Environmental Youth Action Corps Manual

I. INTRODUCTION

All over the world we are faced with **environmental** issues that impact nearly all aspects of life. This includes humans, animals, plants, and the physical environment (bodies of water, soil, air). Many of these systems are disrupted by activities carried out by humans. Often when we damage the environment it negatively impacts our health in return.

People are often not aware of the damaging health and environmental effects activities may cause. Those who understand the consequences have the responsibility to raise awareness in their community on prevention methods to decrease or eliminate behaviors that can negatively impact both people and the environment.

II. PLASTICS

Introduction

Plastics are made up of long chain polymers. Polymers are formed when naturally occurring resources are transformed into other substances with completely different properties. Substances created by humans are called **man-made** or **synthetic** substances. This means the substances cannot be produced in nature. In the production of plastics these resources usually include coal, natural gas, and oil. Plastic is widely used because of its variety of characteristics. Plastic is light, durable, moldable, and most importantly economical. This makes plastic usable for many different products such as, bottles, packaging, technology, car manufacturing, and grocery bags.

The Problem

Worldwide over eighty million tons of plastic are produced every year. Between 500 billion and a trillion plastic bags are used every year, with less than one percent being **recycled**. Out of seven types of plastics that are created and used, usually only three types are recycled. Although all plastics can be reused or recycled they are often disposed of improperly, adversely affecting human health and the environment. The most common forms of improper plastic disposal are burning and littering.

Improper Plastic Disposal

Improper disposal of plastic usually happens because municipal solid waste services do not exist in rural areas or people cannot afford to pay for these services. If solid waste services do exist, sometimes recycling is not offered as an option. To get rid of plastic waste, people often burn or throw it out into the environment. Plastic is burned by some because it burns and provides cheap energy for fire.

Plastic is thrown into the environment because it is easily picked up by flowing water or wind and disappears from sight. However, scientific evidence shows that these disposal methods can be harmful to humans, plants, animals and the environment.

Burning

Burning plastics emits **toxic fumes** and particles into the atmosphere. The fumes and particles can be carried away over long distances and fall onto land and/or water surfaces. The chemicals that are released from burning plastic can persist in the environment for hundreds of years.

Water Dumping and Littering

Most plastic is not **biodegradable** and can remain in the environment for hundreds of years. Because plastic is not naturally found in nature, it breaks down, **decomposes**, at a slower rate than natural materials like wood or dead grass. Additionally, plastic is light weight and is moisture resistant. These characteristics make plastic easily transportable through air and water. This is problematic because they do not biodegrade as rapidly as natural substances do. As the plastic breaks down into smaller and smaller pieces, the pieces become even easier to transport and can more readily enter the environment and the **food chain**.

Hazards of Improper Plastic Disposal:

Health Hazards

Burning plastic materials poses serious health threats because smoke emitted from fires can enter the body via the **respiratory system**. Smoke emitted by fire enters the body by inhalation either through the mouth or nose. Smoke that enters into the respiratory tract can irritate the esophagus, throat, or lungs. Short term effects of inhaling smoke include headaches, fatigue, weakness, and dizziness. Repeated exposure can increase the risks of developing serious respiratory conditions such as asthma, bronchitis, and emphysema. Burning plastic can cause more severe health complications like heart disease cancer, immune system and **reproductive** organ dysfunction and can even lead to death. Chemicals released from burning plastic can harm the unborn child in pregnant women.

Littering plastic produces harmful effects to land and bodies of water.

Because plastic can persist in the environment for hundreds of years, chemicals can dissolve and be released into water. The water then carries the chemicals to other places where plants, animals and humans come in contact with or consume the water. The same chemicals as those released from burning plastics can then enter body and pose the same health risks such as development of cancer or reproductive system dysfunction.

Environmental Hazards

Improperly disposing of plastics **pollutes** the air, water, and land. Pollution from plastic mainly occurs through littering. Plastics are easily transported over air or water to places all over the world. It has been estimated that for every square mile of water, there are 46,000 pieces of plastic floating. This kills approximately 1 million sea birds, 100,000 sea mammals, and countless numbers of fish. These animals get entangled in plastic, choke on it, or consume it. Chemicals in plastics tend to bio-accumulate, or build up in the tissues and organs of animals, eventually working their way up the food chain to humans. The most serious threat to animals, especially sea animals, is plastic bags.

Hazards of Improper Plastic Disposal		
	Health Hazards	**Environmental Hazards**
Burning 	SHORT TERM EFFECTS - Smoke irritates respiratory system - Headaches, fatigue, weakness, and dizziness LONG TERM EFFECTS - Increase risks of developing asthma, bronchitis, and emphysema. -Hearth disease, cancer, immune and reproductive systems dysfunction	-Releases harmful chemical byproducts into the atmosphere, water, and soil
Water Dumping 	-Causes chemicals from plastic to seep or leach into water, which can enter the body either through skin absorption or by drinking	-Traps or entangles wildlife, which can lead to death -Decomposes slowly -Small pieces can be eaten by fish or birds and enter the food chain
Littering 	-Causes chemicals to seep or leach into soil which can enter the body through food	-Traps or entangles wildlife, which can lead to death -Decomposes very slowly -Small pieces can be eaten by birds or small mammals and enter the food chain

Ways to Reduce and Reuse Plastic

One way to eliminate the harmful effects of plastic is to *reduce* the amount of plastic one uses. Reducing the use of plastic can be done by avoiding products that contain plastic and by purchasing products with less plastic packaging. When possible buy items made from or packaged in metal or glass. These materials can be re-used for longer periods of time and do not leak chemicals into food or water. For the plastics that you do have, make sure you *reuse* them as much as possible. If your community does not have a recycling program, start one or collect them on your own.

Ways to reuse plastic

1. Reuse plastic bags to collect trash.
2. Reuse plastic bags for carrying groceries or farm produce
3. Reuse your plastic bags for storage
4. Turn your plastic bags into rope
5. Reuse them as storage containers for water
6. Use old jugs and bottles as pots for plant starts and seedlings

III. BATTERIES

Introduction

Batteries are a convenient way of providing power for common everyday appliances, such as; flashlights, radios, and mobile phones. However, if batteries are not stored and disposed of properly, the chemicals inside them can leak. This can cause adverse environmental and health effects.

Some batteries are more harmful than others. Batteries that contain heavy metals such as mercury, cadmium, or lead acid, are highly hazardous to human health and the environment. Less harmful batteries contain substances such as carbon zinc, lithium, and nickel metal hydride. Although less dangerous, these kinds of batteries should still be properly contained and disposed of to prevent unnecessary health risks.

Improper Uses of Batteries

The four most common ways batteries leach their harmful contents to humans are by burying, burning, improperly storing, and placing them near or around the mouth.

Hazards of Improper Use of Batteries

Health Hazards

The contents of batteries mainly enter the body through **ingestion** or inhalation. Health hazards by coming in contact with the metals of a battery include headaches, abdominal discomfort, seizures, and even coma. Heavy metals (for example cadmium) can increase the risks of developing cancer.

Environmental Hazards

When batteries are not safely disposed of their contents can enter the soil, ground water, and larger bodies of water. Burning batteries releases toxic vapors and particle matter into the

atmosphere. The contents of batteries are damaging to the environment because they are mostly heavy metals and can easily enter the food chain.

Hazards Of Improper Battery Use		
Improper Uses of Batteries	**Health Hazards**	**Environmental Hazards**
Burning Batteries Produces toxic vapors that can be inhaled. 	- Respiratory illnesses. - Headaches, abdominal discomfort, seizures -Coma	-Releases toxic vapors and particle matter into the atmosphere
Burying Batteries Corrodes battery casing and causes contents to leak out. 	-Cancer if repeatedly exposed to contaminated soil, crops, or ground water	-Contents can leach into soil and/or groundwater and make their way into the food chain -Release of heavy metals into environment -Contents dangerous to other living things like plants and animals
Putting near or around mouth 	-It is a common misconception that more energy can be released from a battery if the contacts are touched against your tongue. THIS IS NOT TRUE! -Releases battery acid which can cause serious chemical burn to the inside of mouth -Can cause accidental ingestion of heavy metals	-Contents can leak onto other surfaces in the home where others may come in contact

Proper Battery Storage & Disposal:

Storage

New, unused batteries should be kept in a safe place. Unused batteries still contain the same chemicals as those of used batteries, and pose the same threat of **contamination**. If a battery comes into contact with another object, in particular other metals or objects that contain

moisture, the possibility of that battery to leak acid is increased. Thus it is important to store new batteries in a clean, dry enclosed area.

Disposal

Used batteries should be kept in a storage area, such as a heavy plastic container or bucket with a lid in a dry environment. Excessive exposure to heat and, or water causes the batteries to release their contents at an unsafe rate. The container should be kept clear from commonly used areas, as well as sources of water and food

Battery Alternatives

Solar power is a new alternative to batteries that reduces chemical waste, and can be found in everyday items like flashlights. Try to purchase items that can be charged or used with solar power.

In situations where batteries are the only option, batteries containing non-toxic metals such as carbon zinc, lithium, and nickel metal hydride should be used to reduce the amount of hazardous waste.

IV. PESTICIDES

Introduction

The most common form of synthetic (man-made) chemicals in farming are pesticides and commercial fertilizers. Pesticides are chemicals used to control or destroy crop pests that cause damage to and/or kill crops. But pesticides also poison and kill other living things, including helpful plants and insects, and animals and people. They can also drift far from where they are used and pollute the soil, water and air. Pesticides include insecticides, herbicides, fungicides, and rodenticides.

Farmers have not always used pesticides and many farmers have great success farming without them. If you have a choice, it is safer for your health and the health of the land not to use pesticides.

Improper Pesticide Handling

Most pesticides are used in farming, although they can also be applied commercially for landscaping. However, local regulation about proper handling, storage and application of pesticides is not always enforced. This has led to an increase in human exposure to pesticides.

The most common forms of pesticide exposure occur from the ingestion of pesticide residue on produce and improper storage and handling. Improper handling occurs when protective equipment, like masks and gloves are not used. Pesticides can stick to your skin, hair and clothes, even if you cannot see or smell them so it is always important to wash with soap and water after handling pesticides. Improper storage happens when containers of unused portions are not clearly marked and/or when unused portions are stored inside homes where more people can come in contact with the pesticide.

Pesticides pose health threats to those who directly handle the pesticides, to their families if pesticides are improperly stored inside the home and to anyone who neighbors a farm where pesticides are used. This happens because pesticides can readily enter the human body in several different ways.

Routes of Exposure:

1. **Inhalation**- Pesticides applied as dusts, mists, sprays, and gases can reach the respiratory tract and be absorbed into the blood stream in the lungs.
2. **Ingestion**- Pesticides can be ingested by storing them in unmarked containers, (especially in food containers), eating crops sprayed with pesticides, drinking local water contaminated with pesticides, or by eating soil contaminated with pesticides.
3. **Dermal Exposure**- Contact with pesticides during application and through soil and crops can be readily absorbed by the skin and enter the body.

	Improper Pesticide Handling	Improper Pesticide Storage
How it Happens	-Not wearing protective equipment like, goggles, gloves and masks. 	-Unmarked containers -Stored inside home 

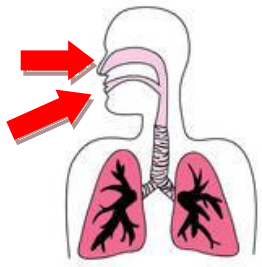
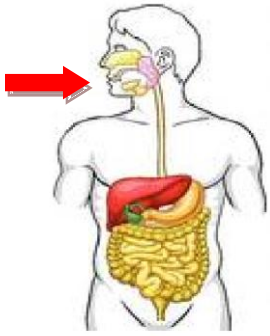
Hazards

Health Hazards

Long term exposure to pesticides poses threats to human health and the environment. Adverse health effects caused by these chemicals have also been associated with transmission from a mother to her unborn child. This may cause growth retardation, birth defects, and fetal death. Children are especially at high risk because they may play in soil and ingest soil that contains pesticides. Also, children pose the highest risk of accidental poisonings from pesticide ingestion from improper storage and unmarked containers.

Environmental Hazards

Pesticides can also contaminate the environment, especially when not used correctly. When excess pesticides are applied to an area they can runoff and travel to other areas and pollute drinking water. This may negatively impact both plants and animals. Pesticides can poison animals in the same way they poison people through ingestion and inhalation. They can also harm the soil because they kill insects, worms, fungi and bacteria that help keep soil healthy.

Pesticide Routes of Exposure	Health Hazards
Inhalation 	SHORT TERM EFFECTS -Irritation to respiratory mucus membranes -Sneezing, coughing -Dizziness -Breathing difficulty -Changes in heart rate -Vision disruption LONG TERM EFFECTS -Respiratory problems -Cancer -Nervous system dysfunction/depression -Poisoning
Dermal (through skin absorption) 	SORT TERM EFFECTS -Skin irritations -Dry skin -Ulcerations -Allergic reactions LONG TERM EFFECTS -Poisoning -Cancer
Ingestion 	SHORT TERM EFFECTS -Vomiting -Diarrhea -Muscle twitching -Intestinal/abdominal pain -Dizziness -Breathing difficulty -Changes in heart rate LONG TERM EFFECTS -Poisoning -Nervous system dysfunction/depression

Proper Pesticide Handling

Handling Guidelines

- Always read all the instructions included with the chemicals
- Be aware of specific chemicals in the pesticide and how they can harm your health
- Always protect exposed skin form pesticides
- Wear masks and gloves when handling pesticides
- Store pesticides in containers marked as dangerous or poisonous

Pesticides and your food

Fruits and vegetables grown with pesticides usually still have pesticide residue on them. Eating food with pesticides over a long time can collect poisons in your body and cause long-

term health problems. Because of this it's important to wash your fruits in vegetables in either soapy water or salt water (5 spoonfuls of salt to 1 liter of water) then rinse in fresh water. Eating foods grown without pesticides is always safer and healthier but they can be expensive and hard to find in some areas.

Pesticide Alternatives

Organic farming techniques use no chemical inputs, enhance soil fertility and yields and have no pesticide residue. Pests can be managed using integrative pest management. See the Bio intensive Farming Manual in Village Volunteers Sustainable Village Library for comprehensive information on organic farming techniques.

V. COOKING VENTILATION

Introduction

The World Health Organization estimated that indoor smoke from solid fuels ranked as one of the top ten risk factors for the global burden of disease (lost healthy years). Millions of people around the world lack chimneys or hoods to allow for proper **ventilation** of their stoves. This causes a very high percentage of **emissions** to reach peoples respiratory systems while cooking or heating their homes.

A common source of fuel for cooking and heating has been traditional biomass like wood, crop residues, charcoal, and animal dung. When burnt in poorly ventilated areas, these fuels produce carbon monoxide and fine particles that cause both acute and chronic health risks. A common practice, burning plastics indoor has the same health consequences as those mentioned in Section I.

Hazards

Health Hazards

Indoor air pollution is a severe threat because it is trapped indoors, increasing the health hazard on humans. Smoke from burning solid fuels is a risk factor for acute respiratory infections, chronic obstruction pulmonary disease, and lung cancer. Indoor air pollution is suspected to cause blindness, cataracts, premature births, and low birth weight. Children are even more at risk and are two to three times more likely to suffer from respiratory infections than children not exposed to indoor smoke. Women also are more at risk because they are the primary food preparers of the household. Three of the main chemicals produced that pose a risk are carbon monoxide, nitrogen dioxide, and sulfur dioxide. Wood smoke also produces a variety of particles and gases that can affect health.

Dangerous Gasses:

1. **Carbon monoxide** – The primary concern with this gas is its ability to cause immediate toxicity. Some of the first tissues affected by carbon monoxide are heart and brain tissues. This can cause headaches, nausea, vomiting, and cognitive impairment. Severe carbon monoxide poisoning can cause confusion, lack of consciousness, and even death.

2. **Nitrogen dioxide and sulfur dioxide** – Can also be released during indoor cooking and cause adverse health effects. These gases mainly irritate the eyes, nose, throat, and respiratory tract. Respiratory irritations may be greater in those who have asthma and in children. Repeated exposure to nitrogen dioxide may cause development of acute or chronic bronchitis.
3. **Wood smoke** – can cause eye, nose, and throat irritation. They can also decrease lung function and increases respiratory infections.

Proper Cooking Ventilation

The best solution to decrease or eliminate indoor air pollution is to provide proper ventilation for stoves and improved smokeless stoves. For example, when cooking use lids on pots and concentrate the fire to burn hot so that food is cooked faster.

VI. Why We Should Plant Trees

Introduction

Trees provide shade, fuel and food and they beautify our surroundings. They also preserve **biodiversity** by attracting and providing homes for native insects, birds and animals. These are all good reasons to plant trees but the most important reason is that they affect all life on earth. Trees can help restore damaged lands by making them more fertile and can provide firewood and timber. A way we can reduce **carbon dioxide** in our atmosphere is by planting trees. Trees take up carbon dioxide in a process called photosynthesis as a key ingredient in making their food. The trees use carbon dioxide along with the sun's light and create a type of sugar. This sugar is used as an energy source for the tree.

As a bi-product of photosynthesis, trees also release oxygen into our atmosphere. Therefore, not only do trees reduce carbon dioxide in our atmosphere, they also increase the quality of air we breathe. Trees can also provide us with firewood. However, we need to remember that when we burn wood the carbon is released as carbon dioxide. Therefore, if we burn a tree we need to plant more trees to offset this damage.

Trees aid moisture to the air, which can increase rainfall. Also, the deep root systems of trees can help reduce soil erosion. This is beneficial, because soil erosion can degrade water sources and damage infrastructure.

From an aesthetic standpoint, trees are pleasing to the eye. They provide shade, food, and are a great habitat for a variety of animals. Let's get out and plant trees!

VII. Climate Change

Introduction

Our atmosphere acts like a blanket which keeps the earth warm enough to sustain life. Due to human activity excessive amounts of heat-trapping gasses, like carbon dioxide, are increasing the earth's temperature. These are called greenhouse gases.

Due to this increase in temperature, global weather patterns are changing. We call this alteration of global weather patterns "Climate Change". Some places experience more floods and severe storms, while other places receive less rain and face severe droughts. These fluctuations in weather patterns are stressful to animal and plant life because they disrupt their normal patterns.

- Flooding, severe storms and drought cause crop loss, famine destruction of homes, mass migration, injury and death
- Diseases worsen or spread because changing weather patterns bring more insects and disease-carrying animals, and lets them move to new places
- Hotter temperatures sometimes leads to increased illness and death

The environment has a natural ability to absorb pollution but if too much is created the earth cannot absorb it all. One of the Greenhouse Gases that we can work to reduce is carbon dioxide. When we drive cars and buses, carbon dioxide is released as a bi-product.

What You Can Do

- Plant trees- trees help to slow climate change because they absorb carbon dioxide.
- Make a goal to plant lots of trees every year!
- Share the information you know with your friends and family so they too can understand the problem.
- Reduce and Reuse plastic.

Glossary

Biodegradable - items that are biodegradable are capable of being broken down into smaller pieces.

Biodiversity – the variety of life in a certain location or environment.

Carbon Dioxide - a gas that is present in the atmosphere and is released from cars and by the use of electricity. It is damaging to the environment in large amounts.

Contamination - making unsafe, unusable or changing and object by coming into contact with another object.

Decompose - the process of breaking down an object into smaller parts.

Emissions - the release of gases into the environment.

Environment - the surroundings in which one lives. Examples of your environment are the trees, water and houses that surround you.

Food Chain - the ordering of animals where smaller animals are on the bottom and larger animals on top ordered by which animals feeds on the smaller ones. Humans are on the top of the food chain because we eat most animals.

Ingestion- food, objects and or drink entering the body through eating or drinking.

Man-made or synthetic - material or objects that are not made naturally and therefore must be made by humans.

Pollute - making the environment unclean by disposing of objects, gases and garbage where they do not belong. Polluting can be throwing away garbage in a field rather than a garbage container.

Recycle - reusing an object by either finding a new way to use it yourself or by bringing it to a facility where they are able to reuse the object, usually plastic, paper or glass, and make it into a completely new object.

Reproductive - the system that regulates the ability of both men and women to produce children.

Respiratory System - the system that regulates breathing including your nose, lungs and trachea.

Toxic Fumes - gases that are released from a substance the can be damaging and harmful to the environment and human health.

Ventilation - the ability for air to move around which keeps it from having to many fumes or toxins.