Guide to Attaining Healthful Environment

Division of Environmental Health

Healthy Environment

INTRODUCTION:
Our environment plays an important role in our health. In order to have good health, we need to have safe, clean environments to live, work and play in. Many diseases and illnesses can be prevented by eliminating environment related risk-factors. By taking care of our environments, we take care of ourselves.

Importance of a Healthy Home

Homes are meant to be safe-havens that provide shelter and safety from the weather and the outside world. Having safe homes to live in protects us from injury and **disease**. But to keep our homes safe and healthy and free of health risks we must take good care of them.

Health Risks Within the Home

Insects, snails and other larger animals that carry and spread diseases are known as **vectors**. Some of the vectors that pose an immediate threat in Palau are mosquitoes, houseflies, cockroaches and rats. These vectors are well-known for spreading diseases such as Dengue fever and Leptospirosis, but they can also spread other diseases that we are not aware of. By practicing good **sanitation** we can reduce the number of vectors in and around our homes and therefore reduce the risk of disease and illness.

How to Maintain a Healthy Home

There are many things we can do to make our homes undesirable places for vectors to live. Pests are very similar to humans in the fact that they need the same things to survive that we do: food, water and shelter. By limiting their access to these three requirements we can discourage them from settling in and around our homes.

- First of all, cleaning up piles of scraps and garbage known as harborage, eliminates possible vector
- Secondly, we should make sure that all food is securely stored and out of reach.
- And finally we should eliminate sources of standing water and make sure that water sources are covered at all times.

By making sure that all areas of our homes are clean and tidy we are decreasing the number of places that vectors might try to build their homes or nests.

"The connection between health and dwelling is one of the most important that exists" -Florence Nightingale

Healthy Environment

1. Disease – an impairment of health or a condition of abnormal functioning
2. Vectors - An organism, such as a mosquito or tick that carries disease-causing microorganisms from one host to another.
3. Sanitation - the development and application of sanitary measures for the sake of cleanliness, protecting health, etc.
4. Habitats - The area or environment where an organism normally lives or occurs

Healthy Environment

Study the picture below. Circle areas that you believe to be “unhealthy” areas that could contribute to vector-borne disease and illnesses.

Healthy Environment

In the space below, Draw your own picture of what you think a healthy home should look like.

HEALTHY ENVIRONMENT
Worksheet 3

Use the table below to create a Healthy Environment Checklist (An example has been provided in the first row.)

#	Item Description	Y/N
1	Covered trashcan	Y

Safe Drinking Water

INTRODUCTION:

By now you have learned that water = life. Water is **essential** for human survival. But there are some very interesting facts about water that you may not be aware of. For example, did you know that about 66% of the human body is made up of water? In addition, 75% of the earth is covered with water. That means, the earth is covered with more water than land! But of that water, 97% is in the earth's oceans. Only 3% can be used for drinking water. And although a person can live without food for almost a month, a person can only live without water for about a week.

Importance of Safe Drinking Water

Many of us don't realize how important it is to have safe water to drink and how fortunate those who do have it are. You probably assume that safe drinking water is easy to come by and that everyone has access to it. But that isn't the case. Did you know that 1.1 *billion* people on earth do not have access to safe drinking water?

At this point you may be wondering what the difference between *safe* drinking water and *unsafe* drinking water is. Safe drinking water is free of harmful **bacteria**, **parasites** and **viruses**. These germs can sometimes make people very sick. To prevent this we have to make sure that our water is clean before we drink it. In **urban** areas, like Koror, people do not usually have to worry about making sure their water is clean because the public sanitation department takes care of it. But **rural** communities, like those in Babeldaob and the outer islands, who do not have this service, must treat their own water.

Tips for Safe Water

Here are some ways you can help ensure that your water is safe to drink:

Make sure your catchment tank is properly set up. It should have a good cover on it so that rats and other pests cannot get into it. It should also be made of nontoxic materials. It should also be placed away from trees and plans that can act as a highway for pests.

Boiling water at a rolling boil for at least one minute will kill any germs that may be in your water.

Clorox can be used to treat water to kill any germs. If a very small amount of Clorox is used, it will kill the germs but will not harm you.

DEH can provide water test kits to test water quality.

Recipe to treat Drinking Water using Clorox:

55 gallons water = 2 teaspoons Clorox 1

500 gallons water = 5 tablespoons Clorox

1 gallon of water = 3 drops Clorox

00 gallons water = 1 tablespoon Clorox

5 gallons water = 10 drops Clorox

200 gallons water = 2 tablespoons Clorox

Safe Drinking Water Vocabulary

- **Essential** – Absolutely necessary.
- **Survival** – the act of surviving; remaining alive.
- **Bacteria** – organisms not able to be seen except under a microscope, found in rotting matter, in air, in soil and in living bodies, some being the germs of disease. Example: *a throat infection caused by bacteria*
- **Viruses** – a microscopic organism that can cause disease.
- **Parasites** – an animal or plant that lives on another animal or plant without giving anything in return. Example: *Fleas are parasites; He is a parasite on society.*
- **Urban** – of, consisting of, or living in, a city or town. Example: *He dislikes urban life; urban traffic*
- **Rural** – 1. country life, away from populated areas, in remote locations, sometimes without paved roads, indoor plumbing, or public water connection.
  2. Referring to agriculture or farming.

Safe Drinking Water
Worksheet 1

Use the space provided below to draw one picture of a glass of untreated water and one picture of a glass of treated, safe drinking water.

Treated Water

Untreated Water

Safe Drinking Water
Worksheet 1

In the space provided below, describe the differences between treated water and untreated water.

Treated Water

Untreated Water

Safe Drinking Water Worksheet 3

True or False?

Using the information you have just learned about safe drinking water and the ways we can make sure that our water is safe to drink, decide whether each of the statements below is true or false. Read the statement, then on the line provided, write a T for True or F for False.

1. _____ Water is NOT essential for human survival.

2._____ Everyone on earth has safe water to drink.

3._____ If a person drinks water that has harmful bacteria in it, they can become sick.

4._____ Pests like to live and breed close to or directly on standing water.

5._____ Saltwater or ocean water is safe to drink.

6._____ 75% of the Earth is covered with water.

7._____ Catchment tanks should be covered.

8._____ Safe drinking water is free of harmful bacteria, viruses and parasites.

9._____ Soap can be used to treat water to make it safe for drinking.

10._____ The Division of Environmental Health can test your water to see if it is safe to drink.

Liquid Waste Management

INTRODUCTION:

Do you ever wonder where the water goes when it disappears down the drain? If you live in an urban community, your liquid waste goes down the drain, through underground pipes to the local liquid waste treatment center. If you live in a rural community, then your community might not have a treatment center and you have to figure out a way to get rid of your own liquid waste.

LIQUID WASTE FAQs (Frequently Asked Questions)

WHAT IS LIQUID WASTE?

Liquid waste is water that has been used for cleaning, washing or sewage produced by people or animals. Liquid waste is also referred to as wastewater or grey water.

WHAT IS LIQUID WASTE MANAGEMENT?

When we refer to liquid waste **management**, we are talking about the right way to **dispose** of liquid wastes.

WHY IS LIQUID WASTE MANAGEMENT IMPORTANT?

Liquid wastes such as dirty dishwater, used bathwater and sewage are filled with harmful germs and bacteria. If liquid waste is not properly disposed of it can find its way into other water sources and contaminate them. It can also begin to **accumulate** and become very smelly, **toxic** and **hazardous**.

WHAT CAN I DO TO HELP?

If you understand what liquid waste is and know how to properly dispose of it, you can help make your community a safer place to live.

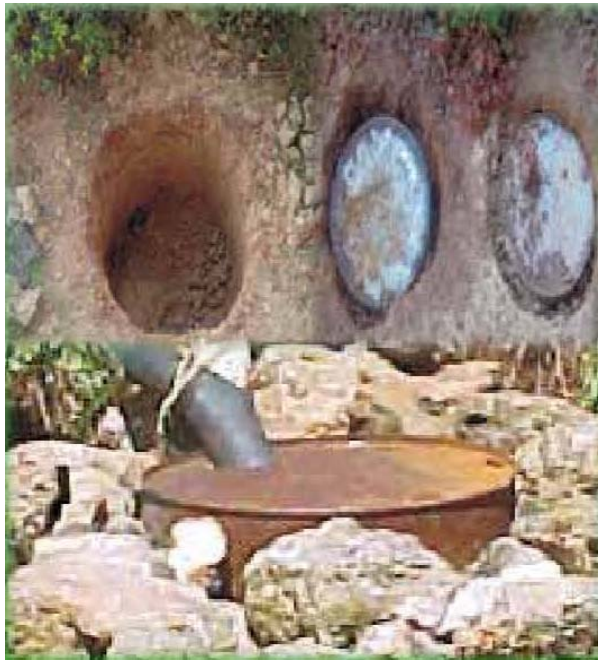
Liquid Waste Management Vocabulary

1. **Management** – to oversee a job; to direct to accomplish a purpose.
   Ex. The teacher is in charge of classroom management.
2. **Dispose** – to get rid of something; throw away
3. **Accumulate** – to gather or build up.
4. **Toxic** – Harmful, destructive or deadly.
5. **Hazardous** – A source of danger.

Liquid Waste Management Worksheet 1

Cesspit Construction

If you live in a rural community, then you may have to find a way to get rid of your household liquid waste so that it doesn't contaminate any nearby water sources. One way to do this is by making a cesspit. In this lesson we will make model cesspits so you will know what they look like and how to build one.



For this exercise you will need:

- Several sheets of construction paper
- Scissors
- Glue, tape or a stapler
- Scrap paper
- An old piece of hose, tubing or a straw

To construct your model cesspit, follow the steps below:

Step 1

1. Take one sheet of construction paper and fold in half.
2. Next fold the halved paper so that it forms a cylinder. (This is the ‘drum’ for your cesspit.)
3. Secure the ‘drum’ where the paper meets at the top and bottom of the cylinder with glue, tape or staples.
4. Set the drum upright on your desk.

Step 2

1. Take some scrap paper and tear it into small pieces.
2. Crumple the pieces into little balls. (These will be used as “small rocks” for your cesspit)
3. Fill ¼ of your cesspit with your “rocks”.
4. Use your scissors to cut a small circle that will fit inside your drum. (This is your barrier which will prevent soil from filling the spaces between the rocks)

Step 3

1. Place your straw or tubing inside your cesspit. (This acts as your drainpipe)
2. Find something to cover your cesspit.

Liquid Waste Management Worksheet 2

In the space below, Draw a picture of your cesspit and how it should look outside your home. Make sure to include your house and the cesspit in the picture.

Solid Waste Management

INTRODUCTION:

In the last lesson, we discussed the job of liquid waste management. In this lesson, we're going to cover Solid Waste Management. Solid waste is better known as "trash."

Humans produce tons and tons of trash every single day. In fact, it is estimated that every person produces about 4.3 pounds of trash per day. When you consider that there is about 6 billion people on planet Earth that adds up to a lot of trash! So what do we do with all that trash? Check out the diagram below to learn about the cycle of trash.

THE CYCLE OF TRASH

First, we put trash into a bin.

Then we put the trash into containers outside until we can get it to the dump site.

Next, someone takes the trash to the dump site.

REDUCE, REUSE & RECYCLE

Something that we can do to decrease the amount of garbage that gets produced is to Reduce, Reuse and Recycle. Think twice before you throw something in the trash bin. Reducing the amount of trash we produce greatly helps the environment. One way to reduce your trash is reuse items. For example, old plastic bottles can be reused over and over again for water or other drinks or even for olbaol. Another thing you can do to reduce your garbage is to recycle. Most states have started a garbage separation project. Separate your glass, plastic and aluminum at home, then dispose of it in the designated areas.

Did you know you can even earn money by recycling? The local company “Belau Scrap Company / PECI” will buy all of your old aluminum cans. So if you’re not already, make a separate bin for aluminum cans. The more cans you collect the more money you earn!

Garbage Separation Project

Why wait to start helping the environment when you can get started right now? With the help of your teacher, find four separate bins that you can use for throwing trash away. Mark the bins for paper, plastic, aluminum and other. Using plastic gloves or a plastic bag to cover your hands, collect any garbage you find around your classroom or school and put it into the appropriate bin.

Solid Waste Management Worksheet 1

The statements below are out of order. Read them and then put them in correct order by numbering them 1-5. 1 should come first and 5 last.

_____ Trash is taken to a public dump site.

_____ Humans produce trash.

_____ Trash is segregated into 4 categories: paper, plastic, aluminum and other.

_____ Trash is disposed of in a designated bin.

_____ Trash is placed in a covered, elevated bin outside while it waits to be taken to the dump site.

Physical Control of Mosquitoes

INTRODUCTION:

We are all familiar with Dengue Fever. It is a very unpleasant illness involving high fevers and headaches and sometimes even requires hospitalization. Dengue fever is spread from mosquitoes to humans. Dengue fever is very common in tropical areas like Palau. Stopping mosquitoes is the key to stopping the Dengue fever virus. One way to stop mosquitoes is through physical control of mosquitoes.

True or False?

Before we discuss the physical control of mosquitoes, take a few minutes to read the following statements and decide if they are true or false.

1._____ Male mosquitoes only eat nectar, female mosquitoes are the ones who drink blood.
2._____ Baby mosquitoes are born in water and live in the water until they become adults.
3._____ A female mosquito can lay between 100 – 400 eggs.
4._____ A mosquito can mature from a baby to an adult in less than 10 days.
5._____ Mosquitoes can fly far from their homes.

If you answered TRUE for all of the statements above, then you are right! They are all facts about mosquitoes. Now that you know some facts about mosquitoes and why stopping them is important, read on to find out how you can physically control them.

WHAT IS PHYSICAL CONTROL OF MOSQUITOES?

Physical control of mosquitoes involves keeping mosquitoes off and away from you.

There are three ways to physically control mosquitoes:

- Keep mosquitoes off yourself.
- Keep mosquitoes outside.
- Prevent mosquitoes.

Keep Mosquitoes off yourself

1. Wear long sleeves, long pants and socks. Light colored clothing is best because mosquitoes can be attracted to dark colors.
2. Use mosquito nets.
3. Stay inside at dusk and dawn when mosquitoes are most active

Keep Mosquitoes Outside

1. Use mosquito screen.
2. Keep window & door screens repaired.
3. Install mosquito screen on all windows and screen doors.

Prevent Mosquitoes

1. Yard clearing and cleaning. Tall grass is a favorite mosquito resting spot.
2. Drain water from containers without proper covers. Mosquitoes love to lay their eggs on standing water.
3. Install proper lids on all water containers.
4. Fill in ditches, pits or potholes.
5. Discard old tires and unused containers properly at public dumps. These items can collect water and become greatest places for mosquito breeding.
6. Dispose of trash in proper trash bins with tight fitting lids.

Physical Control of Mosquitoes Worksheet 1

Word Scramble

Put the letters in the right order to complete the sentence.

1. Mosquitoes can infect people with the _____fever virus.
   UENEGD

2. One way to stop mosquitoes is through _____ control.
   LAHPYICS

3. Dengue fever is common in _____ areas.
   RPOICTLA

4. _____ mosquitoes feed on blood.
   EEMLAF

5. Mosquitoes lay their eggs in or around _____.
   TREAW

6. To keep mosquitoes out of your house makes sure all door and window screens are _____.
   DEPERIAR

7. _____ old tires and unused containers properly at public dumps.
   CISDDAR

8. Stay _____at dusk and dawn when mosquitoes are active.
   EDSNII

9. Male mosquitoes eat only _____.
   CTARNE

10. Wear _____colored clothing.
    TGILH

Biological Control of Mosquitoes

INTRODUCTION:

In our previous lesson we learned how to stop mosquitoes through physical controls such as clothing, screens and limiting mosquito habitats. Biological control of mosquitoes uses natural remedies and processes to stop mosquitoes. In addition to using physical controls to stop mosquitoes, plants, insects and animals can also be useful for this purpose.

PLANTS

- Rub together *Premna Obtusifolia* leaves and apply/rub on exposed skin.
- Rub together Lemongrass leaves and apply/rub on exposed skin.
- Grate coconut meat and apply/ rub on exposed skin.
- Apply coconut oil on exposed skin.

INSECTS & ANIMALS THAT EAT MOSQUITOES

- Dragon Flies
- Geckoes
- Cave Bats
- Gambushia-Copy (Fresh water fish)
- Island (Gray) Swiftlet

Biological Control of Mosquitoes Worksheet 1

In the space provided below draw a picture of a plant, insect or animal that can be used as a biological control to stop mosquitoes.

Chemical Control of Mosquitoes

INTRODUCTION:

Our final lesson on stopping mosquitoes focuses on Chemical control. The chemical control of mosquitoes involves purchasing products from the store that have specially designed and formulated to repel mosquitoes. Different chemical products to stop mosquitoes include skin repellents, insecticides that can be sprayed around the house and aerial pesticides sprayed by professionals.

KEEP MOSQUITOES OFF:

PEOPLE

1. Use insect repellent with DEET (N,N-DIETHYL-METO-TOLUAMIDE or N,N-DIETHYL-3-METHYLBENZAMIDE)
2. DO NOT use DEET on children under 2 Years old.
3. Use repellent only on exposed skin and clothes (NOT near eyes, nose, mouth, cuts, irritated skin or children's hands)

INDOORS

- MORTEIN RESIDUAL SURFACE SPRAY (Insecticide)
  - Spray corners, underneath tables, beds, couches, all possible mosquito resting places
  - Spray evenly/moisturize surfaces for effective action
- OUTDOOR
- Aerial Pesticide is a restricted activity for authorized people only.
  - Authorized Agencies are:
    - Division of Environmental Health (DEH)
    - Environment Quality Protection Board (EQPB)

Chemical Control of Mosquitoes

Read the statements in the left column and match them with the correct word in the right column.

_____ Chemical product designed to keep mosquitoes off people.

_____ The use of natural processes and remedies to control mosquitoes.

_____ Chemical used to keep mosquitoes off of indoor surfaces.

_____ Disease spread by Mosquitoes.

_____ Controlling mosquitoes by keeping them off and away from your body.

_____ Chemical mosquito control that can only be sprayed by professionals.

_____ Natural oil that can be used to repel mosquitoes.

_____ Natural plant that can be applied to skin to repel mosquitoes.

A. Dengue Fever Virus

B. Physical Control of Mosquitoes

C. Repellent

D. Aerial Pesticides

E. Coconut

F. Biological Control of Mosquitoes

G. Insecticide

H. Lemongrass

Palau Integrated Pest Management (P-IPM)

INTRODUCTION:

Previously we learned that Dengue fever is spread from mosquitoes to humans, but mosquitoes are not the only pests that spread diseases. Pests like rats and cockroaches can spread diseases as well. Rats are especially well known for spreading a dangerous disease called *Leptospirosis*. If we take steps to eliminate pests from our homes, we can help prevent the spread of disease. The best known way to eliminate pests is through the Integrated Pest Management system.

What is Integrated Pest Management?

To integrate something means to make a whole by bringing parts together. The P-IPM aims to stop pests by eliminating all of their requirements for survival: food to eat, water to drink and harborage –shelter to live in.

Integrated Pest Management Worksheet 1

Draw a picture of an environment that has all of the requirements for survival that a rat would need. Then circle the things in the picture that are required for rats to survive in the environment.

Integrated Pest Management Worksheet 2

Now, re-draw the picture after eliminating all of the required survival tools for the rat. This will help show how to maintain good pest management. After you are done drawing, share your drawing with the class and discuss good ways to keep environments clean to reduce pest problems.

Final Evaluation

NAME _____ DATE _____

Read the definitions ill t he left column. Then match the definition with the correct vocabulary word by writing the letter in the space provided.

1. ____ an impairment of health	A. Essential
2. ____ the area or environment where an organism normally lives	B. Parasite
3. ____ absolutely necessary	C. Disease
4. ____ the act of surviving; remaining alive	D. Toxic
5. ____ an animal or plant that lives on another animal or plant without giving anything in return	E. Vector
6. ____ living in a city or town	F. Habitat
7. ____ to get rid of something; throw away	G. Survival
8. ____ Harmful, destructive, or deadly	H. Rural
9. ____ An organism that carries disease causing microorganisms	I. Dispose
10. ___ Country life	J. Urban

Final Evaluation

Read the following statements and decide if they are True or False.

Put a T in space provided if you think the statement is T or an F if you think it is False.

1. ___ Many diseases and illnesses can be prevented by eliminating nvironment related risk-factors.
2. ___ We do not have to worry about disease-carrying pests in Palau.
3. ___ Pests, like humans, need food, water, and shelter to survive.
4. ___ All water is safe t o drink.
5. ___ 75% of the Earth's surface is covered with water.
6. ___ 66% of the human body is made up of water.
7. ___ Humans do not need water to survive.
8. ___ Liquid waste is water that has been used for cleaning, washing or sewage produced by people or animals.
9. ___ Each person on earth produces an average of 4.3 pounds of trash every day.
10. ___ You can earn money by recycling aluminum cans.
11. ___ You can throw your trash wherever you feel like it.
12. ___ Having screens on doors and windows helps keep mosquitoes out your home.
13. ___ You cannot get Dengue fever from mosquitoes.
14. ___ Rats can carry diseases that can infect humans.
15. ___ Insecticides can be used to keep rats out of your house.

Final Evaluation

In your own words, describe what you think a “Healthy Environment” is and why it is important.