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Lilongwe Wildlife Centre
WASTE MANAGEMENT
ICCM

A MESSAGE FROM LWC EDUCATION MANAGER & ICCM

"All around the world we are seeing the negative impacts of our increasingly unsustainable living practices - deforestation leads to floods, droughts and crop failure; pollution causes loss of biodiversity and sicknesses like cancer. The importance of ensuring environmental sustainability is becoming more important every day, a challenge recognized as one of the eight Millennium Development Goals (MDG). Closer to home the Malawi Growth and Development Strategies also identified the need of incorporating environmental issues in the school curriculum.

Lilongwe Wildlife Centre welcomes tens of thousands of children through the gates each year, and we can give them the knowledge and skills to make a difference. I hope that you, as educators, take great pride in bringing environmental topics to life in your school and inspiring your learners to put these important concepts into action.

We all have a part to play in protecting our natural heritage for the benefit of both people and the environment, so let's work together to make our world a better place."
Clement Manjaalera, Environmental Education Manager education@llwc.org, 0999 230606

"International Conservation & Clean up Management /ICCM believe in turning environmental challenges into social and economic solutions through holistic waste management including design. There are many resources in Malawi if we see and manage waste as a resource."
Nyomi Rowsell, Executive Director of ICCM nyomi.iccmanagementmalawi@gmail.com 0992 113151

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Dear Educator,

This guide has been written to help you deliver an interactive, inspirational and informative session on waste management to learners. Your task is to lead your learners on a journey, to explore environmental issues, develop skills, encourage positive attitudes and empower them to take action.

You should be able to tailor the session to the time available, the age of the audience and their level of education and their previous understanding of the topic. This can be agreed with the supervising leaders. You can also use much of the material in this guide to deliver sessions in schools. Agree the schedule with the group leader and start the session off by outlining the plan to the learners.

Good luck!

~ RECOMMENDED PROGRAMME ~

Included in this pack is an example lesson plan. This and the background information inside should give you an idea of what could be taught around the subject of waste management.

1) Lesson: A chance to introduce the topic at hand. What are the different types of waste and how are they currently managed? What are the negative impacts of poor waste management and how can we help? What is our responsibility as an individual? This should take place in a class-room, preferably with the use of a projector but if not then use the flash cards at the back of this guide. Children should be encouraged to participate wherever possible.

2) Extension Activity: Try to keep the initial lesson short, no more than 20 minutes, so the extension activity could be done the following day.

3) Case Studies: These can be explored in a further lesson, or after the lesson, depending on the level of the learners.

4) Background Reading: There is more information included within this guide that you can draw on depending on the style of the session and the level of knowledge of the audience. There are also many other resources available in the LWC library which you are welcome to study.

5) Follow up in the classroom: Make sure you follow up with learners. They may be interested to take the education even further with future sessions on the subject or further modules.

~ GOALS & NEEDS ~

Lesson Plan Goals:
Students will be able to

- define the 3 terms organic, inorganic and hazardous
- define the 3 terms Reduce, Reuse, Recycle
- identify 4 actions they can take to help the environment.

Needs:

- Video projector

WASTE MANAGEMENT: LESSON PLAN

Encourage the learners to ask questions and contribute. Supporting materials include a PowerPoint presentation and flashcards if there is power. Remember that you only have around 20 minutes to introduce the topic so keep it fast paced, but make sure that the learners keep up.

MOTIVATION/INSPIRATION (7 min)

Waste analysis: Understand the waste in your space? Collect and sort waste in your area? What is the most waste?

Public surveys on waste. Understand the systems people use to manage their waste. When do people manage waste, in the house? At church? In public spaces? What is our responsibility?

Look at different ways waste is used in your area? Make a creative report to understand the materials, costs and skills that make different waste innovations.
Research online if you need some help; www.iccmanagementmalawi.org, www.theguardian.com/environment/waste, www.plasticoceans.org/rwanda-plastic-bag-ban/ www.africa.com/10-young-afripreneurs-creating-solutions-recycling-upcycling-waste/

TYPES OF WASTE (7min)

Teacher says: "Lilongwe, a city of 1.2 million people, generates more than 600 tons of solid waste a day / 600,000kg " Read through the Solid Waste Composition and Greenhouse Gases Emissions Baseline Study in Lilongwe City, Malawi for more information and analysis of what waste.

Ask Students: "How many people are in this room right now?" "How many kgs of solid waste would we generate each day? In a month? In a year?

1. Organic Waste: **Anything that comes from animal or plant sources. It is made of carbon and it can biodegrade. (food, lawn clippings)**

2. Inorganic Waste: **Cannot biodegrade. Usually substances of a mineral origin (eg. Rocks.) Can also be hydrocarbons like plastic**

3. Hazardous Waste: **Items that are harmful to our health or the environment.**

What are the different types of waste? Summarize and quickly cover the definitions:
Go on a transit walk with the students and pick up waste, decide and separate each category of waste?

ACTIVITY: LISTS

Activity to get the class thinking about the different types of waste. Split the class into several groups and assign them with a type of waste. Give them 2 minutes to list as many examples of their type of waste as possible, then count at the end to see who the winners are.

REDUCE, REUSE, RECYCLE (3 Min)

-Teacher asks: “Has anyone seen this image before? Simply what do each of the terms mean?”
-Quickly review the chart with the green arrows.

Note: below is detailed information. Do not read all aloud. This is just to help the instructor.

Reduce: Use less.

As a society, we should make less waste overall. For example, we should buy items that have little or no packaging, rechargeable batteries, etc. Ex. Plastic Bags, Packaging

Reuse: To use again.

We should reuse items we normally throw away. For example, using paper lunch bags multiple times instead of throwing them away after just one use. Ex. Paper for school or Sell or give clothes to another.

Recycle: To make ready to use again.

We should remember to recycle items that are recyclable (paper and plastic items have a recycling code stamped on the bottom to tell us if they can be recycled). Also, we can "close the recycling loop" by buying items made from and packaged in recycled materials. We must continue looking for new ways to recycle currently non-recyclable items. Ex. Glass bottles or plastic bottles

Recycling icons  why recycle; to reduce our general waste

QUOTE AND FINAL DISCUSSION (5 min)

Put up quote: **“There is no such thing as ‘away.’ When we throw it away, it must go somewhere.” – Anne Leonard**
With the icons discuss what can be made from the recyclable materials. Using the quote on the board and without discussing it, the teacher asks: “What can the class do or Malawi do specifically to Reduce? To Reuse? To Recycle?”

Finish up the lesson here. The following extension should be done by the teacher the following day. Have the teacher review the types of waste, the impacts of poor waste management and the concepts of reduce, reuse and recycle.

Follow Up Extension Activity (30 Min)

On the board, review organic, inorganic, hazardous waste.
Review the concepts of Reduce, Reuse and Recycle

- **Get the learners to make their own reduce reuse recycle poster.**
- **Ask learners to bring trash from home. Find something that can be reduced reused and recycled.**
- **Or look at the trash bin in class. What can be reused or recycled?**

BACKGROUND READING

The following background reading should provide you with all the knowledge and information behind the waste management module. Both for the lesson plan and for potential extra classes

~ DEFINING WASTE ~

Waste (also known as rubbish, trash, refuse, garbage, junk, and litter) is unwanted or useless materials. There many different forms and can be solid, liquid or gas.

The earth is a '**closed system**' – nothing disappears. In nature, the cycle of life operates in a circular system and waste generated by one organism becomes food for another. Fallen leaves decay and the nutrients are returned to the earth, to become food again for the tree. An exciting challenge facing city communities is to begin to imagine life without waste, where everything that is thrown away at the end of one life becomes the technical or organic nutrient for another life.

~ WASTE BEING MIS-USED

The earth is affected by people burning general waste. Air pollution will harm the atmosphere and add to global warming and climate change affecting billions of lives. General waste can be minimized through knowledge of recyclable materials and understanding the value of waste.

PPP– polluter pay principle must be repeated to the public.

~ SOURCES OF WASTE ~

- Domestic e.g. vegetable peelings
- Commercial e.g. packaging, plastic bags
- Industrial e.g. gases from factories
- Agricultural e.g. maize husks
- Clinical/biomedical e.g. blood, bandages
- Mineral e.g. stones from mining for precious stones
- Nuclear e.g. from power plants

~ WHAT IS WASTE MANAGEMENT? ~

Waste management is the precise name for the collection, transportation, disposal or recycling and monitoring of waste. This term is assigned to the material, waste material that is produced through human being activity. This material is managed to avoid its adverse effect over human health and environment. Most of the time, waste is managed to get resources from it. The waste to be managed includes all forms of matter i.e. gaseous, liquid, solid and radioactive matter.

The methods for the management of waste may differ for developed and developing nations. For urban and rural populations, industrial and residential areas it does differ as well. The management of waste in metropolitan and rural areas is general responsibility of the local government. While the waste that is produced by the industries is managed by the industry itself, in case it is non-hazardous.

~ METHODS OF WASTE MANAGEMENT ~

Waste management differs between countries and between urban and rural areas. Government often takes some responsibility for waste management especially in cities. Here are some of the main methods of managing waste:

LANDFILL: Burying waste is a common practice in most countries. A well-managed landfill can be a hygienic and cheap method of disposing of waste. However poorly designed landfills cause many adverse environmental impacts e.g. attraction of vermin. Another common product of landfills is gas (mostly composed of methane and carbon dioxide), which can cause global warming.

INCINERATION: Burning materials reduces the volume of solid waste. Incineration is a controversial method of waste disposal, due to issues such as emission of gaseous pollutants.

RECYCLING: Some waste materials can be recycled into new products. This waste can be separated out and taken to a recycling factory for processing. Recycling of materials like plastic, aluminium and glass on a large scale is common in many countries but not well developed in Malawi. There is a plastic recycling factory in Blantyre.

ENERGY RECOVERY: The energy content of waste products can be harnessed directly by using them as a direct combustion fuel, or indirectly by processing them into another type of fuel. An example of this in Malawi is the use of fuel briquettes made out of waste materials like paper.

~ LOCAL PERSPECTIVE: WASTE MANAGEMENT IN LILONGWE ~

Lilongwe City Council is responsible for waste management in the city. Lilongwe Water Board is set to take over responsibility for liquid waste management in the city. The sewerage system in Lilongwe covers only 9% of the city. The majority of Lilongwe's residents, especially those in the informal settlements, rely on pit latrines for human waste disposal. Waste management services are readily available in the high income areas but the low income areas do not have access to these services.

Commercial areas such as markets have their waste collected, albeit irregularly. The landfill in Lilongwe's Area 38/2 is estimated to receive about 20,754 tonnes of solid waste per month. Urgent attention and new ways need to be found to address waste collection and management. It is vital to involve all sectors in waste management because the city council does not have sufficient capacity to collect and dispose off all the waste produced in the city.

Most households, especially in the informal settlements, dispose their waste in open spaces, on riverbanks and along roadsides. Uncollected refuse is a common site in Lilongwe's markets and a major cause of environmental degradation. Management of the only dump site in Lilongwe's Area 38/2 is poor. A few local development organizations have come forward to assist in improving sanitation in the city through the promotion of ecological sanitation (eco-san) toilets that encourage use of human excreta and urine as organic manure.

~ HOW LONG DOES WASTE TAKE TO BREAKDOWN? ~

Waste breaks down eventually, but some takes a lot longer than others.
Here are some examples of waste products and how long they take to break down ...

~ NEGATIVE IMPACTS ~

There are many negative impacts associated with poor waste management affecting people, wildlife and the environment. Here are just a few examples:

HUMAN DISEASE: Improper management of sewage which can get into water cause diseases like dysentery and cholera. Atmospheric pollution like smog from cars and factories can cause cancer. Even broken bottles left lying around can collect stagnant water and become a breeding ground for mosquitoes, leading to the spread of malaria.

INJURY & DEATH TO WILDLIFE: Fish can die from chemicals that have been washed into the river. Birds that eat the poisoned fish can also die. Or if all the fish die and there is no fish for the birds to eat, the birds will die from starvation. Animals may try to eat waste like plastic bags and can suffocate and die. If this happens to someone's domestic animal, like a cow, then this will also lead to a loss of income.

CROP FAILURE: Gases released into the atmosphere - like methane from rotting waste, smoke from fires or gases from factories - can lead to **acid rain** which can destroy crops and the fertility of soil. Dumping waste in the wrong place can also cause blockages where water should drain, which can lead to floods which can damage crops.

CLIMATE CHANGE: Atmospheric pollution is linked to changes in climate. The gases mentioned above can also lead to a change in weather patterns, which in turn can affect crops as well as extreme weather patterns like tornadoes and hurricanes that can destroy houses.

LOSS OF INCOME & UNPLEASANT PLACES TO LIVE: Poor waste management makes the environment look ugly. This is unpleasant for the people who live nearby and will also discourage people from visiting, including tourists who would bring money to the local community.

FACTFILE: WASTE

- It is estimated that more than five million people die each year from diseases related to inadequate waste disposal.
- At least 60 per cent of the countries said that solid waste disposal was among their biggest environmental concerns.
- As much as 50% of waste from the average household could be composted.

~ GLOBAL PERSPECTIVE: THE GREAT PACIFIC GARBAGE DUMP ~

In the middle of the Pacific Ocean between the Americas and Europe there is a giant collection of rubbish, officially the largest 'landfill' in the world. It includes all sorts of rubbish from broken chairs to plastic bottles, oil residue from ships, basically anything that has been washed into the sea and has become stuck in this huge swirling mass thanks to the ocean's currents. Much of the garbage is underwater, so the photo shown here is an extreme example.

DID YOU KNOW...

- Estimates are that the floating dump covers the area the size of the USA, which is 80 times bigger than Malawi.
- Plastic constitutes 90% of all trash floating in the world's oceans.
- Every square kilometer has roughly 120,000 pieces of floating plastic.
- It is estimated that over a million sea birds and one hundred thousand marine mammals and sea turtles are killed every year from ingestion of, or entanglement in, rubbish.

~ ACTIONS: HOW YOU CAN HELP ~

Put a value to waste. Understand what recyclable waste is around and the innovations that can be made from these resources i.e. making recycled paper, paper briquettes, paper jewellery, plastic weaving, solar tubes...

Colour code and label bins or a waste sorting structure to make recyclable waste collection easy.

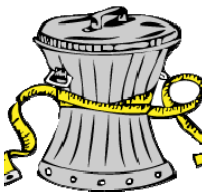
Teach waste innovations for environmental economic and social benefit.

Lilongwe Wildlife Centre ICCM

BACKGROUND READING

Here are some ideas about how these rules can be put into practice. Depending on your location and resources, some points will be more practical and relevant than others.

~ REDUCE ~



- Shop carefully: Buy in bulk to reduce the amount of packaging required; choose returnable, reusable or recyclable containers.
- Avoid over-packaged products and unnecessarily packaged food
- Choose durable articles that will last a long time.
- Use rechargeable batteries where possible, cloth dishtowels and napkins instead of paper ones, and refillable ink pens. Avoid disposable plates, cups and cutlery.
- Take your own basket, or re-useable plastic bags, to the supermarket to avoid using new plastic shopping bags each time.
- In the office and at school, photocopy both sides of the paper.
- Think before you buy – do you really need that item?

~ REUSE ~

- Glass and plastic bottles with deposits can be returned to shops for reuse.
- Wash and dry plastic bags for reuse.
- Reuse paper that has only been printed on one side. Staple together paper that has been written on one side only for scrap paper.
- Nursery schools make good use of the inside core of toilet rolls and paper towels, egg boxes, cereal boxes and jam jars.
- Charities welcome unwanted clothes, furniture, toys, books and magazines. Offer electrical devices in working condition to charities or schools before disposing of them.
- Repair things rather than throw them away.

~ RECYCLE ~

- If products cannot be reused then recycle them. The first step is to separate your waste at home/school into organic waste, plastic, glass, cans and paper - all of which can be recycled for reuse.
- Glass and cans are 100% recyclable. Contact Lilongwe Wildlife Centre or the City Council to find out what recycling programmes operate in your area.
- A compost heap is a must! Kitchen and garden waste can be added to the compost heap, or used to feed pets or garden birds.
- Used motor-oil is recycled by people who operate a maize mill and can be dropped off for free at most reputable vehicle service stations.
- Find out about fuel briquette projects that might want your paper waste.

ACTIVITY TIME: ROLE PLAY

Split the learners into four groups and give each group one of the following scenarios.

- **A raw sewage pipe is broken by some construction workers repairing a road next to a river.**
- **A factory illegally dumps its chemical waste on the edge of a village near crops.**
- **People in a township keep their own houses clean but drop rubbish on the streets.**
- **A boy's mother asks him to burn some rubbish from the garden. He starts a fire to burn it and then he goes out to play with his friends. The fire catches to some nearby trees....**

Ask them to spend 15 mins to come up with a role play (5 minutes)around each scenario in front of the class, showing the negative behaviour and the consequences that impact the people, wildlife and the environment.

~ SCHOOL MICRO-PROJECTS ~

Here we have suggested some additional practical waste management activities that you may want to adapt depending on your resources.

WASTE TO WONDER

So much waste can be re-used and an art and craft 'waste workshop' is a fun way to help learners get creative. Perhaps the class can have a competition about who can create the most exciting gift or piece of art out of waste? Examples of things that could be made from waste include jewellery, bags & wallets, note paper, glasses and candle holders, metal sculptures, papier-mâché bowls.

MAKE YOUR OWN RECYCLED PAPER

Recycling paper is simply a process of turning waste paper back into pulp. The pulp is then recaptured on a gauze to once again become a sheet of paper. Pulp is made with warm water and postage stamp sized pieces of paper. After soaking to soften, it is shredded up into pulp with a hand food-mixer or egg beater. Please contact us for full details of how to create recycled paper.

MAKE YOU OWN COMPOST

Composting uses nature's own recycling system. When leaves drop from a tree, they decay into soft black humus over time, without any help from people. Anything that once lived will eventually decompose. Composting is based on this natural process and begins with the thousands of micro-organisms which live naturally in soil. They feed on a moist heap of organic waste materials, generating considerable heat in the process. Other groups of "decomposer" organisms go to work as the temperature rises, an ever-changing workforce of bacteria, fungi, and insects. When the temperature drops, turning or stirring the pile gives the decomposers more oxygen and the heat builds again, helping to kill harmful bacteria. When all the easily decomposed material has been consumed, the temperature drops for the last time and earthworms and ants may move in, signalling that the compost is ready to feed new plants with its "recycled" nutrients. Finished compost has the distinctive fresh smell of newly-turned soil and won't heat up again no matter how often you turn air into the pile. The ideal result of the composting process is crumbly, dark, soil-like humus.

*Please contact LWC or ICCM for advice and guidelines for all of these micro-projects

Taking responsibility

PPP

POLLUTER To make sure people take responsibility for cleaning areas in the appropriate way.

PAY People dumping waste should be fined as they are causing environmental damage

PRINCIPLE To ensure the sustainability of laws and people's attitudes are met so people manage their waste

RRR

REDUCE Minimising waste in the community.

RECYCLE Designing innovations and other useful products from waste

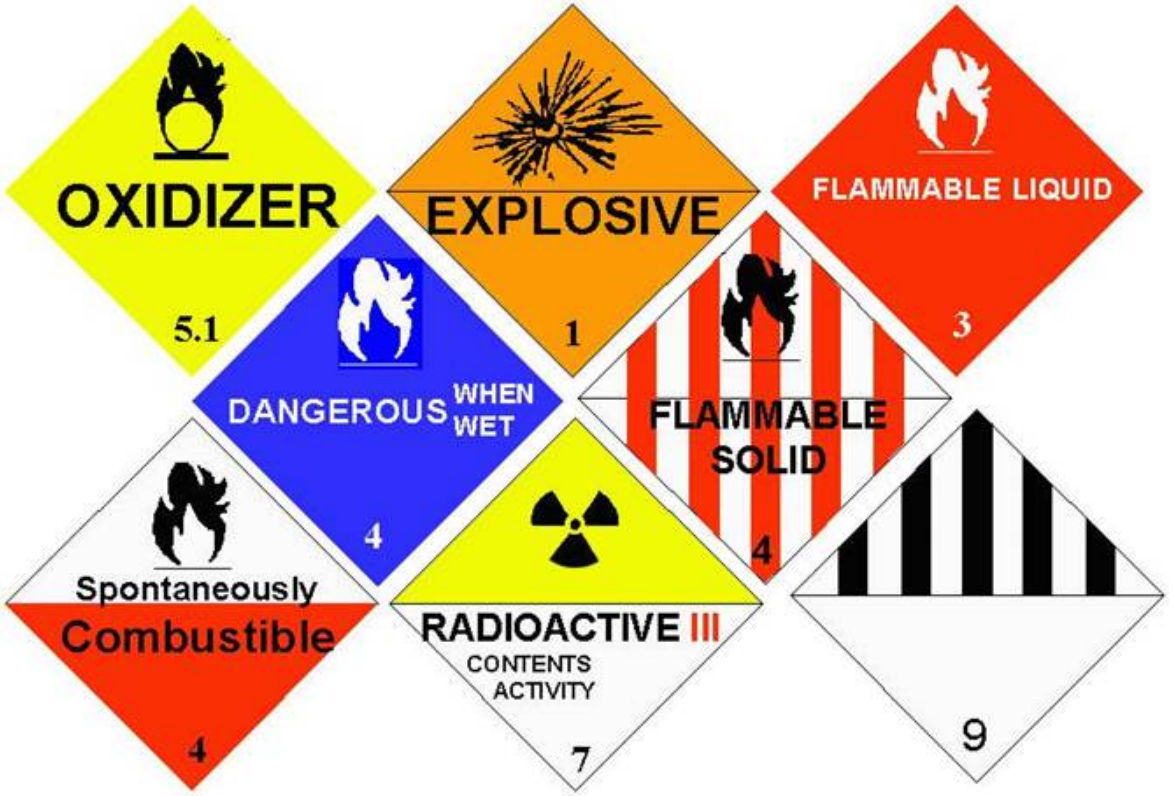
REUSE Utilising the waste generated for other purposes

VIDEO..Creating value out of waste

TYPES OF WASTE: ORGANIC

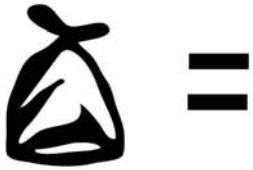
Organic Waste: **Anything that comes from animal or plant sources. It is made of carbon and it can biodegrade. (food, lawn clippings)**

HAZARDOUS



Hazardous Waste: Items that are harmful to our health or the environment.

RECYCLABLE PLASTIC



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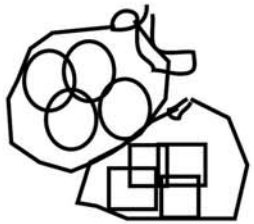
chips bags

grocery and retail bags

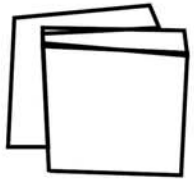
case wrap

crisps and sweets bags

bread bags



produce bags



food storage bags

mandazi bags

RECYCLABLE PAPER

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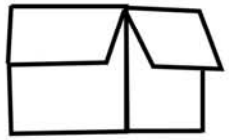
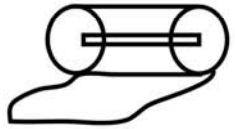


Mabokosi

Mapepala a mu office



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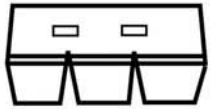
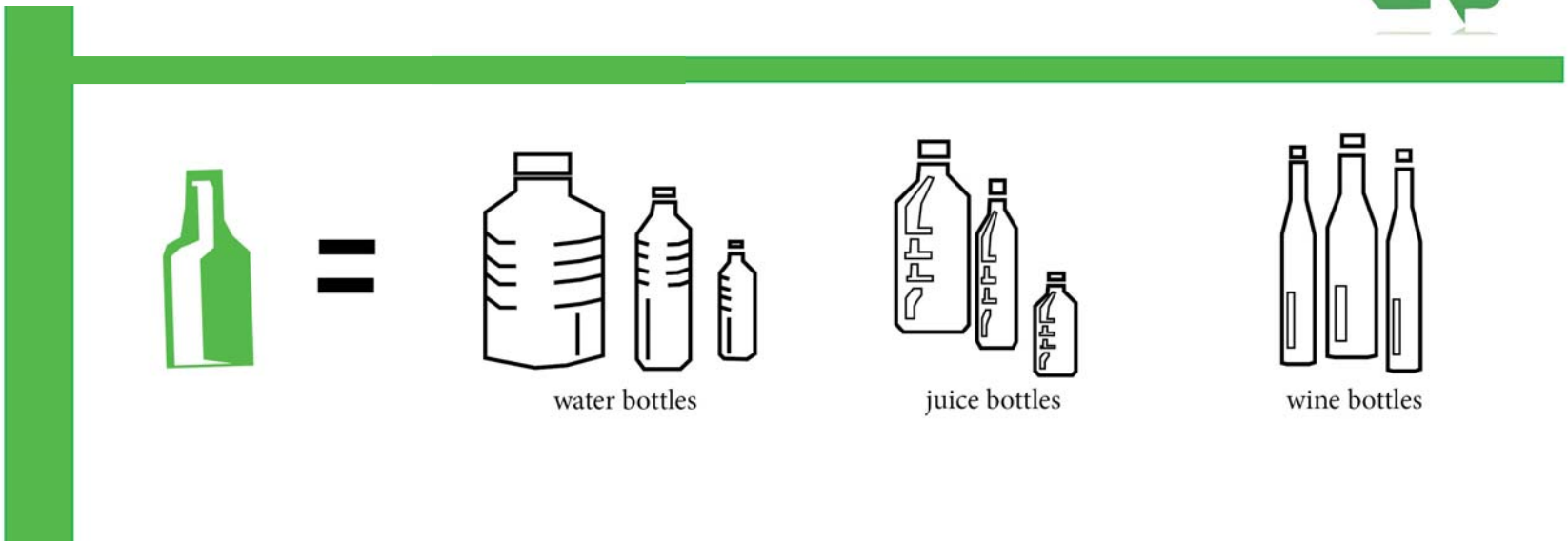


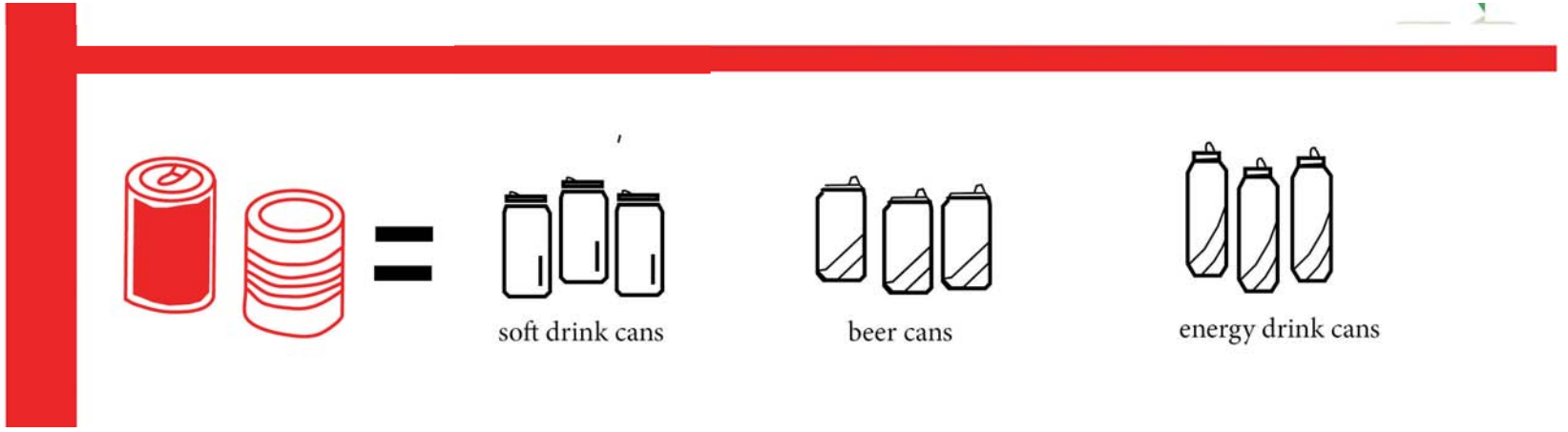
Ma tray oyikamo mazila

Mapepala a news

Makatoni a Chibuku

RECYCLABLE BOTTLES / CANS





WASTE INNOVATION IDEAS
WHAT IS YOUR MARKET?

How we recycle the waste:

PAPER

- paper briquettes
- jewellery
- papercrete building blocks
- recycled paper
- tissue

GLASS & PLASTIC BOTTLES

- walls, windows,
- floors, construction
- jewellery
- glass chandelier
- interior decorations
- organic garden pots
- water channelling

PLASTICS

- maize bags
- door matts
- plate and tea coasters
- curtains

TIN CANS

- roof tiles
- flooring blocks
- furniture
- interior decorations
- solar heater

BOTTLE CAPS

- placemats
- stylish boxes
- IRA calculators
- wind chimes
- jewellery
-mosquito curtains

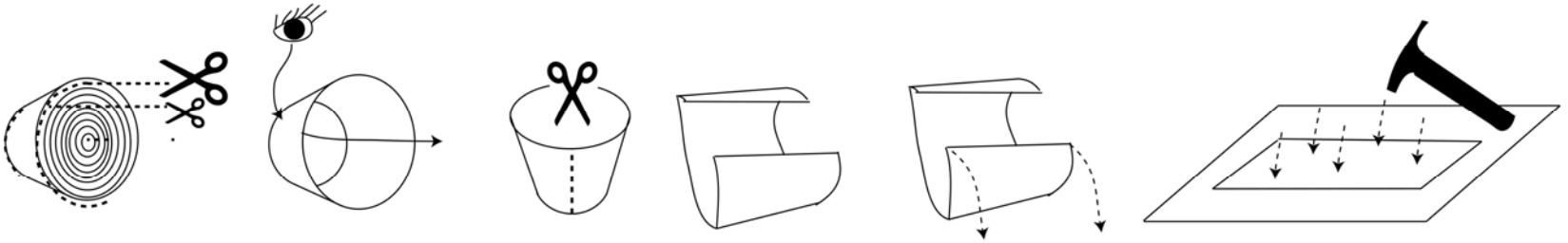
TAKE ACTION: RECYCLE Fill in the missing words

INTERNATIONAL CONSERVATION & CLEANUP MANAGEMENT

ICCM

SHARING KNOWLEDGE - HOW TO MAKE TIN ROOF SHINGLES

Tin cans do not decompose after 500 years, there are several ways to reuse tin cans....



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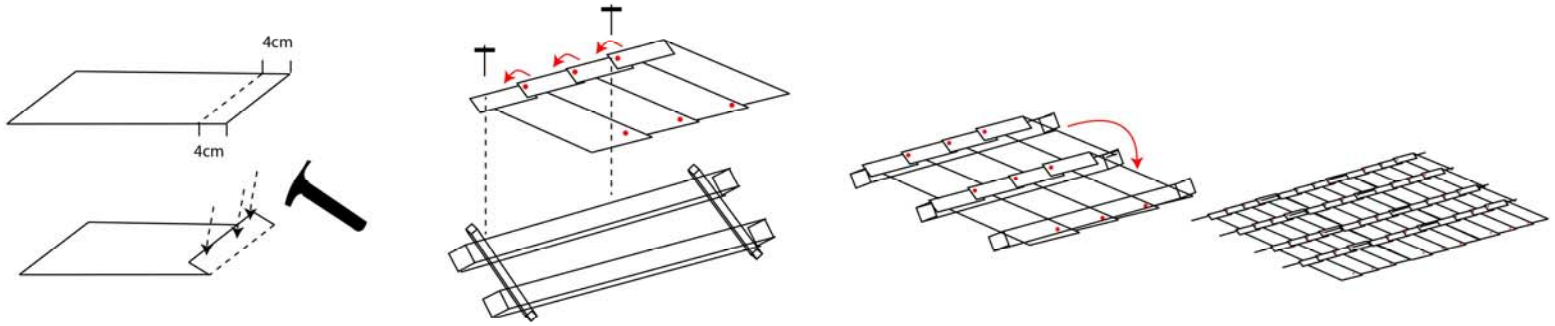

5. 6. 7. 8.

TAKE ACTION: RECYCLE Fill in the missing words

INTERNATIONAL CONSERVATION & CLEANUP MANAGEMENT

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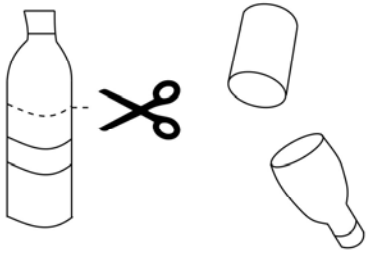
SHARING KNOWLEDGE - HOW TO MAKE PLASTIC BOTTLE BAGS

Plastic bottles are a very strong and efficient material, you can make many things using plastic bottles including strong reusable bags



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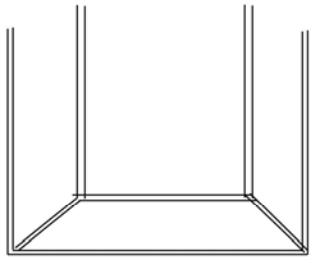

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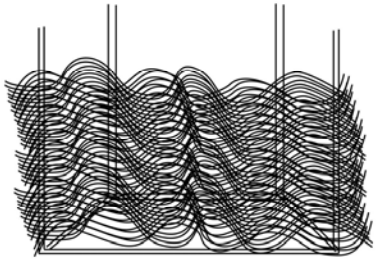

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7.

FINAL THOUGHT

What can the class do or Malawi do specifically to Reduce? To Reuse? To Recycle?”