

# Pago Pago Water Streams



## Presenters

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Gagamoe Stream

Laolao Stream

Vaipito Stream

Church of the Sacred Heart

Pago Pago Park

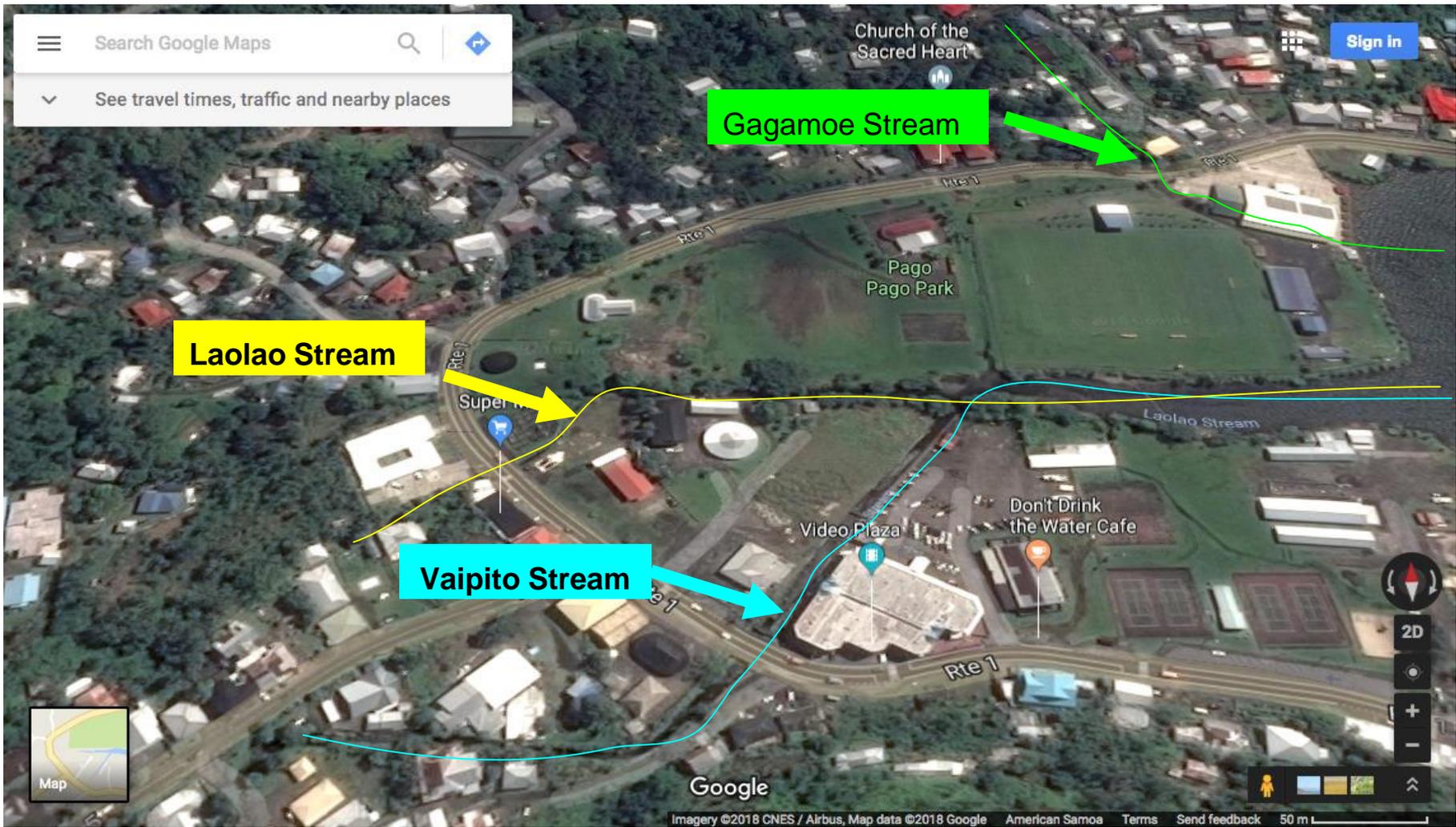
Super m

Video Plaza

Don't Drink the Water Cafe

Google

Map



Rte 1

Pago Pago, Eastern District

Google, Inc.

Street View - May 2014

Laolao Stream



Google

Rte 1

Anua, Eastern District

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Gagamoe Stream



Google

# Vaipito Stream



# What is population?

Population is the whole number of people living in an area.

*Know the term Population.*

*Population changes over time.*

*Make connection to other areas of learning.*



# Pago Pago Population

Population Data of Pago Pago  
1920-2010. Information taken  
from the United States Census and  
Department of Commerce  
Statistical Division.

*Guest speaker from Department of  
Commerce Statistical Division.*

*Share about census.*

*Comparing numbers and data  
collecting (graphing)*

YEAR	POPULATION	ANNUAL GROWTH RATE (PERCENT)
2010	3,656	-14.5
2000	4,278	21.6
1990	3,519	14.4
1980	3,075	25.5
1970	2,451	95.9
1960	1,251	-21.1
1950	1,586	69.8
1940	934	31.9
1930	708	24.6
1920	568	

# Population Growth and Environment

**Erosion** is the action of surface processes (such as water flow that remove soil, rock, or dissolved material from one location to another location).

*Land Grant to help with planting of plants on the stream next to the school and school campus.*



# Standards and Benchmarks

## Earth and Space Science

Standard 7: Students examine organisms' structures and functions for life processes, including growth and reproductions.

Benchmark: Recognize that plants and animals have needs that must be met in order to survive

Indicator: Observe how water is critical to all animals and plants



Introduce the lesson  
The importance of our streams  
TEXT to SELF



Brainstorm/ Prior Knowledge

What is a Stream?

Where does the water come from where does it go?

Would you drink water from the stream why?

How many streams do you know in our area?

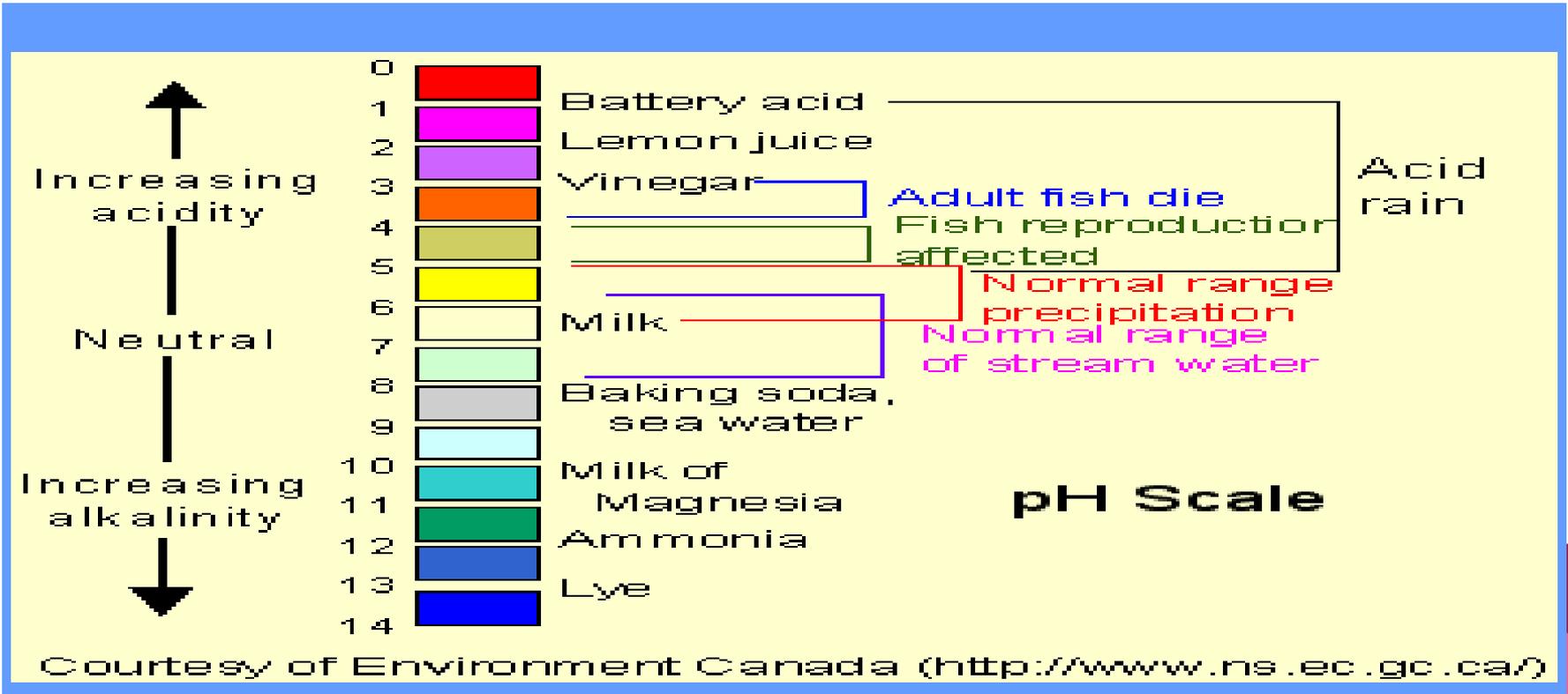
What do you see in the stream?

Are there any living things in the streams?

Do you think they like drinking the stream water why?

Can you draw a map of this stream from the beginning to its outflow in the ocean?.

# Ph level testing of water sources



# TEXT to TEXT

Guest Speaker Matt Erickson: discussing the effects of ph level in the stream.

Explain the chart and the different levels

Experiment

Coke soda(Acid) and a rusted nail

Using the zoomie to view the effects of acid on the rusted nail



# Collecting of stream water samples



After learning about the ph scale students are taken out on the selected sites to gather water samples on maybe 3 different locations

TEXT to WORLD With these samples students will predict the effects of the ph water level on plants and animals. Students can assume how this problem started and how to solve this problem

# Activities

Acrostic poem

Graphic organizer

Interview an expert

Frayer model

Get the Gist

Venn-Diagram

K-W-L



# Animals in American Samoa Streams

When rain enters the soil, it moves deep underground. This is where our drinking water comes from. This water, called groundwater, is fairly clean. The American Samoa Power Authority digs wells to collect and further clean this water before piping it to our homes.

Each year more and more people live in American Samoa, but our supply of water stays the same. Soon we may have to find other sources of drinking water.

Our people once got all of their water from streams. But now many of our streams are polluted. Several agencies, both here and in the United States, are working to make streams clean again.

Some States know how clean their streams are by knowing what animals live in them. Here are some of the common animals we find in our streams. The American Samoa Community College, with help from the U.S. Department of Agriculture, is trying to learn if our stream animals can tell us how clean our streams are too.

## Fishes



kuhlid



gobies



eleotrid



anguillid eel

Four basic types of fishes are in our streams: anguillids, eleotrids, gobies and kuhlids.



atyid



palaemonid

## Shrimps

Two main types of shrimp are found in our streams. One type has feathery fingers that catch little things to eat (atyid). The other type has pinchers that can hold and tear larger things (palaemonid).

## Insects



Our streams are home for some insects also.

## Snails



Picture A



Picture B

There are two main types of neritid snails in our streams. One type has the operculum outside to close itself in (Picture A).

The other type on an open foot with the operculum inside (Picture B).



A cluster of baby snails on a rock



Prepared by Lisa Wade  
Pictures by: Sharon Fanolua, Don Vargo, Agnes Vargo, and Lisa Wade



If we do not take care of our streams, these animals may not have a home, and we may not be able to use the water.

Please keep our streams clean.  
**Fa'afetai tele lava.**

# Importance of Stream Animals

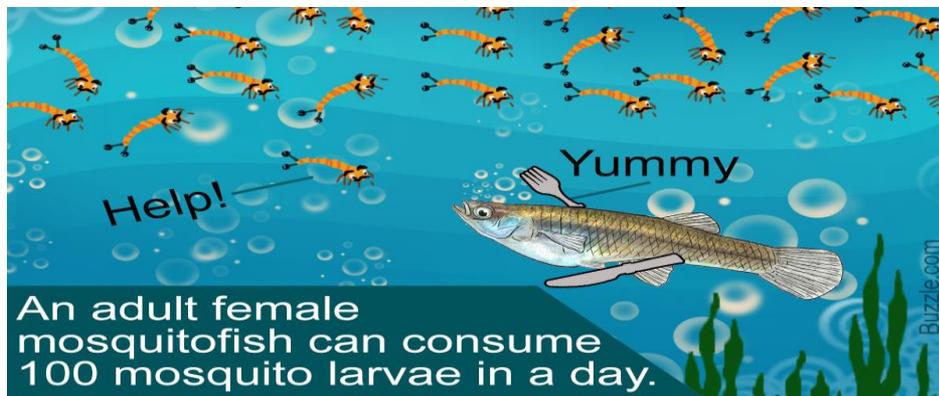
- Snails keep algae growth under control.
- Shrimps filter organic debris from flowing water and hunt insect larvae hiding in sand and among small stones. They are also an important food source for fishes, birds, and—long ago—early settlers.
- Fishes are an important food for large birds, and some people enjoy catching them for food and sport.



Source:  
Stream  
Fauna of  
American  
Samoa

# Invasive Stream Animals: Indicators of an Unhealthy Stream

Mosquito fish



Cane Toad (Tadpoles)



# BIG IDEAS

1. Identify/Classify stream animals
2. Describe a healthy and unhealthy stream according to its organisms.
3. Examine ways to maintain or restore a healthy stream



# Stream

## Plants



Essential Question: How do native plants increase the health of streams and habitats in our watersheds?

- Native Plants
- Invasive Plants

Guest Speaker (Tavita Togia from National Park)

# Invasive Plants

## Key features of Invasive Plants

- Reproduce quickly
- Lack natural predators
- Grow in disturbed areas

Game:

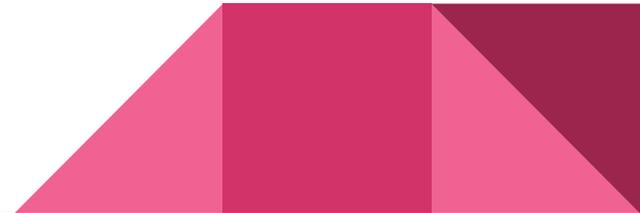
“We’re being Invaded”



# Native Plants



- Benefits of Native Plants
- How native plants contribute to water quality





**Plants shade streams and keep the water cooler and help trout to survive with more oxygen**

# Water Stream Pollution



Source of  
Water  
Pollution

Common Source of Pollution



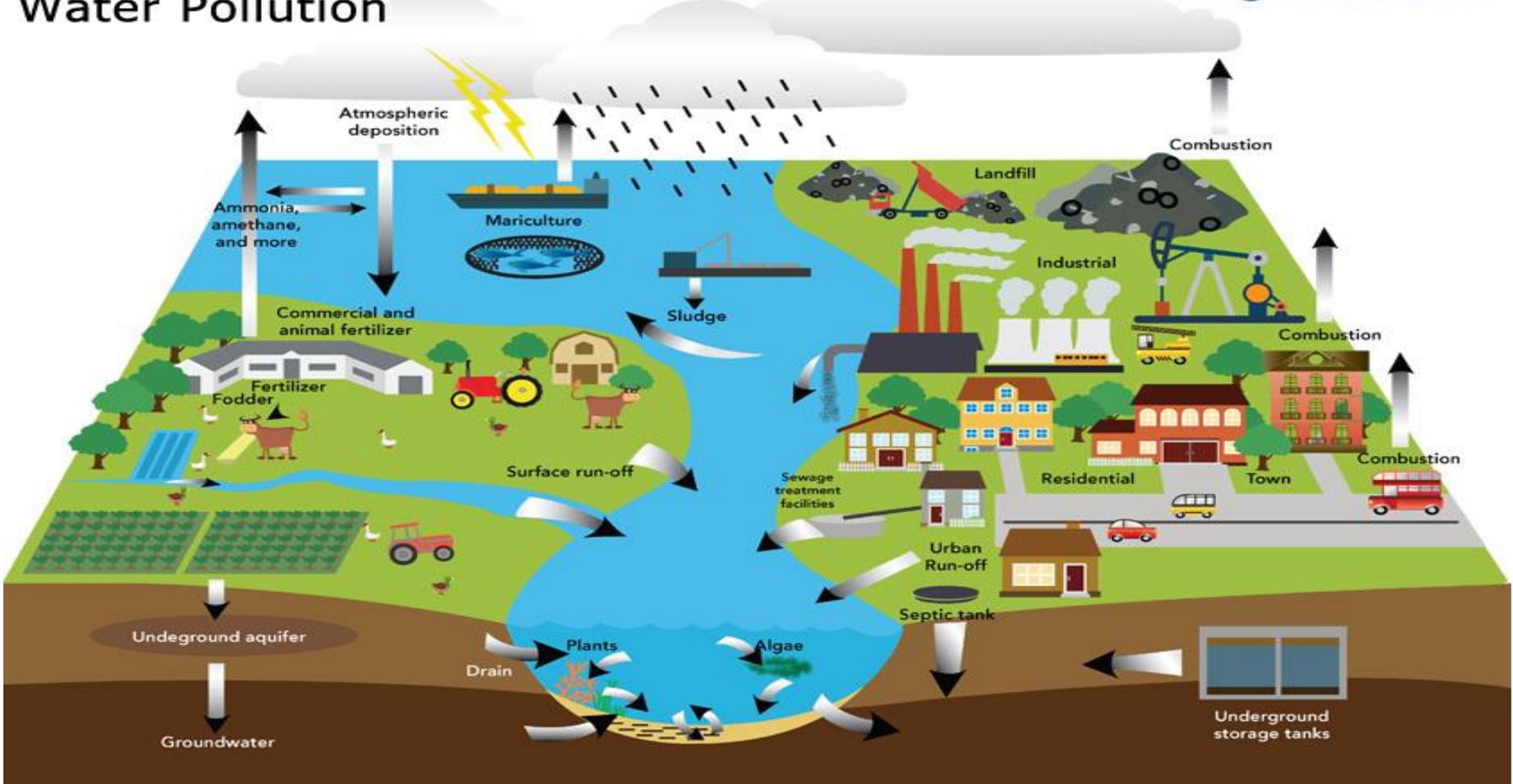
Family homes

Common Source of Pollution

School



# Sources of Water Pollution



# Other lessons

## ❖ Data Collection

### ★ Trash Collection from streams

- Daily
- Weekly
- Monthly

### ★ Weather: Good and Bad

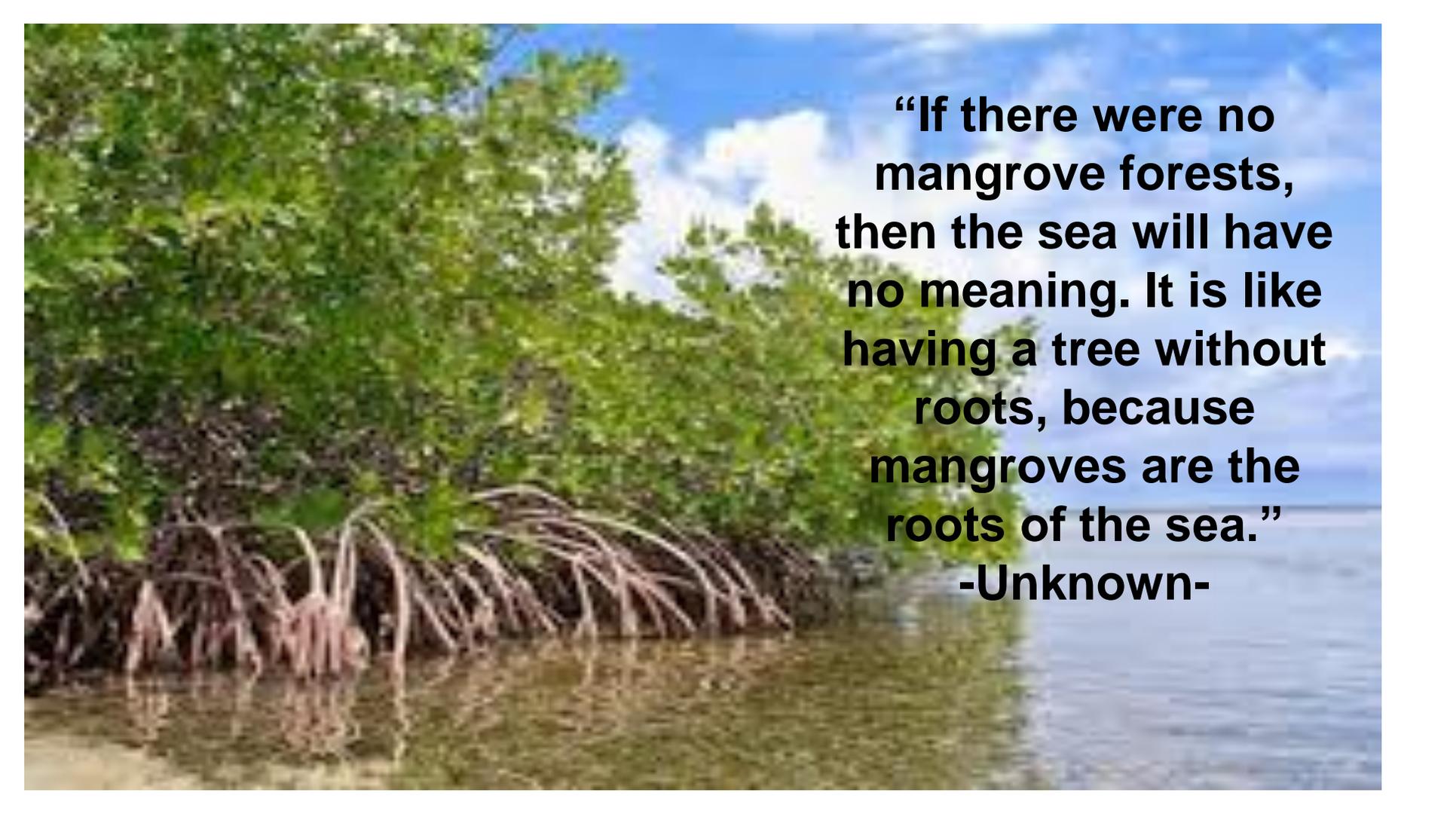
## ❖ Classifying pollutant: Solid, Liquid or Gas

- ◆ Physical, chemical or biological

## ❖ Classifying of non-degradable according to their recycling standard

# MANGROVES





**“If there were no mangrove forests, then the sea will have no meaning. It is like having a tree without roots, because mangroves are the roots of the sea.”**

**-Unknown-**

# 2 Types of Mangroves in American Samoa

A. Oriental Mangrove (*Bruguiera  
Gymnorhiza*)

B. Red Mangrove (*Rhizophora  
Mangle*)

1. RIGOR



## 2. RELEVANCE

## FACTS:

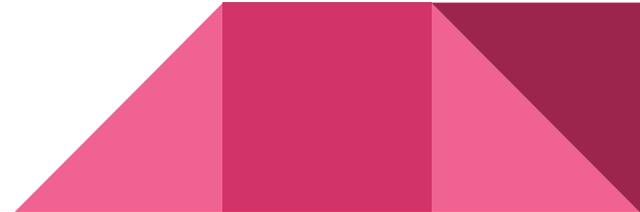
- Mangroves filter sediments that go into the water so the bad sediments don't kill the coral reef colonies.
- They act as pollution control and also naturally filter out industrial and human wastes.
- They produce flowers and rely on bees and insects for pollination.
- Many animals make their homes in the mangrove such as: flying fox (bat), crabs, fish, bees, etc.
- Red Mangroves” are the most common choice, use particularly in marine aquariums in the sump to reduce nitrate and other nutrients in the water.

### 3. RELATIONSHIP

## Planting Mangrove



- It is a tree or shrub that grows in chiefly tropical coastal swamps that are flooded at high tide. Mangroves typically have numerous tangled roots above ground and form dense thickets. (*McKean, E. 2005*)



## 4. RESPONSIBILITY

## 5. RECIPROCITY

### LESSON EXAMPLES:

- > Guest Speaker: Mr. Tavita Togia  
(National Park of American Samoa)
- > Field Trips to the Harbor
- > Hands on Lesson
- > Planting of Mangrove
- > Students learn about caring for their village and environment.

