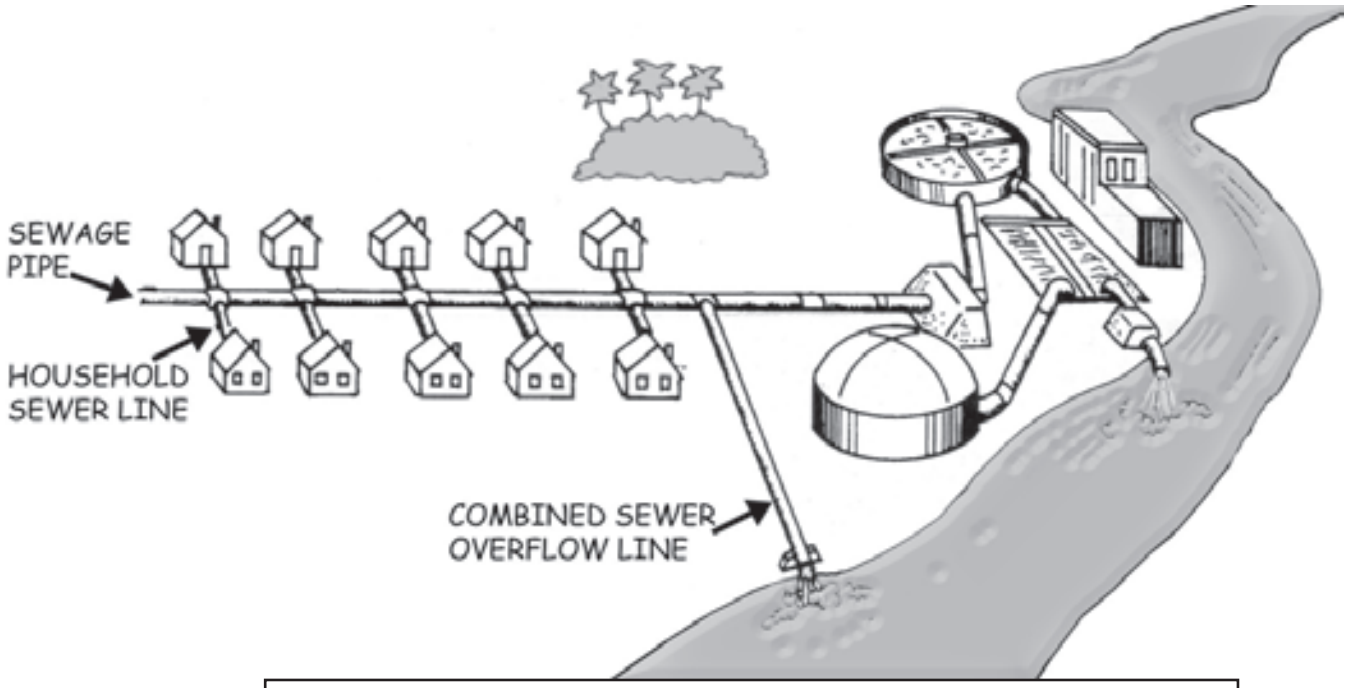
1. Draw a straight line in the middle of the room to represent a sewage pipe running underground. Label the line- ***sewage pipe***. Draw a ***sewage treatment plant*** at one end of the line and label. Close to the sewage treatment plant, draw a line from the sewage pipe to the river or sea- label the line the ***outflow line*** and label the river or sea. Place a ruler or chair on the outflow line. This represents the **gate**.

2. Arrange chairs along each side of the line. The chairs represent the houses on the street. Draw a line from each chair to the sewage pipe- this represents the ***household sewer line***.

3. Ask some of the students to come and sit on the chairs- they represent the households. Give each student “household” a handful of waste tokens.

4. Place two students in the sewage treatment plant to represent the treatment plant. One student will be holding a bucket while the other student ***(the treatment plant manager)*** counts off five seconds. Five seconds are required for the treatment plant to clean the waste from each household.

Youths get ready for the Flush Bowl activity



Use this diagram to help you organise the Flush Bowl Activity

5. Number the pupils sitting and explain that whenever their number is called out, they should pick up some of their tokens and walk to the end of the line to place them in the bucket. (They should be an arm's length from the student in front of them)

6. Begin the activity by calling "Flush 1". Household number one has to stand up and walk down the sewage line to the treatment plant. It should take less than a minute.

7. Call out another household number (when you are confident that the students are following the process, you can start calling a few numbers at the same time).

8. Call "flush 1, 2, 3, and 4". Four households join the line. Are there any problems- ask the students: "what can you observe?

9. Call even more households at the same time. Are there any problems? Has the system backed up? *The system has backed up if students are stuck in line and cannot move further down to the treatment plant. If the system has backed up, continue with the number 10; otherwise call all household numbers to join the line.*

10. Tell the class "The sewage system has backed up. The sewage pipe is too full. Is there a lot of pressure in the system? What will happen if the pressure builds up or is not released? What can the treatment plant manager do?"

11. Ask the treatment plant manager to open the gate on the outflow line. The students who are still waiting should move into the outflow line and drop their “waste” at the end of the pipe, into the sea or river. *Ask the class- what does this represent? Do they know of local situations or areas where this has happened?*

Deconstructing the activity:

- What lessons have been learnt?
- Are there times when everyone in town may flush their toilets at the same time? When, why?
- How does this affect our sewage treatment system?
- Identify the problems that arise when waste enters the river untreated.
- Is this a problem in Fiji?
- What might happen if we do not address these problems?
- What can we do to prevent this from happening?

Group presentation by students

Activity- Sum of the Parts

Purpose:

To appreciate the importance of good decision- making regarding use and management of resources.

Time: 1 hour

Materials: newsprints or A4 paper (depends on the number of groups), markers, crayons, pollutants.

Curriculum Connections:
English- pre-writing activity;

Maths- probability;

Social/ Health Science- places & environment; where rivers come from; features of the changing environment; family & social living; conflicts;

Basic/ Elementary Science- earth science; environment; harmful actions of man on the environment;

Skills- gathering information; organising; analysing; identifying cause & effect; application; proposing solutions.

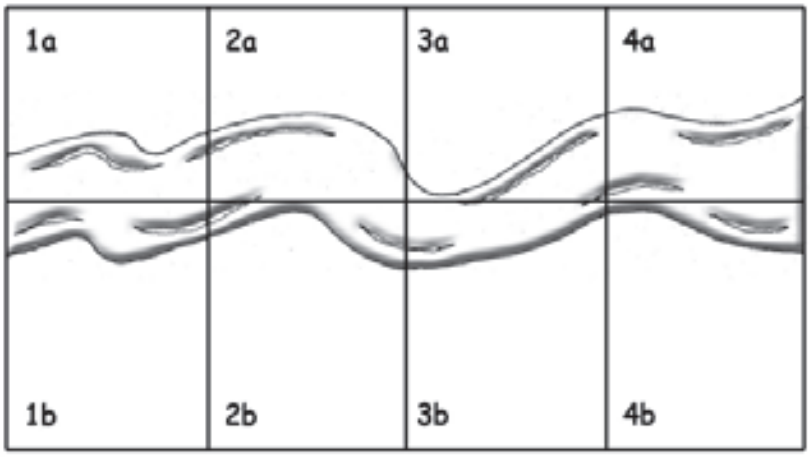
Note:
In a Maths class, students add a list of figures to obtain the total or 'sum' (of the parts).

Many people have attended a large gathering, concert or sporting event, and have been amazed at the amount of garbage left behind. Each person attending probably did not leave much on the ground, but with 2000 other people all doing the same, the total amount was large!

Taking a closer look at how students can positively or negatively contribute to water quality helps them appreciate their role in water quality management.

What to do:

1. Prepare the materials before the activity. If you are going to divide your students into eight groups, then use eight newsprints, and arrange as shown below.
2. Use a blue marker; draw a river as shown using ¼ of the page leaving ¾ blank to allow for students to fill in. Number each newsprint by placing very small numbers in the upper corner.



Put the newsprints together and draw the river. Each piece is riverfront property. Mark the corner of each newsprint as shown. The numbers should not be easily noticed by students.

3. Inform the students that they have just won the lottery- each student has won $1 million each. What will they do with their money?

4. Place the students into groups according to the number of newsprints you have (as above- eight groups). Each group has a piece of riverfront property to spend their money on as they wish.

5. Give out a piece of ***river front property*** to each group with crayons or markers. The properties have a river and land.

6. The students should be given 15 to 20 minutes to draw their developments on their property. Encourage the groups to discuss with each other their plans for development and come to an agreement. They may choose to work together or individually, they may choose to sub- divide the property and have separate developments, or combine their money for a major development.

7. When the groups have finished with their developments, ask each group to present their property development plans to the rest of the class.

8. Announce to the class that you had forgotten to tell them that their rivers were actually part of one waterway, with properties side- by- side. Call out the property numbers. Groups should line up their properties according to the number on the top left hand corner. That is; 1a opposite 1b and so on.

9. Ask the groups to stand behind their properties. When everyone is ready, start with property number 1a ***(upstream)*** to describe how their developments have affected the river. Give each group tokens to represent the different types of pollutants they add to the water- put these in the river.

10. Continue with 1b, adding tokens to the river until you reach the end.

11. Explain that the water is flowing from upstream- down stream past the other properties. Ask the students to push their pollution items downstream to their neighbour's.

Teachers in Labasa adding pollutants in 'Sum of the Parts'

Deconstructing the activity:

- How did those downstream feel?
- How would this affect their development plans?
- Could people living downstream be affected by the actions of those living upstream?
- Could upstream users alter the water quality of those downstream?
- What are the best plans and practices that could be taken to prevent waterways from pollution and degradation? Each group should come up with at least one solution.
- Can groups see the consequences of their actions?
- Teachers can continue teaching the lesson by conducting a role play where downstream property users approach upstream property users to reduce their level of water pollution.

Sample Questions to ask when facilitating the activity

- How did you plan for sewage waste disposal; kitchen and other domestic waste?
- Do you have examples where you practiced conservation?
- Did you have any strong disagreements with your group members on how to use the land?
- How did you resolve this?
- Did you decide for yourselves how you would spend your money or were you influenced by others?
- Is this a situation young people may often find themselves in? What are the drawbacks of this? How do adults deal with this?
- What were their - individual/ group - choices based on? Link to values or what they think is important? E.g. if I valued wealth at any cost…. How would this influence my decision on how I will use my $1 million?
- Can you think of any problems you might face while developing your land or after? Why?
- When developing or using the land, did you think the developments would create this much pollutants? Or problems?
- How do you feel, now that you know you are sharing the river with other communities?
- Water is a major carrier or vehicle of rocks, soil, sediments, leaves, seeds, pollutants, diseases (germs, bacteria) and so on. What has happened to the water in front of you?
- Which communities or groups have been affected?
  How do you feel? What developments have caused the problems?
- Are they (you) willing to do something about this? How? Why or why not? What could you do to make your situation better?
- Does this situation happen here? Where? What are some actions taken by community groups?

Extension:

- Adapt this activity for a coastal/ beach environment if your school is situated near the coast and you do not have rivers, or if teaching on the coastal/ marine environment.
- Divide your property into beachfronts, and follow the same procedure as above for Sum of the Parts. Adapt the deconstruction questions from above for your beachfront situation.

Example of 'Sum of The Parts' using beach- front properties

Beach- front properties

Sample questions may be:

- Who is responsible for the beach pollution?
- Could a property on one end of the beach be affected by the actions of the property on the other end?
- How did the participants who owned the properties feel about the pollution accumulating on their beachfront?
- How would this pollution affect their plans for using their property?
- Would you swim in the water near your property? What effects could the pollutants have on marine life?
- What steps could you take to reduce the contaminants and help ensure the water was safe?

Adapted from: ***Project WET (Water Education for Teachers) Curriculum and Activity Guide***; Project WET (Water Education for Teachers) International; 1995 ;(pp 267-270).

Water Saving schools!

Boubale Primary School success story is focused on wastewater management. According to school HOPE teacher, "as part of HOPE this year we made a trough using old drums to collect water. The children use this to water the flowers around the school compound. This has really helped to reduce our water bill! Children manage water and have been encouraged to practice this at home."

At Naduna Arya Primary School, a lily pond was constructed for HOPE 2005. The water from the gutters was channeled into the pond, which also has fish.
"Since HOPE began students have become more aware of the need to conserve water, particularly in dry season. Future plans for the school include more water conservation and waste water management." School HOPE coordinator

HOPE Water Conservation Actions! HOPE schools have developed many different Drip Irrigation projects.

At St. Augustine's Primary School used-- water from the taps flowed into a drum of sand which was filtered out into a separate drum and used for watering the gardens.

At Ulubau District School, drums have been placed under the taps collect waste water to use in the gardens. Water is also drained into nearby dalo plantations

Innovative efforts from HOPE schools to better manage water and waste water! Water conservation activities have created major changes in HOPE schools. Students are more aware of the need to protect their precious water resource!

HOPE Actions - promoting Water for Life

HOPE encourages students to practice good environmental stewardship!

Lily pond at Lomolomo Public School. Also like many other HOPE schools, Lomolomo students drained water from taps to gardens and planted vegetables on slopes to combat soil erosion.

Nagigi Indian School uses a bore hole as their water supply and students are taught to use their water wisely and every child has a water bottle which they use to wash their hands over their flower gardens so waste water goes directly to the taro patch.

Extra! Extra!
HOPE through Murals!

What is a Mural?

A *mural* is an artwork painted on a permanent surface such as a wall or fence, or perhaps even on a structure like a rainwater tank. Murals are usually painted in a prominent position where they can be viewed by the public. Murals can be made by a group of people who work together to make the artwork as a team. Murals are BIG and colourful– the bigger and more colourful the better!

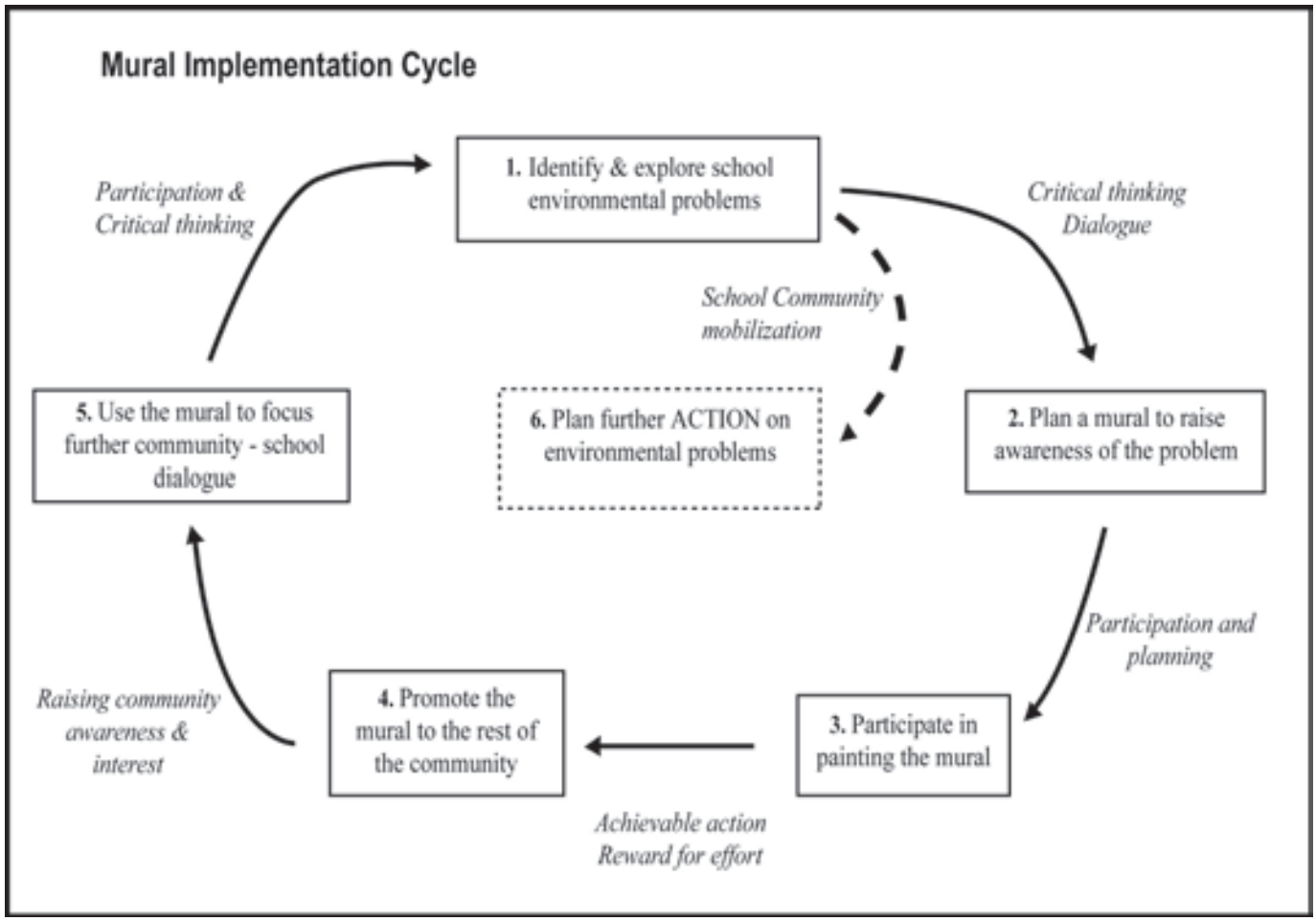
Some example murals:

Use a *mural* to Help Our Planet Earth!

A mural is an effective way to make a start towards taking action for the environment by involving everyone in first steps that are *achievable and rewarding.* Environmental issues can sometimes seem too big or too difficult to handle, or sometimes they are just taken for granted and don't enter our minds. Mural projects are very enjoyable and the results can be appreciated by everyone.

The development of a school or community mural is a way of taking a first step to solve an environmental problem, involving people and creating an environment for change.

"The first step towards getting somewhere is to decide that you are not going to stay where you are."



Extra! Extra!
Extra Fast Facts about Fiji's Environment!

Population

- The total population of Fiji in June 2006 was 905,949 with a growth rate of 1.4%. Ethnic groups are 51% Fijians (predominantly Melanesian with a Polynesian admixture), Indian 44%, European and other Pacific Islanders, overseas Chinese and others making up the last 5%. The population density is 45 people per km^2.
- The age structure of Fiji's population is:
  0-14 years: 31.1% (male 143,847/female 138,061);
  15-64 years: 64.6% (male 293,072/female 292,312);
  65 years and over: 4.3% (male 17,583/female 21,074) (2006 est.).
- Life expectancy at birth for males is 67.32 years and for women 72.45 years.
- The most predominant religion is Christian at 52%; 38% are Hindus, 8% are Muslims and 2% others.
- Medium of communication is mainly English, Fijian and Hindustani.

Geography

- Oceania is the geographic term for Fiji's location as an island group in the South Pacific Ocean, about two thirds of the way from Hawaii to New Zealand.
- The total land area is 18,270 sq km with 1,129 km of coastline. There are over 332 islands, of which 105 are inhabited.
- The country is topographically rugged, mostly volcanic in origin especially the larger and intermediate-sized islands. Kabara, Vatulele, Fulaga and Ogea are well known limestone islands, and coral atolls are also part of the group.
- The lowest point is the Pacific Ocean at 0 m and the highest point is Tomaniivi (Mount Victoria) at 1,324 m.
- Natural resources in Fiji include timber, fish, gold, copper, an offshore oil potential, and hydropower. The main environmental issue is deforestation and soil erosion.

Climate

- Fiji has a tropical oceanic climate with tempering influences of the prevalent southeast trade winds. Many visitors prefer the dry season or 'Fiji Winter', from May to October. This time of the year has cooler temperatures, less rainfall and humidity and there is less risk of tropical cyclones.
- Rainfall varies and the windward (windy) sides of the larger islands are extremely wet (1100- 1300mm annually) while the leeward sides have considerably less rainfall (440mm annually).
- The country's average temperature is 28 degrees Celsius.

Water Supply

- The country is well watered. Frequent rains keep alive the small streams, which feed the main rivers. Of these, the Rewa River on Viti Levu is the biggest. It is navigable for 139 km from its mouth, with several small streams running into it. Other important rivers on Viti Levu are the Sigatoka, the Navua, Nadi and the Ba rivers.
- On the second island, Vanua Levu, the rivers are not so large, but they are nearly as numerous. The largest river on Vanua Levu is the Dreketi.
- Water supply in Fiji is distributed as follows: 60 % to agriculture, 20 % to industry and the other 20% for domestic use.
- Clean water and proper sanitation enhance the health and productivity of the work force and have particular implications for the children and future generations.
- Fiji is better off than many Pacific Island nations as 70% of the population has access to proper piped water supplies.
- Since sugarcane farming, which is predominant in agriculture in Fiji, is traditionally carried out without irrigation and most of paddy rice cultivation has been quitted because of unfavourable market conditions, demands for irrigation are quite small. Demand for irrigation is limited to that for vegetable production in the Sigatoka valley watershed.
- Breeding of livestock such as chicken, pigs, cattle, goats and sheep prevails and consumes about 900 m^3/day of water.

Economy

- Fiji is endowed with forest, mineral, and fish resources and is one of the most developed of the Pacific island economies, though still with a large subsistence sector.

- The major sources of foreign exchange are sugar exports, remittances from Fijians working abroad, and a growing tourist industry.
- Sugar processing makes up one third of industrial activity but is not efficient. Long term problems include low investment and uncertain land ownership rights.
- Yet, because of the tourist boom, economic prospects are good.
- Overseas remittances from Fijians working in Iraq and Kuwait have increased significantly.
- GDP per capita is $6,000 (2005 est.)
- Most people working are in agriculture, 70%, and industry and services, 30% (2001 est.) with unemployment rate being 7.6% (1999).
- Sugar, garments, gold, timber, fish, molasses, coconut oil are products sent to main export partners of USA, Australia, UK, Samoa, and Japan.
- Manufactured goods, machinery and transport equipment, petroleum products, food, and chemicals are bought in from import partners Australia 25.9%, Singapore 23.1%, NZ 21.1% (2004).

Agriculture

- Fiji's agricultural produce includes sugarcane, coconuts, cassava (tapioca), rice, sweet potatoes, bananas, cattle, pigs, horses, goats and fish. In 1999 the total crop land was 285 000 hectares.
- Agricultural workers make up over 45% of the total workforce and in 2000 agricultural activities contributed 17.8% to the Gross Domestic Product (GDP).

Tourism

- Over the past few years Fiji tourism has been growing steadily. The tourism industry currently accounts for 24 percent of Gross Domestic Product and 27 per cent of employment.
- At present there are five major hotel projects underway at an estimated cost of $375 million Fiji dollars. (US$210 million).
- There are also several smaller projects on Fijian owned land in the Yasawa Islands that lie northwest of Nadi and in other areas in Fiji.

Energy

- Power is supplied by the Fiji Electric Authority (FEA), currently providing electricity to about half the population of Fiji. Electricity demand has been growing at 5% yearly over the last five years, and is expected to continue to grow faster in the coming years.
- To meet the growing demand, FEA increased its diesel capacity in the past two years. But with global fuel prices increasing, this has led to higher costs, and consequently, higher tariffs for consumers.
- The Government envisions a resource-efficient, cost-effective, and environmentally sustainable energy sector. To achieve this, FEA has embarked on a strategy to diversify its generation sources and promote clean and renewable energy.

Forests

- 54.7%, or about 1,000,000 hectares, of Fiji is forested. 89.4% of this forested area, roughly 894,000 hectares, is classified as primary forest and is the most biodiverse form of forest.
- Approximately 50 % of the land area of the large islands is covered with forest of variable quality, with only about 20% being 'dense forest'.
- Deforestation is on-going but the rate is still unknown. The most significant forest issue in the past 30 years has been the conversion of about 50,000 ha of good tropical forests into mahogany plantation and with it the loss of its birds and biodiversity values.
- In 2000 ownership of forest land was 93.2% private and in 2005 10.1% was for production, 33.9% for protection but only 7.4% for conservation.

Terrestrial Wildlife

- Fiji (native species only) has 57 breeding land birds, of which 26 (46%) are endemic. There are 150 recorded bird species, all 6 mammals are bats and 1 is endemic.
- Of the 27 types of reptiles, 8 (30%) of them are endemic and this number also includes 2 iguanas, 12 skinks, 10 geckos, and 3 snakes.
- Fiji has 2 amphibians which are both frogs found nowhere else (endemic).
- There have been 1594 species of plants recorded and 893, or 56%, are endemic to Fiji only.

Fisheries

- Each person in Fiji consumes approximately 50.7kg of fish each year and fishery production is worth F$130.2 million annually. In 1995 the contribution of the fisheries sector to the GDP was 2.8 percent. Fisheries products are the fourth largest export item after sugar, gold, and garments.

- The Fisheries Division estimated that the value of the artisanal catch was $16.7 million in 1996. A review of coastal fisheries in the Pacific Islands region carried out in 1996 estimated the total value of Fiji's inshore fisheries (commercial and subsistence, but excluding the industrial tuna fishery) to be US$ 64 million. The value of the tuna fishery is estimated to be between US$ 40 and 45 million.
- Fiji has an inshore Fisheries Resource Management plan, and is committed to the formulation of the *I Qoliqoli* Management Plan. There are more than 300 *I Qoliqoli* in Fiji and many of these community-based marine resource management initiatives have been initiated by NGOs and the Institute of Applied Sciences of the University of the South Pacific.

Marine

- The Exclusive Economic Zone area of Fiji is 1,034,700 square kilometres, the territorial (archipelagic) sea area is 195,028 square kilometres compared to land area of 18,272 square kilometres.
- In 2005, in Macuata, local chiefs of Fiji's Great Sea Reef launched the first of a series of marine protected areas (MPAs) that will form one of the world's largest networks of underwater sanctuaries. The chiefs will announce five protected areas, which will include 'tabu' zones where no fishing or harvesting of other marine resources can take place.
- Fiji's Great Sea Reef, the third longest barrier reef in the world, is not well studied, and a recent 12 day study revealed a staggering array of life, including a new species of reef fish.
- The biodiversity of the Great Sea Reef, locally known as *Cakaulevu*, is globally important and must be maintained.

Urban Growth

- Fiji's current population of 905,949 is 25 per cent larger than all 10 Polynesian Island countries and territories combined and the population growth rate is 1.4%.
- Although more than half of Fiji's population is rural, there is a shift to urban areas, and urban growth is associated with increased poverty and crime.
- Dwellings range from modern Western-style homes to makeshift housing in poor areas.
- The recent population census of Fiji show that rural urban migration has occurred at unprecedented levels. Approximately half (47.7%) of Fiji's population lives in urban areas and this represents a 1.3% growth compared to the last census figures in 1996.
- A study by the UN Development Program in 1991 estimated that by the year 2006, 44% of Fiji's population will live in urban areas. This figure has already been surpassed in 1996. The urban population as at 1996 was 46.4%, a growth of 8% in ten years. It is anticipated that rural urban migration will continue following the expiring of land leases (under The Agricultural Landlord and Tenants Act), breakdown in social structures, displaced people and extension of town boundaries. Out of this 46.4% of urban population, it is estimated that 15% will be squatters

Waste

- Poor solid waste management is a serious constraint to our health and environment. Waste is dumped anywhere which is now affecting our reefs, lagoons, inshore fisheries and tourism. Waste is also being burnt in piles at homes and though this is an accepted practice in Fiji, the health and environmental implications from this needs to be considered.
- Waste has the potential for contamination of food supplies, which can impact on local markets or revenue from export crops.
- The benefits from good waste management can include reduced raw material costs, enhancement of the tourism experience, and reduced health care costs. Effective measures will also avoid the need for expensive clean-up operations in the future.
- A Sinclair Knight Merz (2000) study highlighted that approximately 405,260 kg of waste per year is produced in rural areas in Fiji that does not get collected or properly disposed. Since most of the waste is not collected it finds its way through the water ways and lands on our beaches and foreshore areas.
- Waste produced by households in Fiji is mainly composed of biodegradable (more than 65% of the weight), paper (10-15%), plastic (less than 10%), textiles and glass.
- According to the SKM report (2000) the average waste generation rate per person per day is 0.4 kg which amounts to 343kg per person per year.
- Main waste issues are: Litter ; Plastic Bags; PET Bottles; Industrial or Trade Wastes; Sugar Mills; Saw Mills; Gold Mines; Tourism; Difficult Solid Waste and Hazardous Waste.

2003 HOPE Schools

1. Ahmadiyya Primary School
2. Dr Ram Lakhan Primary School
3. Hilton Special School
4. Holy Trinity Primary School
5. Lami Fijian Primary School
6. Nasinu Sangam Primary School
7. Nehru Primary School
8. Pt. Vishnu Deo Memorial Primary School
9. Samabula Primary School
10. Sanatan Education Institute
11. SSM Primary School
12. St. Marcellin Primary School
13. Tacirua Bhartiya Primary School
14. Indira Gandhi Memorial Primary School
15. Suva Muslim Primary School
16. Assemblies of God High School
17. DAV College
18. International Secondary School
19. Lami High School
20. Laucala Bay Secondary School
21. Marist Brothers High School
22. Suva Muslim College
23. Nasinu Muslim College
24. Rishikul Sanatan College
25. Vunimono High School

2004 HOPE Schools

1. St. Augustine Primary School
2. Bethel Primary School
3. Nadogo Secondary School
4. Draladamu Primary School
5. Navoalevu Primary School
6. Naikelikoso Primary School
7. Nasasa District School
8. Daku Bhartiya School
9. Lagalaga Indian Primary School
10. Wainikoro Public School
11. Tabucola Valibar Sangam Primary School
12. Tabia Sanatan Primary School
13. Batinikama Bhartiya Primary School
14. Boubale Indian Primary School
15. Coqeloa Sangam Primary School
16. Naleba Bhartiya Primary School
17. Nabekavu Primary School
18. Vunimoli Islamia School
19. Naduna Arya Primary School
20. Korotari Arya Primary School
21. Uluibau District School
22. Seaqaqa Indian Primary School
23. Seaqaqa Muslim Primary School
24. Cadranasiga District School
25. Dreketi Indian School
26. Muanidevo Primary School
27. Nasarawaqa Primary School
28. Lekutu District School
29. Kubulau District School
30. Ratu Luke Memorial School
31. Batirilagi District School
32. Naduri District School

2005 HOPE Schools

1. Korowiri Tovata Primary School
2. Naduna Arya Primary School
3. Vunimoli Islamia School
4. Korotari Arya Primary School
5. Tabia Sanatan Primary School
6. Bulavou District School
7. Bocalevu Muslim Primary School
8. Tabucola Valibar Sangam Primary School
9. Boubale Indian Primary School
10. Valebasoga Primary School
11. Nagigi Indian School
12. Naleba Bhartiya Primary School
13. Coqeloa Sangam Primary School
14. Uluibau District School
15. Vunicuicui Sanatan Dharm School
16. Qawa Primary School
17. Nabekavu Primary School
18. Guru Nanak Primary School
19. Bethel Primary School
20. Labasa Primary School
21. Naseakula District School
22. Labasa Sangam Primary School
23. Bulileka Sanatan Dharm Primary School
24. Batinikama Bhartiya Primary School
25. St. Augustine Primary School
26. Ami Chandra Memorial School
27. Lautoka Ahmadiyya Primary School
28. Drasa Muslim School
29. Gandhi Bhawan Primary School
30. Jasper Williams Primary School
31. Lautoka Andhra Primary School

32. Lautoka Arya Samaj Primary School
33. Lautoka Central Primary School
34. Lautoka Fijian School
35. Lautoka Muslim Primary School
36. Lautoka Sanatan Primary School
37. Lomolomo Public School
38. Lovu Sangam School
39. Natabua Primary School
40. Saru MGM School
41. Teidamu Primary School
42. Tuvu Primary School
43. Vakabuli Indian School
44. Holy Trinity Primary School
45. Gospel Primary School
46. Marist Brothers Primary School
47. Indira Ghandi Memorial Primary School
48. Draiba Fijian School
49. Pt. Vishnu Deo Memorial Primary School
50. St. Marcellin Primary School
51. St. Agnes Primary School
52. Lami Fijian School
53. Vunimono Sanatan Dharm Primary School
54. Dravo District School
55. Bhawani Dayal Memorial Primary School
56. Deenbandhu Primary School
57. Ahmadiyya Primary School
58. Bishop Kempthorne Primary School
59. Rishikul Primary School
60. Dr. Ram Lakhan Primary School
61. Rishikul Nadera Primary School
62. Arya Samaj Primary School
63. Samabula Primary School
64. Tacirua Primary School
65. Tacirua Bhartiya Primary School
66. Kalabu Fijian School
67. Makoi Methodist Primary School
68. Narere Primary School
69. Suva Muslim Primary School
70. SSM Primary School
71. Nasinu Sangam Primary School
72. Nabua Sanatan School
73. International Primary School
74. Delainamasi Government School
75. Nehru Primary School

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