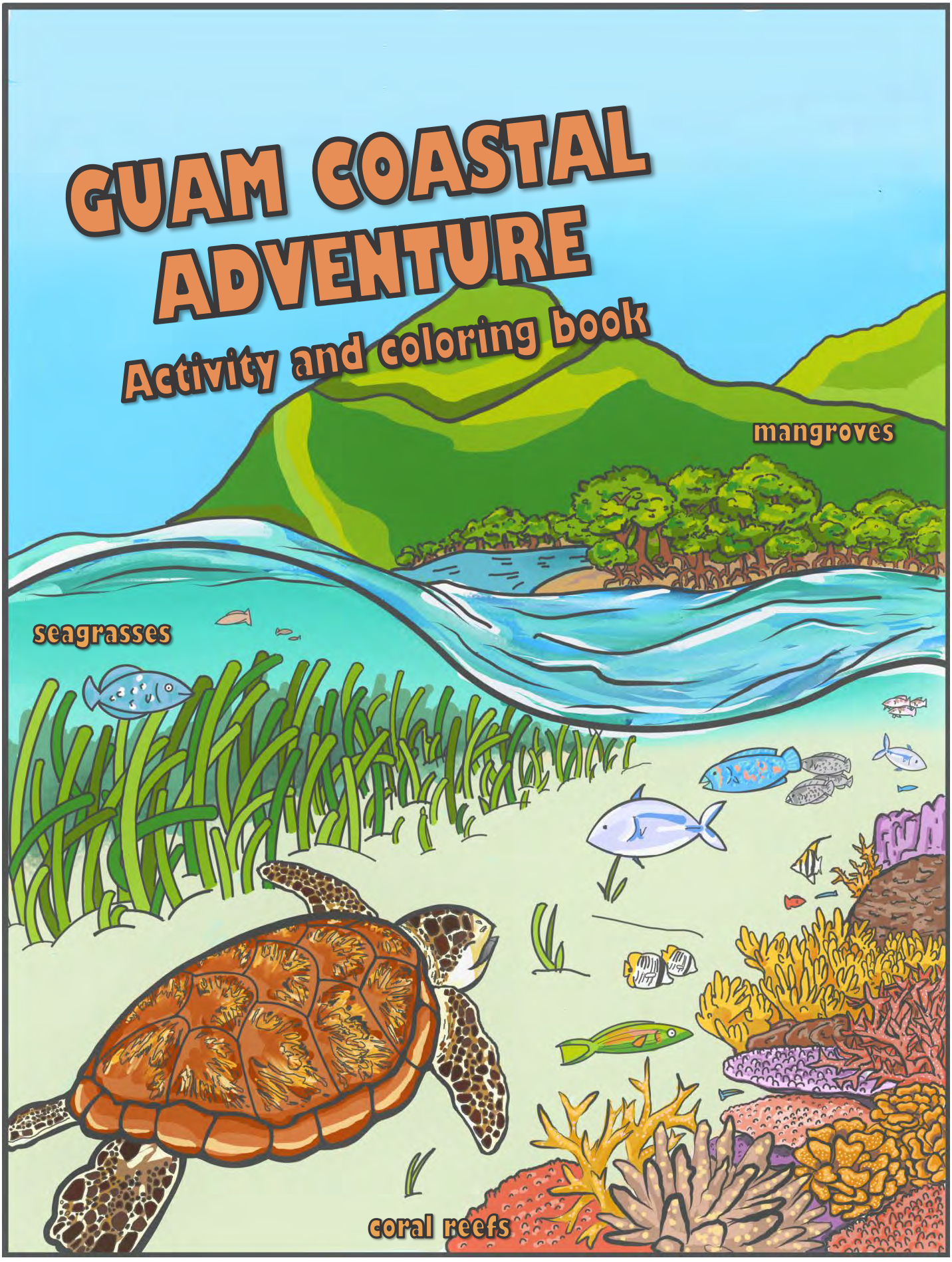
GUAM COASTAL ADVENTURE
Activity and coloring book
mangroves
seagrasses
coral reefs

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Guampedia:

"Pole and Thatched Homes" by Lawrence Cunningham

"Mangroves: The Forest between Land and Sea" by Mildred Kelokelo

"Hima: Conserving a Cultural Heritage" by Francisco Villagomez

Water and Environmental Research Institute of the Western Pacific (WERI) and Island Research & Education Initiative (IREI)- Digital Atlas of Guam

Fish Names of the Mariana Islands, Micronesia, University of Guam Marine Laboratory Technical Report 13, February 2012 compiled by Alexander M Kerr

Guam's Fish and Wildlife Factsheets (May 2002), funded by the Guam Environmental Protection Agency pursuant to the United States Environmental Protection Agency Award # M009063-02 through the Environmental Education Committee of the Water Planning Committee.
https://www.guampedia.com/fish-and-wildlife-fact-sheets/

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GUAM CORAL REEF INITIATIVE

Greetings Ocean Explorer!

Thanks for joining our adventure! We are going to explore three coastal **HABITATS** you can find around Guam. **A habitat is a place where animals and plants live.** Healthy habitats provide animals things they need, such as food and shelter.

Hafa adai, I'm Metgot the Mangrove!

In CHamoru the word "metgot" means strong! I am a strong type of tree that can survive in or near salt water.

What is your name?

My name is:

Mangrove Habitat
Mångle habitat

Salutations! I am Seba the Seagrass!

Unlike the grass on land, I live in salty ocean water. The CHamoru word "seba" means to give a lot, and I create a lot of homes for fish.

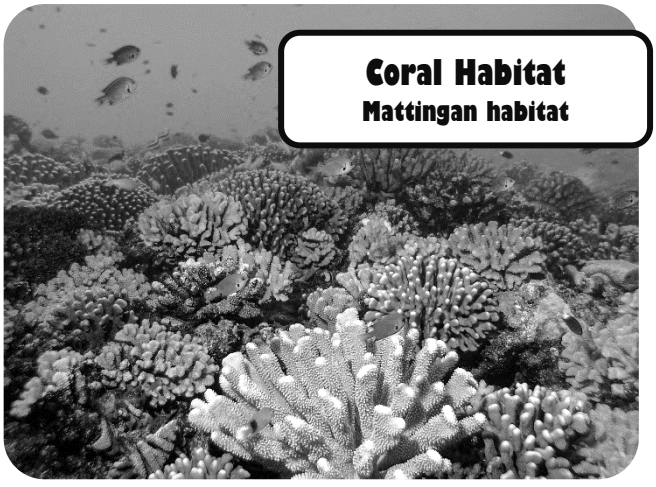
Join us on our adventure!
Draw yourself below:

Seagrass Habitat
Lo'u habitat

Buenas, I'm Åcho' tåsi the Coral!

I am an animal with algae (little plants) inside me.

Quick tip: underlined words are a question or challenge for you. Some have answers in the back.

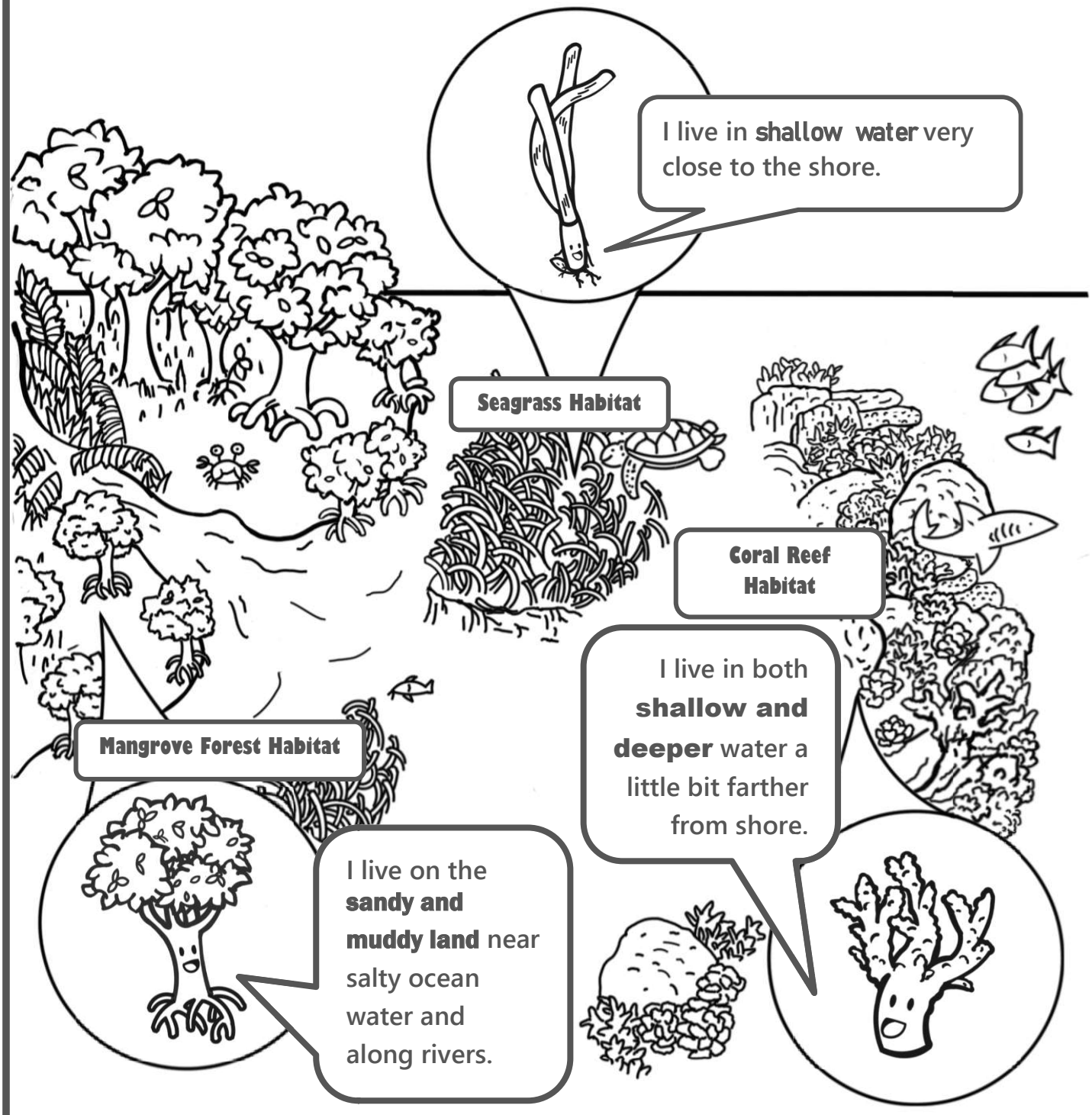


Coral Habitat
Mattingan habitat

Where do we live?

The mangroves, seagrasses, and coral reefs of Guam are along the coast. The habitats look different but are all connected. Animals like sea turtles and fish (can you spot them?) move between the habitats for food or as they grow up.

Seagrasses and mangroves help keep the water clear and clean, which protects the coral reef. All of the habitats **help absorb waves**, protecting the land and the people who live there.



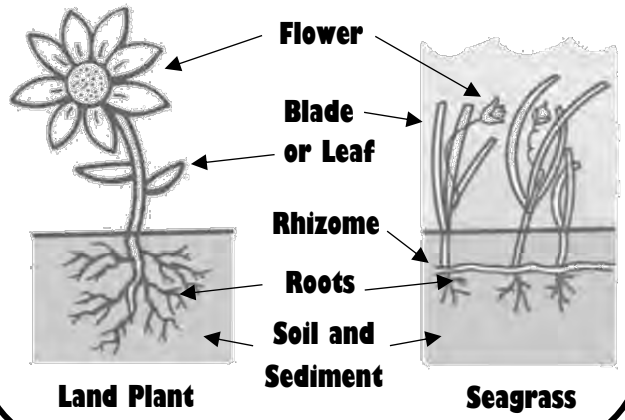
What are seagrasses?

Seagrasses are related to land plants! They also make food using energy from the sun and have flowers that make seeds.

New seagrass can grow from seeds **OR** they can grow along the **rhizome**, which is like a stem but underground.

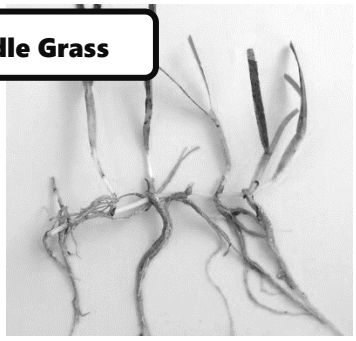
The **rhizome** allows seagrasses to share nutrients (food) and grow quickly horizontally.

How are these two plants similar and different?



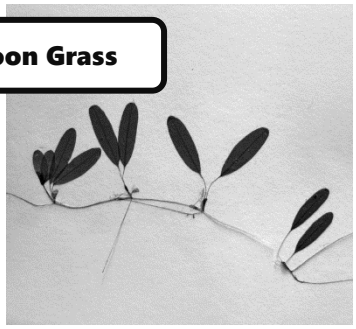
Guam has 3 types of seagrasses. Tape grass is the most common and largest type.
Observe the pictures below and compare the 3 seagrasses. Can you draw a line to match each leaf type and root type to the correct seagrass?

Needle Grass



Tape Grass

Spoon Grass



Leaf type

Oval shaped blade comes in pairs

Wide blade, rounded top

Narrow blade

Root type

Large thick roots

Medium sized roots

Small thin roots

*Answer on page 25

Super seagrass roots!

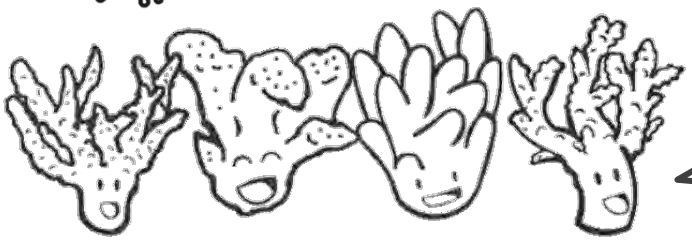
Roots help plants get nutrients and stay anchored in place.

Without enough plant roots keeping the soil in place, the soil can get loose and wash from the land into the sea and get stirred up by waves.

Soil that gets moved around by water is called SEDIMENT.

Especially on steep hills, rain can wash sediment into the ocean. If the sediment lands on the corals it can smother and hurt them.

It takes teamwork! All plants with roots help keep the soil in place. The forests and plants on land, the mangroves, and seagrasses all help protect corals.



Help protect us corals from sediment!

<u>Draw in the missing seagrass under the arrows below! Make sure you draw the roots to keep the sediment in place!</u>

Seagrass can grow horizontally along the rhizome

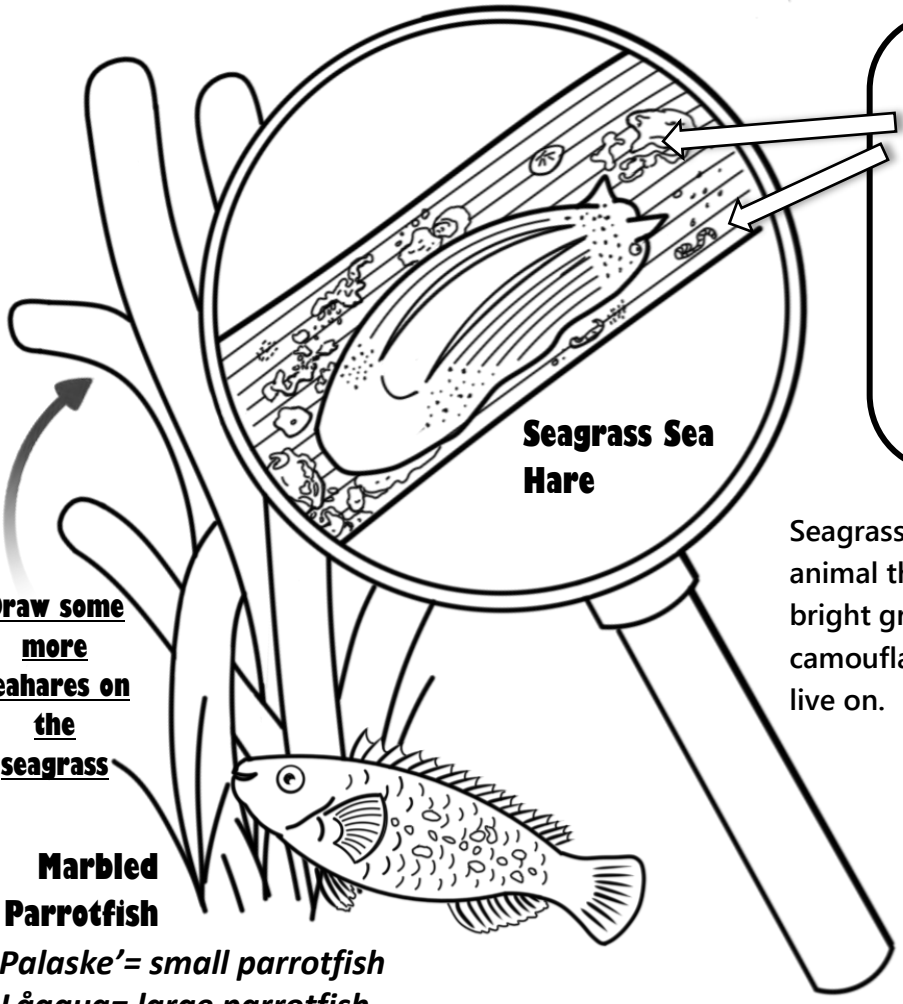
roots keeping sediment in place!

You can also help protect corals by planting trees, and avoiding off-roading, which can tear up the plants.

Bonus Challenge! There are two species of seagrass on this page. **<u>Which one is tape grass and which one is spoon grass?</u>** *Answer on page 25

What lives in the seagrass?

Seagrasses are a great habitat because they provide many creatures with **food** and **protection**. Fish can hide in between the seagrass, and some tiny plants and animals even use the surface of the seagrass as their home. Let's take a closer look!



Seagrass Sea Hare

"EPI-" means "on the surface"

EPIPHYTES are tiny plants and animals, such as algae, sponges, and worms that live attached to the surface of the seagrass.

Many epiphytes are so small you need a microscope to see them!

Seagrass sea hares are an example of an animal that lives on seagrass. They are bright green, which allows them to camouflage with the seagrass blades they live on.

Draw some more seahares on the seagrass

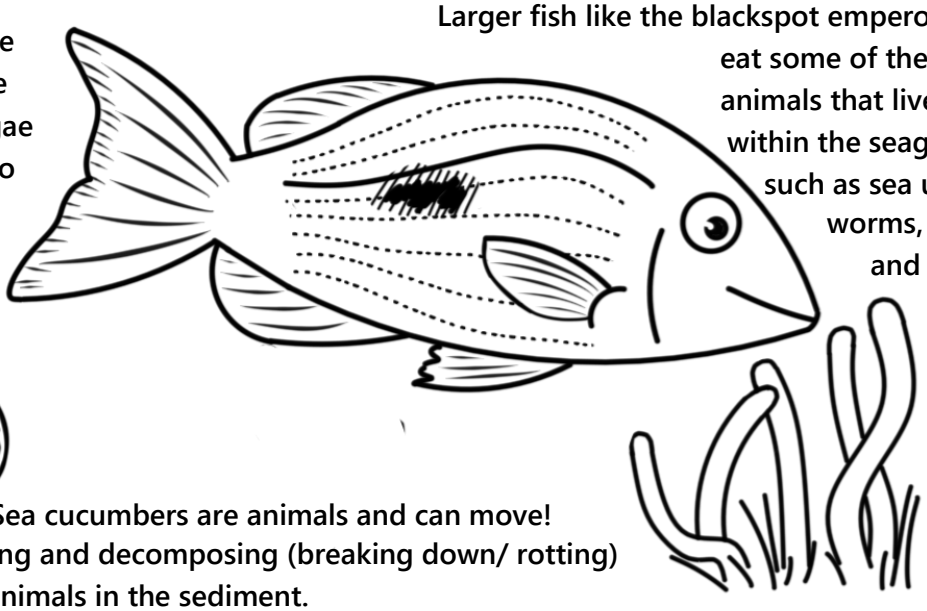
Marbled Parrotfish

Palaske'= small parrotfish
Låggua= large parrotfish

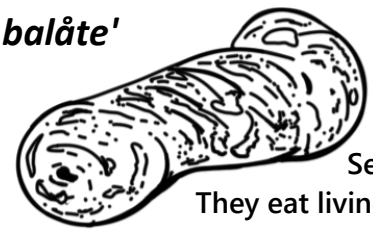
Many parrotfish scrape algae off rocks. However, this type of parrotfish eats mostly algae and seagrass. Sea turtles also eat seagrass.

Blackspot Emperor
mafute'

Larger fish like the blackspot emperor may eat some of the small animals that live on or within the seagrasses, such as sea urchins worms, crabs, and snails.



Sea Cucumber
balåte'



Sea cucumbers are animals and can move! They eat living and decomposing (breaking down/ rotting) plants and animals in the sediment.

What are mangroves?

Mangroves are trees that can grow in a mix of salty and fresh water.

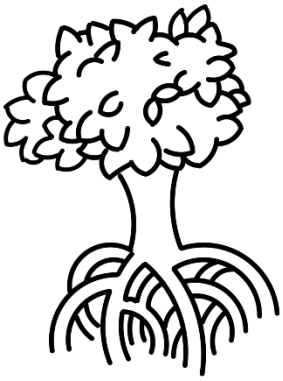
Guam has many species of mangroves with **different shaped** roots. Some mangroves like very salty water and grow very close to the ocean. Some like less salty water and grow farther from the ocean.

These 3 types are some of the best at living in salty environments

Large-leafed Orange Mangrove
Mångle' macho'

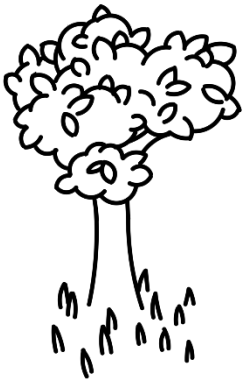
Knee Roots

Red Mangrove
Mångle' hembra



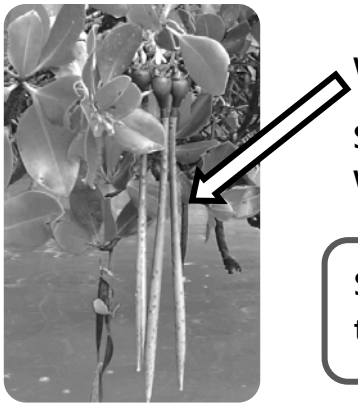
Prop Roots

Grey mangrove
Mångle' åpu



Spike roots

Mangrove Propagule



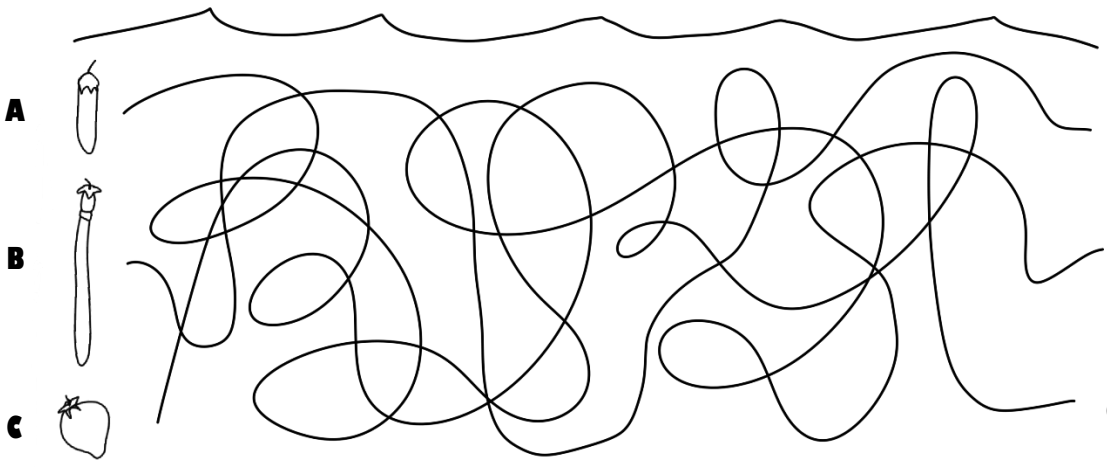
What are those three things that look like long string beans?

Some mangroves have seeds and others have propagules. What's the difference?

SEEDS leave the parent tree before growing

PROPAGULES start growing while still attached to their parent tree

A propagule floats around until it eventually sinks or and starts to grow roots. Different types of mangroves have different propagules. <u>Follow these propagules as they float in the waves to match them to the mangrove type.</u>



*Answer on page 25

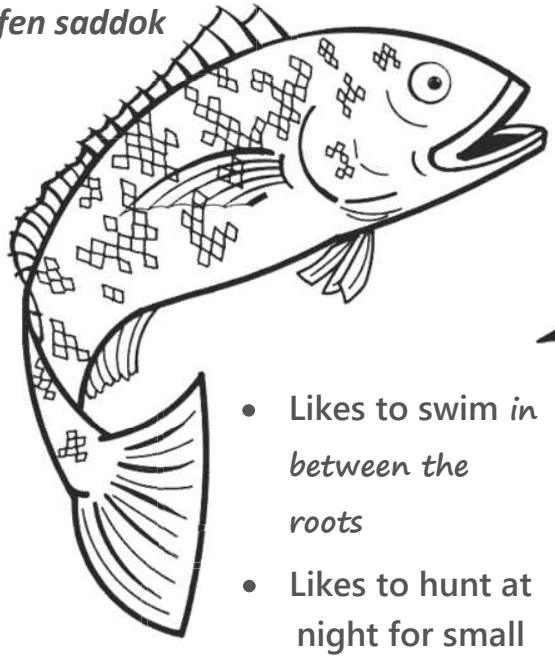
What lives in the mangroves?

There are all sorts of animals you can find living among the mangrove trees.

Can you draw the foods these animals eat and the mangroves around them?

Mangrove Snapper

tagåfen saddok

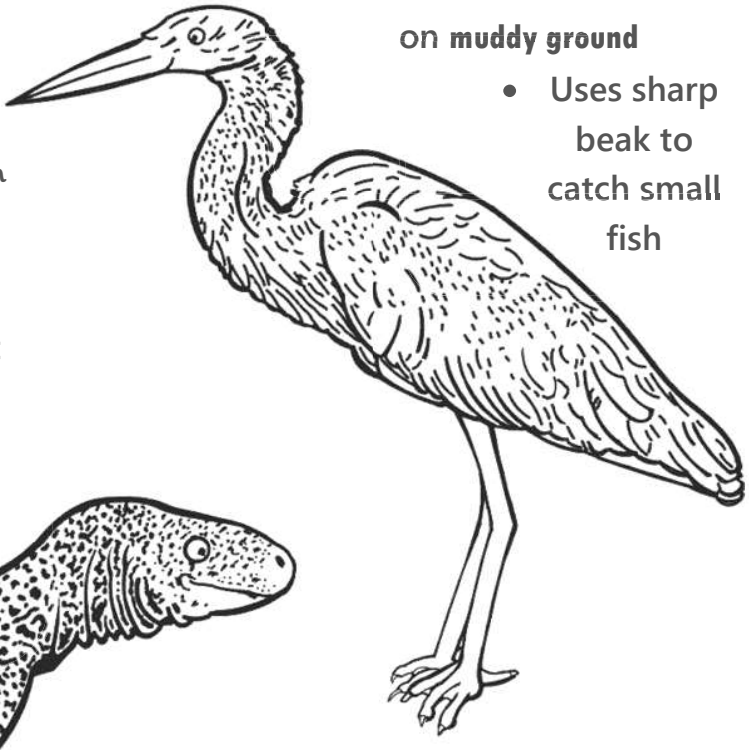


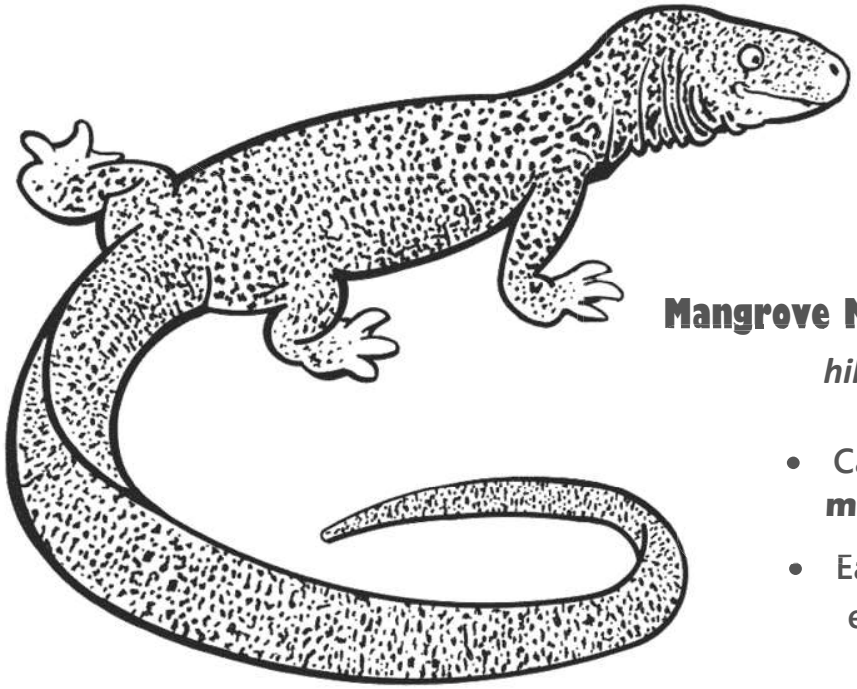
- Likes to swim *in between the roots*
- Likes to hunt at night for small fish and crabs

Pacific Reef Heron

chuchuko'

- Likes to look for food on **muddy ground**
- Uses sharp beak to catch small fish





Mangrove Monitor Lizard

hilitai

- Can climb over fallen **mangrove branches**
- Eats other lizards, eggs, crabs, rats

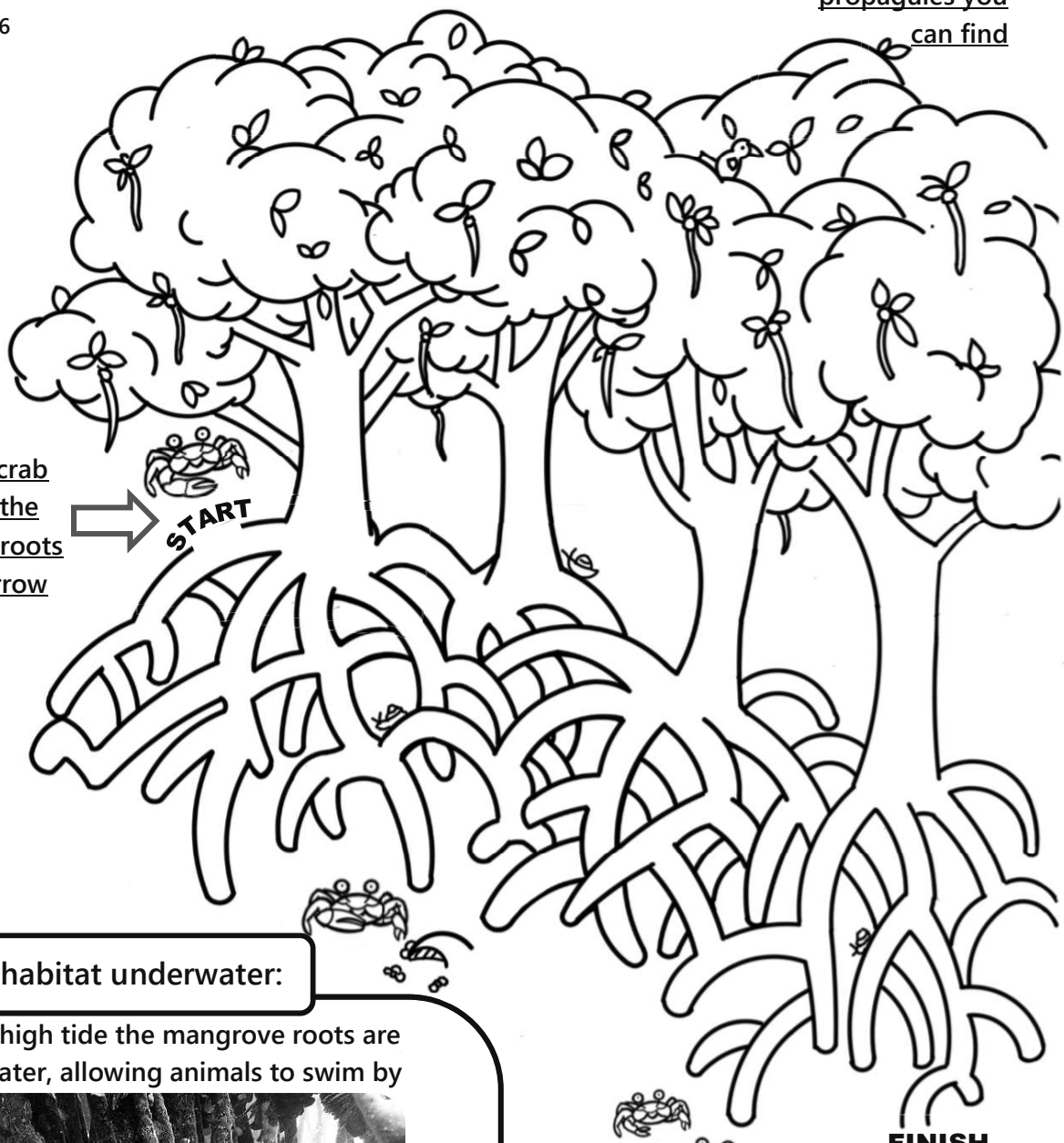
Mangrove Root Maze

Mangroves are great habitats for ocean life because of their complex roots! **Fish can hide in the spaces between the roots,** safe from predators. Little animals like **snails and crabs** also crawl on the roots.

*Answers on page 26

Mangrove propagule

Circle all the propagules you can find



Help the crab through the mangrove roots to his burrow

Mangrove habitat underwater:

During high tide the mangrove roots are underwater, allowing animals to swim by

Here is a group of fish sheltering between the roots.

Female **Male**

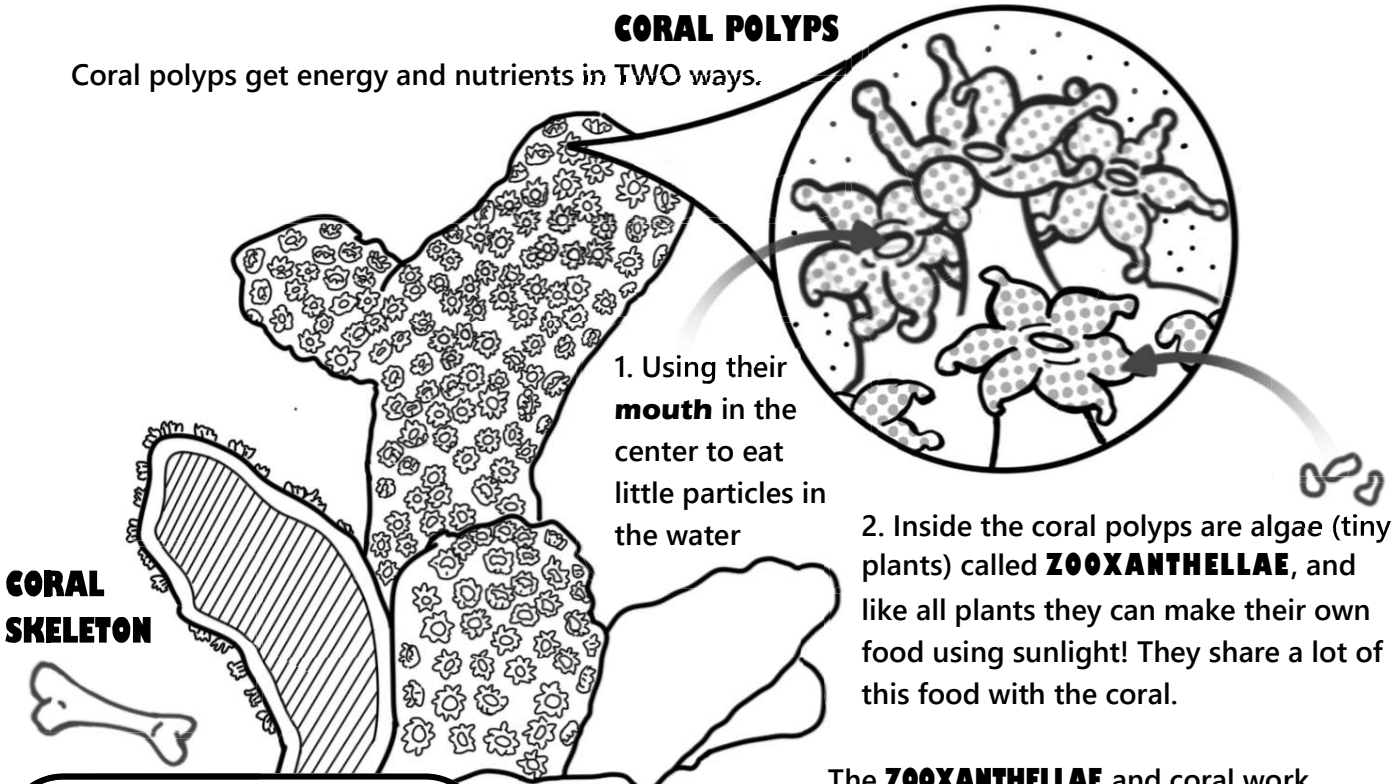
Fiddler crabs are common near mangroves. Male fiddler crabs have one big claw. Circle the males and draw a triangle around the females

What are corals?

Let's take a closer look at coral. The coral is actually made up lots of tiny C**ORAL POLYPS- a ring of tentacles on a stalk.** The polyps are connected and can share nutrients. The coral grows larger by making copies of the polyps. Let's take a closer look.

CORAL POLYPS

Coral polyps get energy and nutrients in TWO ways.



1. Using their **mouth** in the center to eat little particles in the water

2. Inside the coral polyps are algae (tiny plants) called **ZOOXANTHELLAE**, and like all plants they can make their own food using sunlight! They share a lot of this food with the coral.

CORAL SKELETON

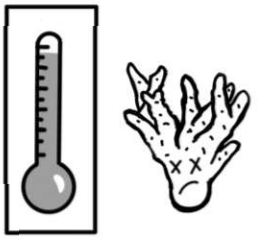
The **ZOOXANTHELLAE** and coral work together as a team! The coral gives the algae a safe home, and the algae gives the coral food.

On the surface are the soft squishy polyps **but most of the inside is a** skeleton **made of limestone.**

Not all corals have a skeleton, some are "soft corals"

<u>Draw some more polyps on these coral branches!</u>

Sometimes if the water gets too hot, the zooxanthellae exit the coral. The coral loses its color and turns white. This is called **CORAL BLEACHING**. If coral stays bleached for too long it can die.



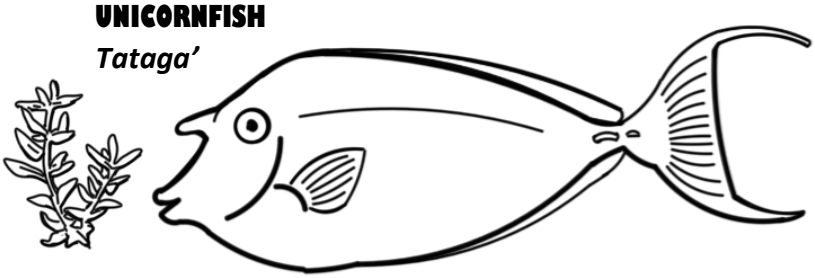
<u>Color these corals, make sure these different kinds of corals aren't bleached**!**</u>

Different fish with different jobs

The coral reef is home to hundreds of kinds of fish. Different fish eat different things, almost like having different jobs. **Having lots of different kinds of fish helps keep the coral reef healthy.**

UNICORNFISH

Tataga'



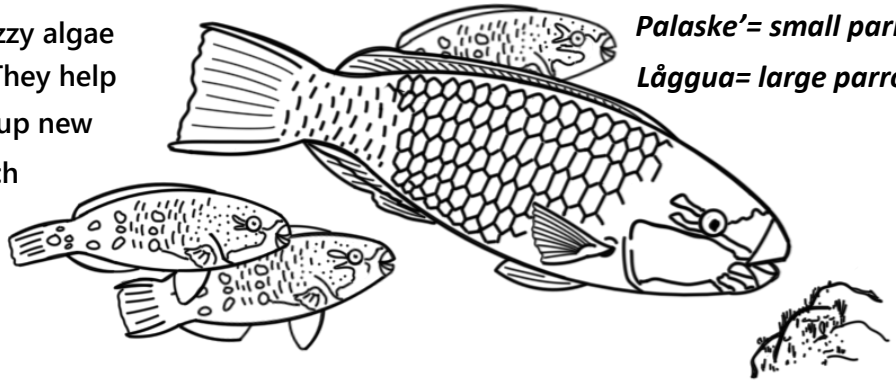
Unicornfish are **important for eating seaweeds.** They help prevent the seaweed from overgrowing into seaweed forests and hurting the corals by blocking out sunlight, and taking up too much space.

PARROTFISH

Palaske'= small parrotfish

Låggua= large parrotfish

Parrotfish scrape off short fuzzy algae from rocks and dead corals. They help *clean up the rock* and open up new space for baby corals to attach and grow.



Create a fish! Think about what kind of role it has on the reef and fill out the information box.

Draw your fish in the box below:

Fish Name: _____

What food(s) does it eat?

☐ seaweed ☐ fuzzy algae ☐ seagrass

☐ other fish ☐ coral ☐ shelled animals

☐ left over scraps from other animals

☐ other: _____

What animal(s), if any, eats it?

_____

What habitat(s) does it live in?

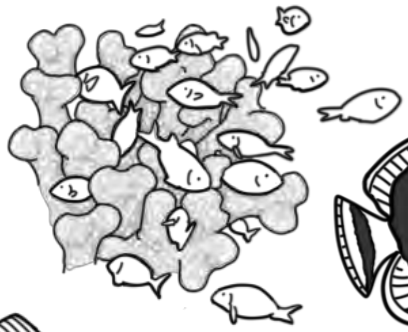
☐ coral ☐ seagrass ☐ mangrove

Coral Reef Creatures

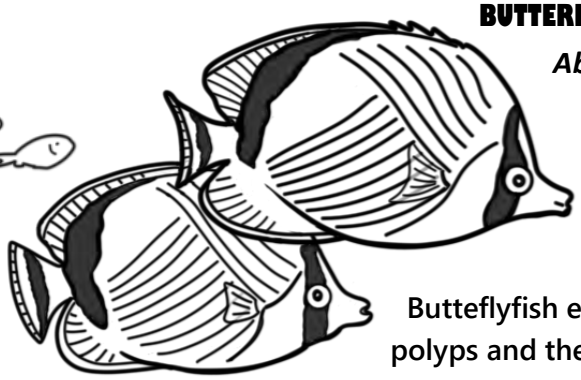
Together, lots of corals make the **REEF- a hard structure strong enough to not get washed away by waves.** Animals can hide around and in between the sturdy coral branches. Creatures big and small can also find food at the coral reef.

Damselfish
Fohmo

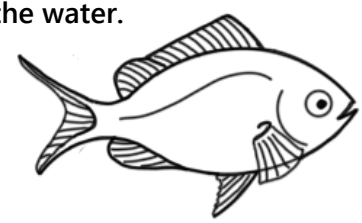
Many damselfish like the blue green chromis are small and quick to hide in between coral branches. They eat small animals drifting in the water.



BUTTERFLYFISH
Ababang

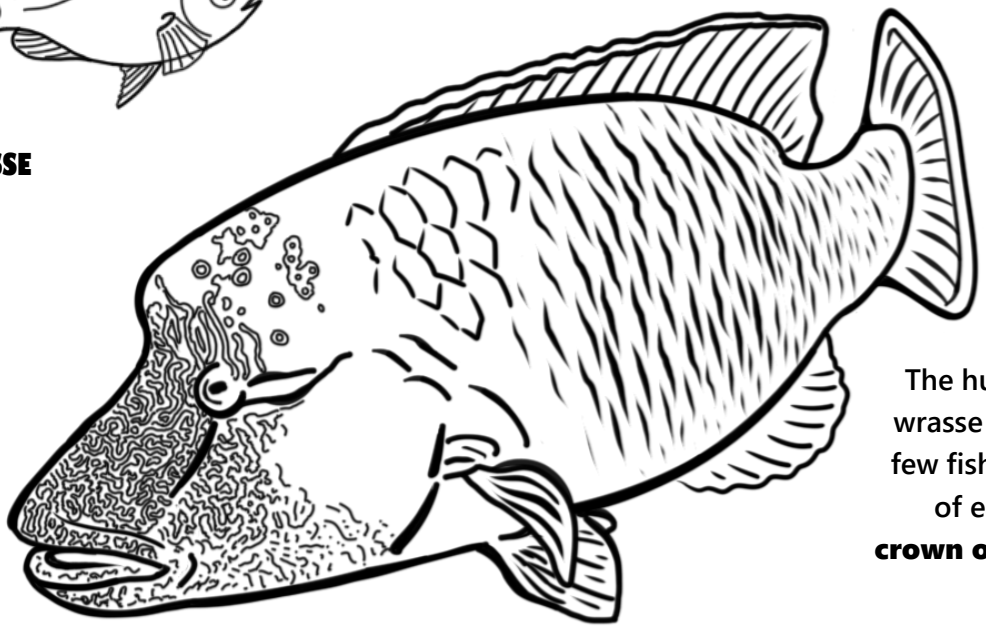


Butteflyfish eat coral polyps and the coral's protective mucus (slime)



HUMPHEAD WRASSE
Tangison

The Humphead wrasse is one of the **largest** coral reef fish. It can live for over 30 years and grow to over 7 feet. (How tall are you?)



The humphead wrasse is one of few fish capable of eating the **crown of thorns sea star**.

CROWN OF THORNS SEA STAR
Puti'on kuronan tituka'

This sea star eats corals, and too many **crown of thorns sea stars can damage the coral reef.**

* check out this sea star on page 24 too!

Too much fishing can lower the fish population. Since different fish have different jobs, **it is important to protect fish to protect the coral reef.** Read more about fish jobs on the next page.

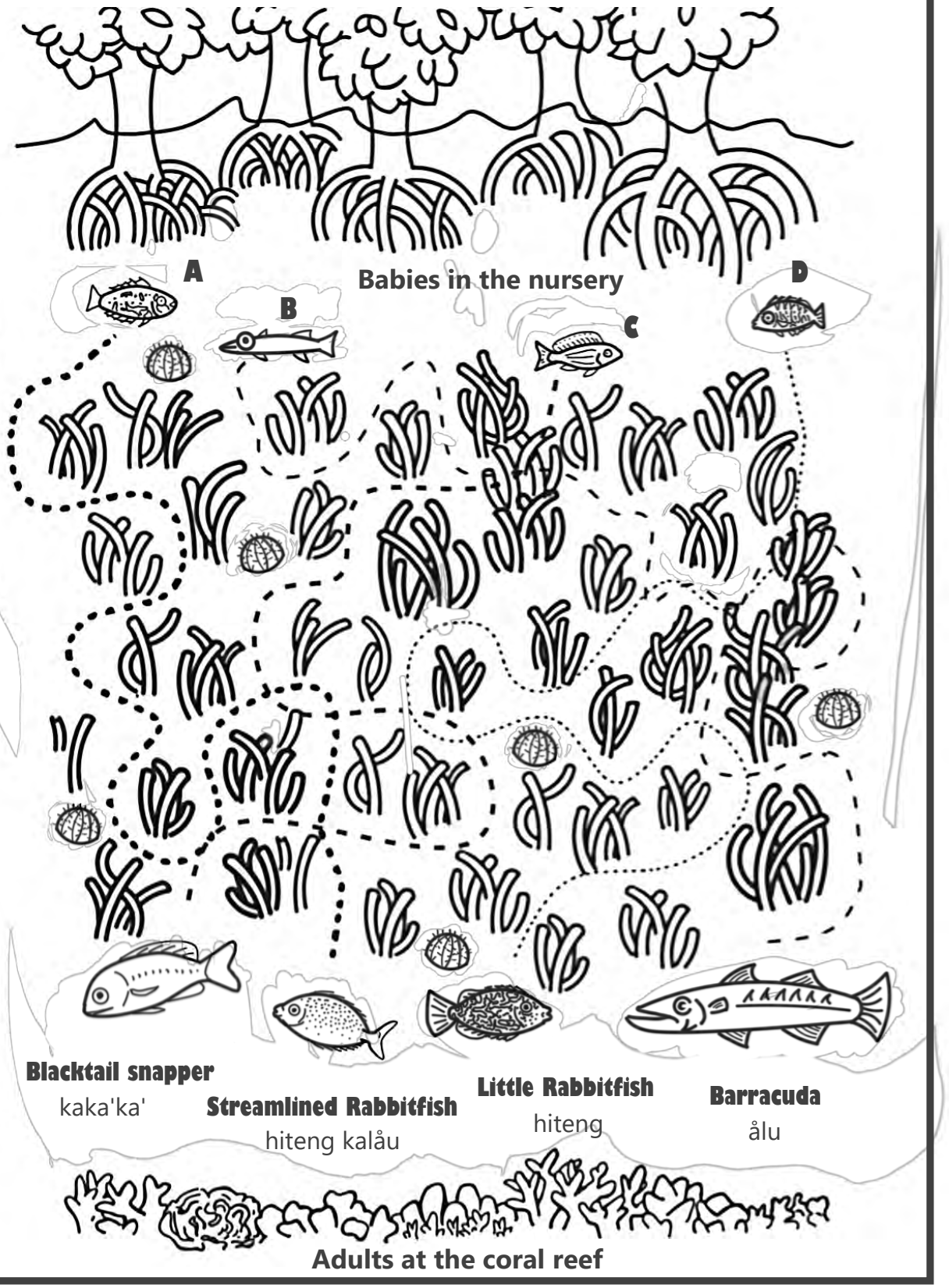
Growing up in the nursery:

Some types of fish use the seagrasses and mangroves as a **NURSERY habitat- a place where young fish can grow up.** As they grow bigger they may migrate (move) to the coral reef to spend their adult life. For babies, the mangrove roots and seagrass blades provide safety from predators and a source of food.

Can you connect each baby fish to its adult form?

*Answer on page 25

Follow their journey, from growing up in the mangroves and seagrass nursery to becoming adults at the coral reef.

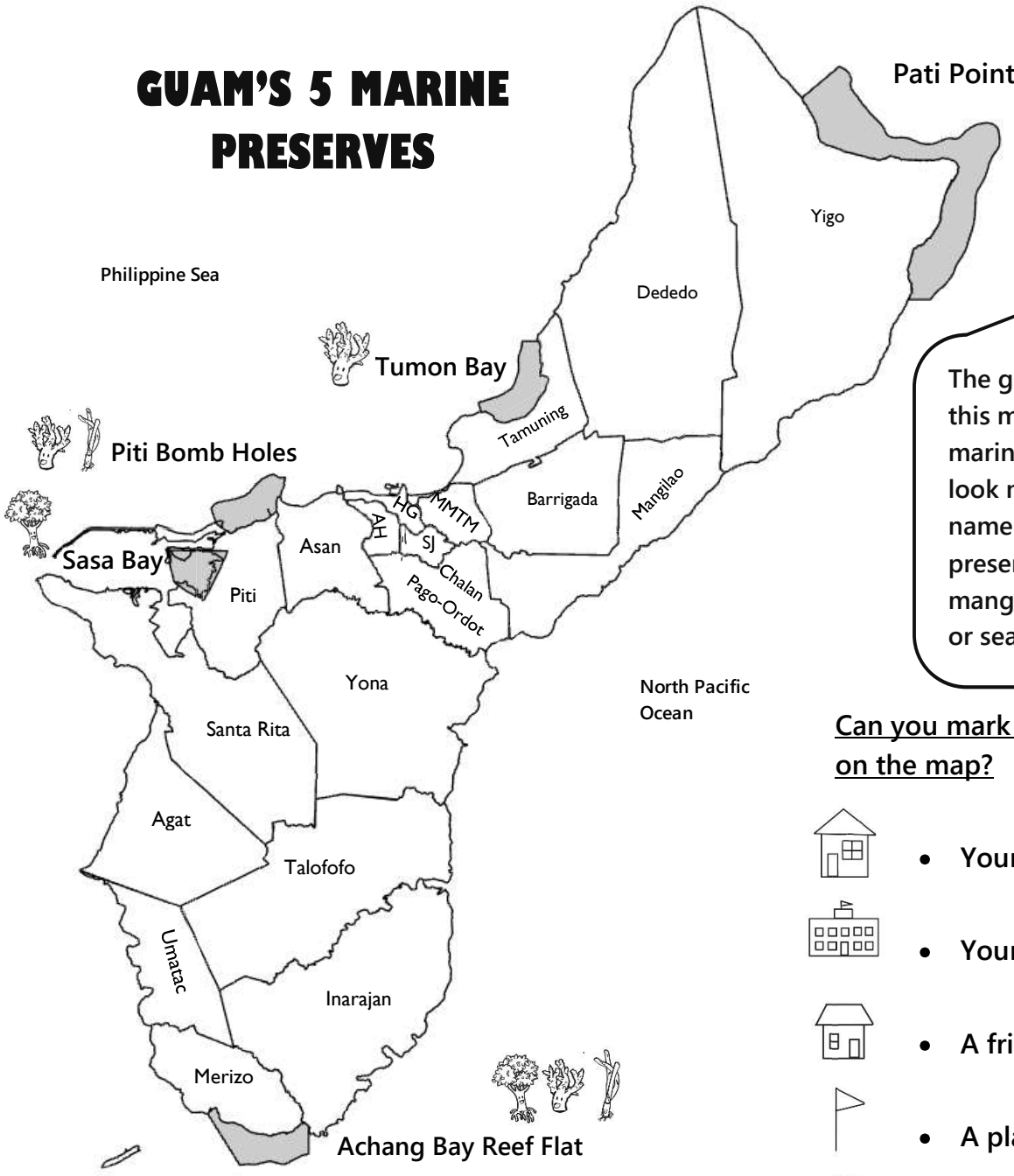


What are marine preserves?

To **PRESERVE** means to protect something from being damaged. **A marine preserve is a place that protects ocean habitats** and the plants and animals that live there.

In the **marine preserve** there are special rules for fishing. The fishing rules help make sure we have enough fish for future generations and help keep the coral reef healthy.

GUAM'S 5 MARINE PRESERVES



The grey areas of this map are our marine preserves, look next to the name to see which preserves have mangroves, corals, or seagrasses.

*Village Abbreviations:
MMTM- Mongmong-Toto-Maite
SJ- Sinajana
AH- Agana Heights
HG-Hagatna

<u>Can you mark these places on the map?</u>

- Your home
- Your school
- A friend's house
- A place special to you
- Your favorite place

Cultural connections- materials

The ancient CHamoru people used many natural materials to help them build homes, clothes, fishing equipment, and other tools. Some of these natural materials came from our coastal habitats.

Nipa Palms

The nipa palm can be found along rivers.

They like freshwater but are still considered mangroves because they can handle a little bit of salt water once in a while.

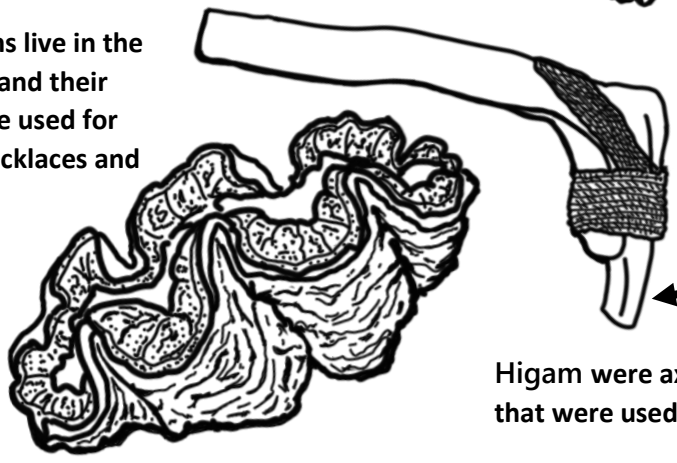
Currently there aren't many Nipa Palms so they are protected.

The most popular plant for **thatching (covering)** roofs was the coconut palm. However, in the past the leaves of the nipa palm were also used.

Add some thatching to the frame of this roof

Hima (Giant clams)

Giant clams live in the coral reef and their shells were used for making necklaces and blades.



Wood & Rope

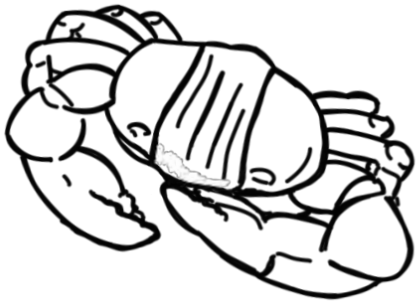
Piece of clam shell

Higam **were axe-like tools made from giant clam shells that were used to carve canoes.**

A **balanggai** was a get together where people would invite friends and family to help with roofing. While they worked people would feast, sing, and have fun.

Cultural connections- seafood

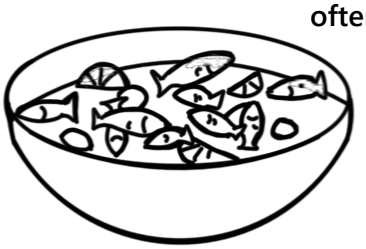
Do you enjoy eating seafood? There is a long cultural tradition of seafood in Guam that is supported by our coral, seagrass, and mangrove habitats.



Pånglao

Land crabs use the mangrove habitat **and create burrows in muddy mangrove sediments. The crabs are cooked to create stuffed land crab, pånglao.**

Mañåhak



Mañåhak are young rabbitfish. They are often eaten fried or pickled to use as a condiment (topping).

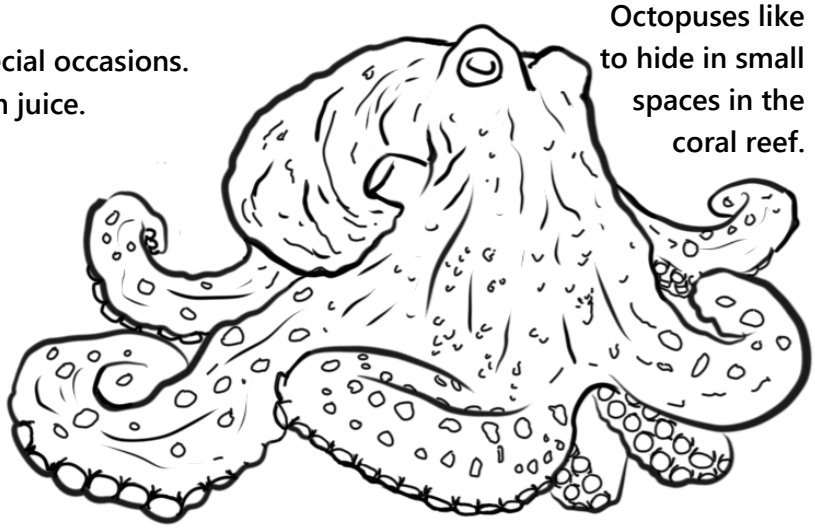
Talayeros, or fishermen using a fishing net called talaya, catch mañåhak from shore. Mañåhak live and eat in seagrass.

Kelaguen Gåmson

Octopus kelaguen is usually eaten for special occasions. Kelaguen dishes "cook" meat using lemon juice.

Coconut, onions, salt, and donne' (peppers) are other ingredients common in kelaguen.

Octopuses like to hide in small spaces in the coral reef.

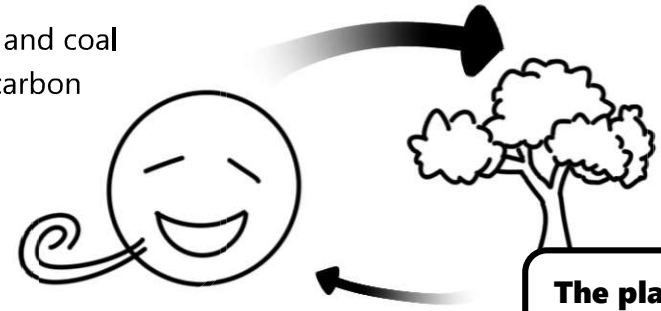


In Guam, you may catch octopus to eat by yourself or with friends and family, but it is illegal to catch to sell them, and illegal to catch them in preserves.

This rule is important because if we catch too many octopus there won't be enough left to reproduce. **These fishing rules are important for keeping the coral reef healthy so seafood can be enjoyed by future generations.**

Breathe in, breathe out. When humans and animals breathe they use the **oyxgen** gas and breathe out **carbon dioxide**; plants do the opposite and use carbon dioxide gas and release oxygen.

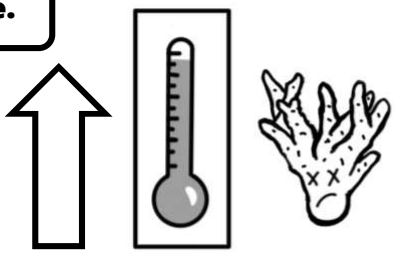
Cars, planes, farm animals, and coal power plants also release carbon dioxide.



Over time we have cut down a lot of trees.

The planet is no longer in balance.

The CARBON DIOXIDE causes the planet's temperature to rise.



The high temperature causes changes in long term weather and affects how often it rains or storms.

This is called **CLIMATE CHANGE**, which is also harmful to corals and people.

Seagrasses and mangroves can help! They absorb a lot of carbon dioxide. Eventually old leaves and roots get buried, and the carbon gets buried in the mud, keeping carbon dioxide out of the atmosphere and **bringing back**

CARBON DIOXIDE

OXYGEN

Take the CARBON DIOXIDE to the seagrass and mangrove where they bury the carbon, then lead the oxygen out.

BURIED CARBON

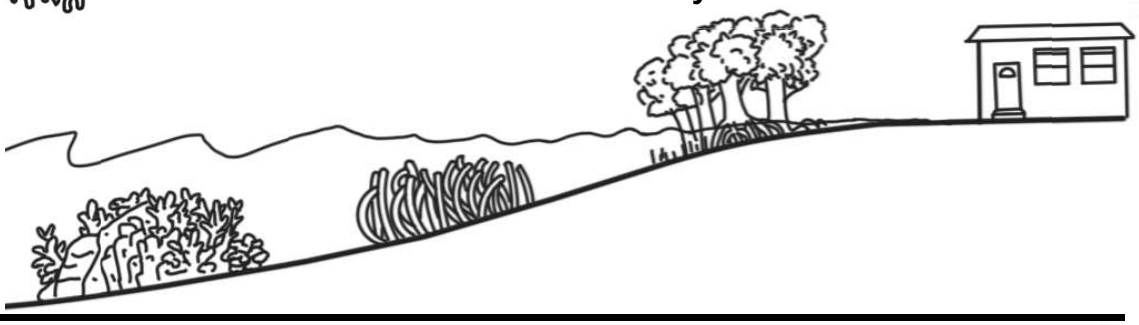
*Answer on page 25

Wave absorbers maze

Can you see the difference between the two pictures below?

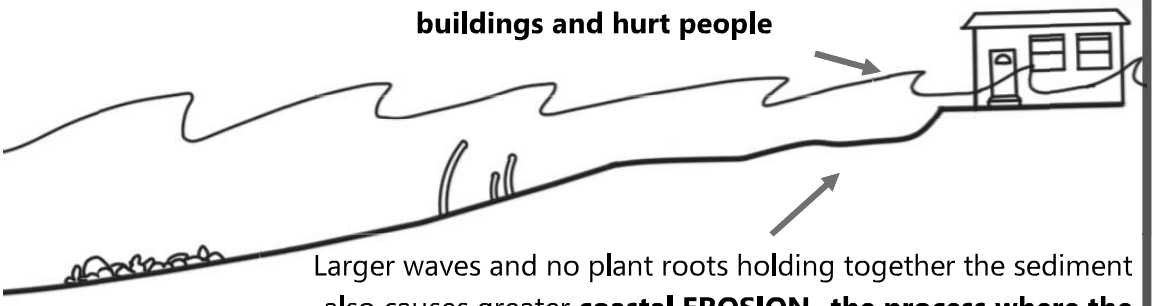
Together we work as a team to absorb the energy of big waves coming from the sea.

Calm waves by the land



Healthy coral reefs, seagrasses, and mangroves

During storms big waves can damage buildings and hurt people

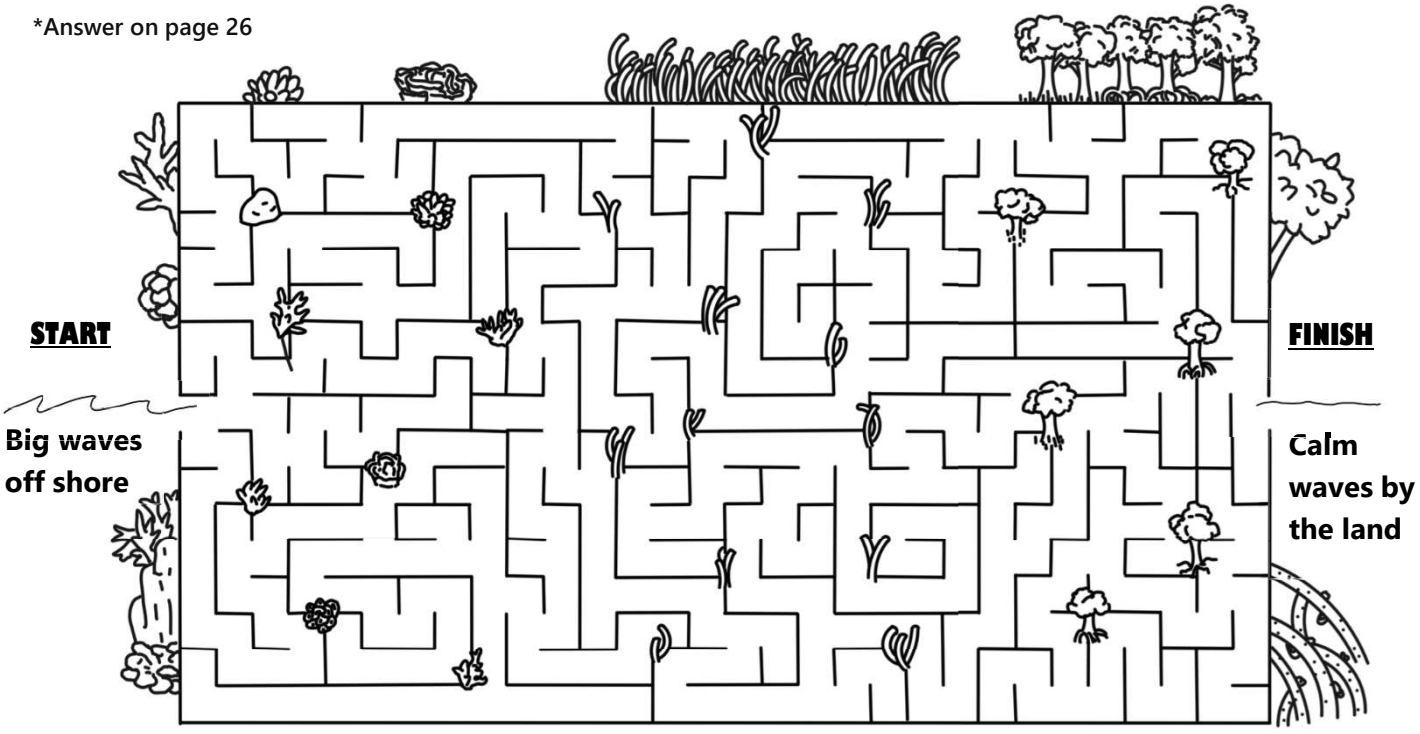


Unhealthy or dead coral reefs, seagrasses, and mangroves

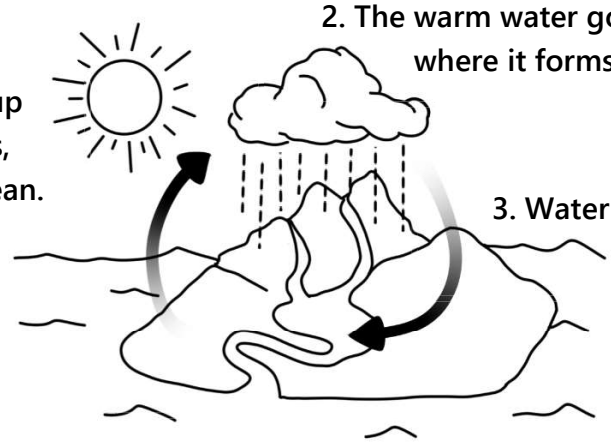
Larger waves and no plant roots holding together the sediment also causes greater **coastal EROSION- the process where the waves wash the land into the sea slowly over time.**

<u>Wave Maze Challenge:</u> Pretend you are the wave! As you travel through the coral reef, seagrasses, and mangroves, **<u>show how the wave energy reduces with how squiggly your line is</u>!**

*Answer on page 26



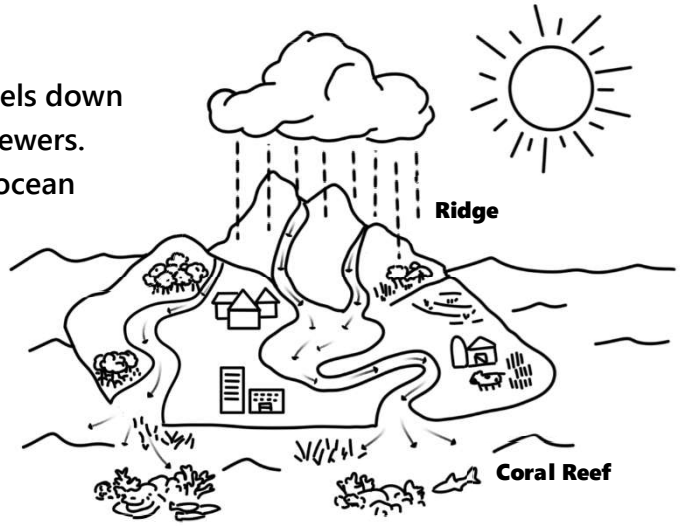
To protect ocean life we need to protect our water. But that can be difficult because water is always moving in the WATER CYCLE.



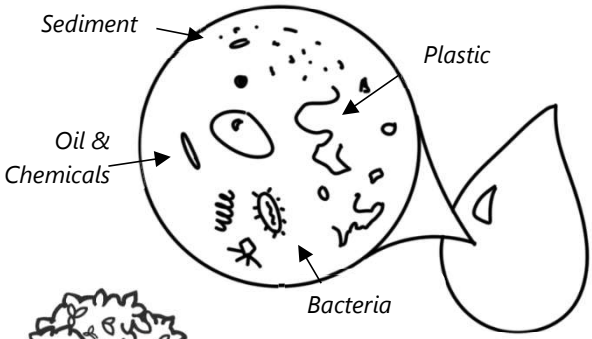
FROM RIDGE TO REEF

What goes up must come down!

Rain on top of the high mountain ridges travels down through the hills, fields, rivers, villages, and sewers. Finally the water ends up in the ground and ocean



INSIDE A WATER DROPLET



As the water travels, it can get polluted. **Pollution** is anything added to the environment that causes harm to living things.

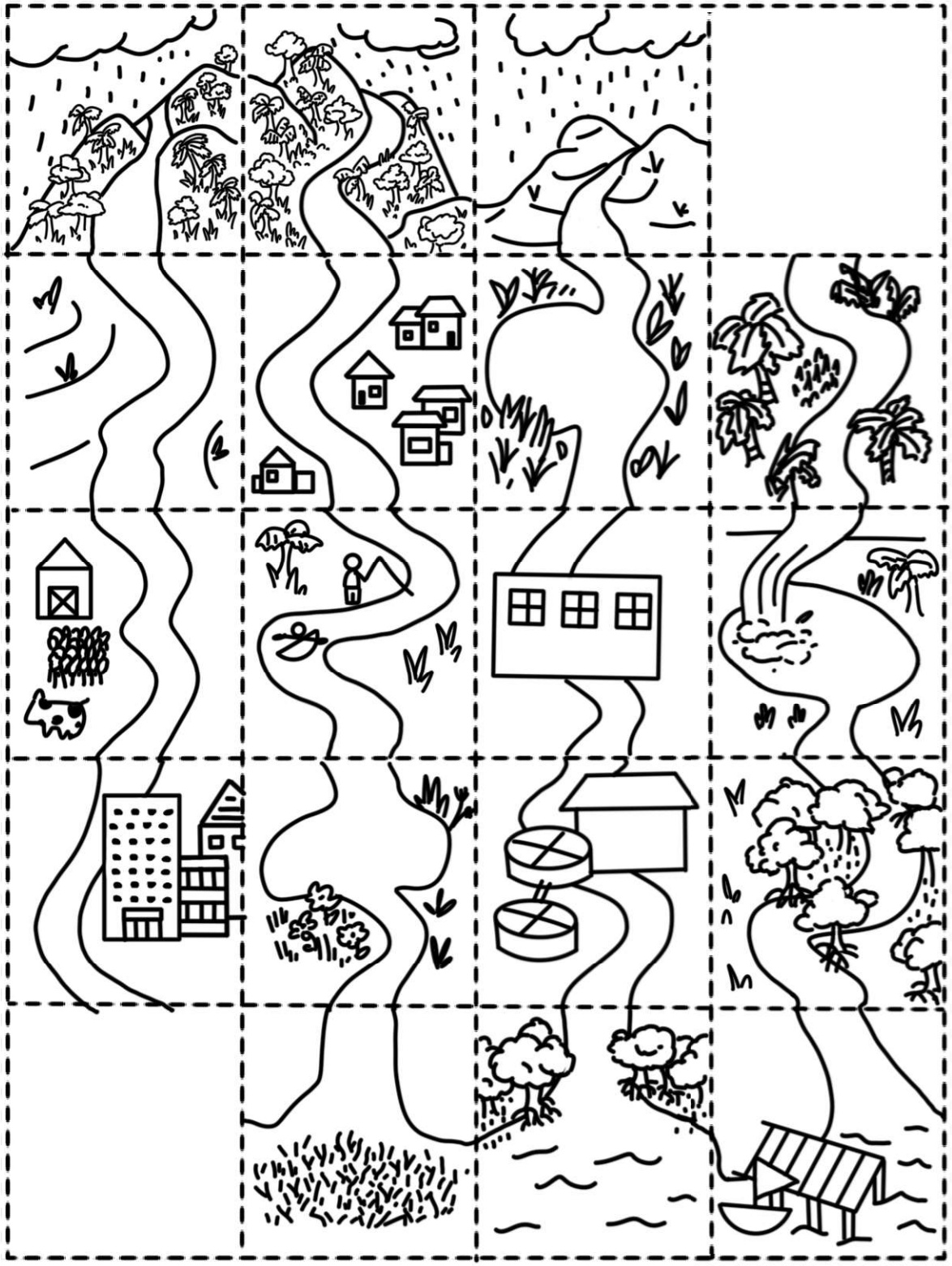
Some pollution you can see, like big pieces of plastic or cloudiness from dirt. Other types of pollution like oil, other chemicals, and very tiny pieces of plastic cannot be seen without special tools.

In order to protect the water reaching the coral reef, we need to start all the way at the beginning at the ridge at the top of the mountain!

<u>On the next page make your own ridge to reef landscape that will help keep the water clean!</u>

A **WATERSHED** is an area of land that collects and drains all of the water on it into a larger water body such as a lake, pond, or the ocean.

Cut out these squares below. See if you can arrange them into a watershed that will keep the coral reef and people healthy. Look on the back of the squares for more information.



*activity adapted from http://www.cangeoeducation.ca/resources/learning_centre/classroom_activities/river_puzzle.asp

Inside each square is some more information about the scene on the other side. **Look for where pollution is created and where it is absorbed and arrange the squares to help make sure the pollution is absorbed for the safety of the corals and people.** See more information about this activity on the other side of this page

Mountain Ridge- the highest point where rainfall starts flowing down	**Mountain Ridge-** the highest point where the rainfall starts flowing down	**Badlands-** areas where there aren't a lot of plants, which causes soil to wash away easily	**Free Space-** you decide, you draw!
Badlands- areas where there aren't a lot of plants, which causes soil to wash away easily	**Village-** a place with lots of homes where people live, people create sewage (poop!)	**Rain Garden-** special gardens that help absorb lots of rainwater to protect people from flooding	**Forest-** when it rains, forests help absorb water, clean water, and keep the soil in place
Farm- great source of local food! However animal poop and fertilizer may go into the water.	**River Park-** water needs to be clean here since people fish and play in the water	**Water treatment facility-** place where water gets filtered and cleaned	**Waterfall recreational area-** water needs to be clean for people to swim
Hotels and Businesses- many people, might create human waste and pollution	**Rain Garden-** special gardens that help absorb lots of rainwater to protect people from flooding	**Sewage Treatment Facility-** where water with human waste (poop) gets cleaned	**Mangrove forest-** helps absorb sediment and pollution
Free Space- you decide, you draw!	**Bay with seagrass-** helps absorb sediment and pollution	**Mangrove shoreline-** helps absorb sediment, pollution, and wave energy	**Marina-** area where people keep and launch boats.

*activity adapted from http://www.cangeoeducation.ca/resources/learning_centre/classroom_activities/river_puzzle.asp

Litter free seas!

Trash that isn't thrown away correctly and ends up in the environment is called **LITTER.**

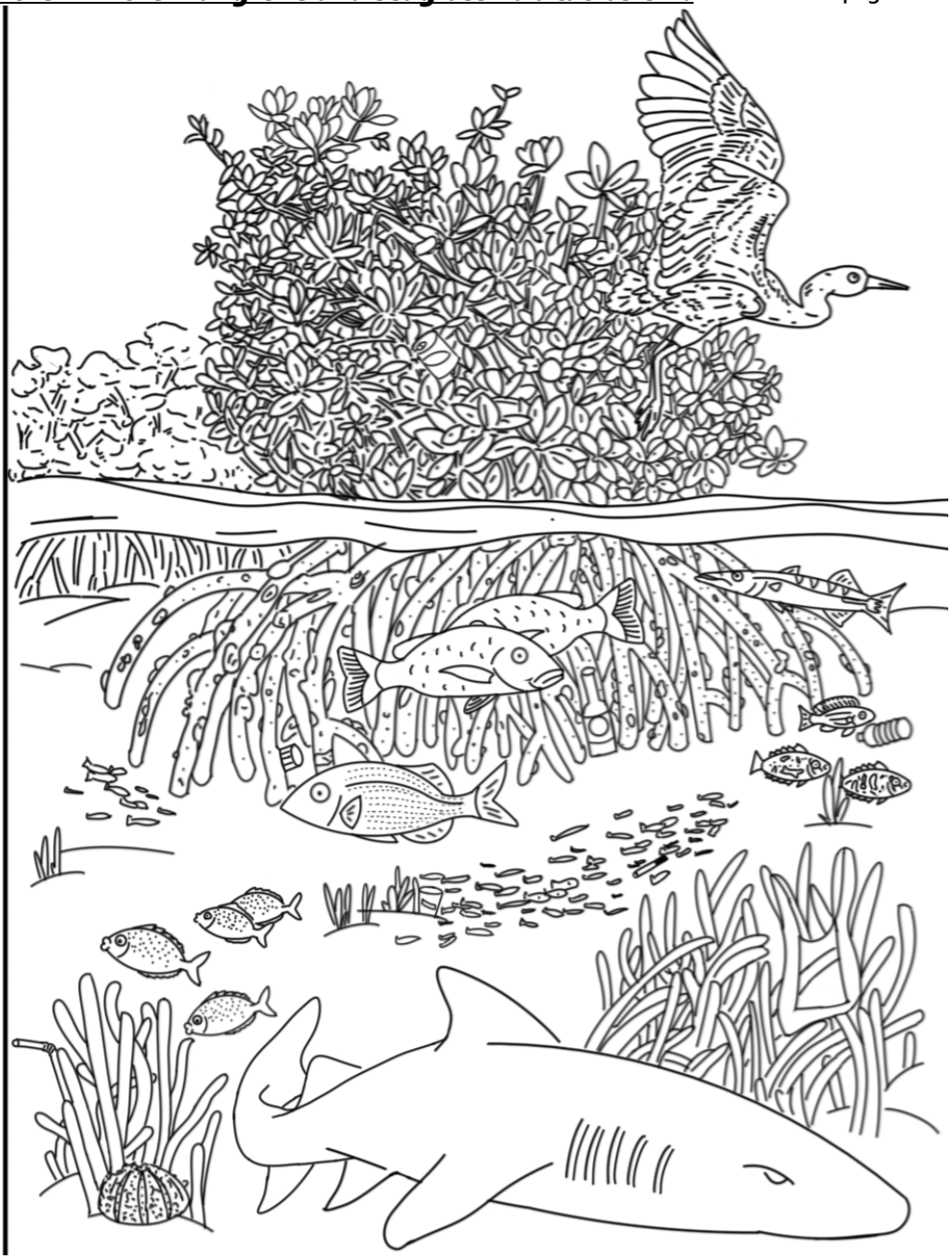
Litter is a big problem. Animals like fish or birds may eat bits of plastic and get sick. Other animals like sea turtles can get tangled in old nets or fishing line and drown.

Litter is also harmful to people. No one wants to swim at a beach full of garbage, step on broken glass, or eat fish and seafood that ate plastic!

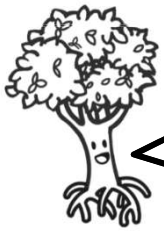
You can help by reducing how much trash you create- only buy things you need and avoid single use plastics. You can also pick up litter you see and join clean up events!

On the side are some of the most common types of litter that ends up on our oceans. Can you find them in the mangrove and seagrass habitat below? *Answers on page 27

- Bottle cap
- Plastic bottle
- Plastic bag
- Glass bottle
- Plastic straw
- Candy wrapper
- Paper cup
- Plastic fork
- Cigarette
- Plastic spoon
- Aluminum drink can
- Fishing line and hook



Be the eyes of the reef!



To **monitor** something means to watch it carefully for changes over time. **Scientists monitor the coastal habitats to see if they are changing or staying the same.** Changes can be good, bad, or neutral (neither good or bad).

For example, scientists can monitor seagrasses by measuring the amount of seagrass and counting the number of fish in the seagrass.

If that area **increased** in seagrass and number of fish, the seagrass is likely healthy.

If that area **decreased** in seagrass or number of fish, the seagrass is likely **unhealthy** and there might be a problem like pollution or too much fishing.

YOU can help too by being a **CITIZEN SCIENTIST.** Anyone can be a scientist if they record what they see snorkeling and help monitor the environment.

The **C**rown **O**f **T**horns **S**ea star (also known as **COTS**) is a large spiky venomous sea star. If there are too many COTS they eat too much coral and hurt the reef.

Can you help the snorkelers find all the crown-of-thorn sea stars below and record them in the report?

***hint-** some may be hiding under coral

Reports help scientists know how many COTS are on the reef.

Coral Reef Monitoring Report:

Location: Gun Beach

Date: ____/_____/_____

Name: _____

Number of crown of thorn sea stars: _____

***Answer on page 28**

Get involved in Guam's citizen science monitoring program and help monitor coral reefs! **Report your real crown of thorns sea star sightings and other observations at www.eormarianas.org**

Become a steward of the land and sea!

Being a **STEWARD** means taking care of something. In our journey, we've learned a lot of ways to protect our corals, seagrass, and mangrove habitats and the animals that live there.

What are your ideas to protect the ocean? Can you think of ideas to fill in the missing letters of the STEWARD acronym below?

S - Snorkel with respect! Do not touch or kick corals, or trample the seagrass.

T - Trees, trees, trees! Protecting our forests, mangrove trees, and seagrasses helps keep soil in place so the sediment doesn't get washed onto and hurt corals.

E - _____

W - _____

A - Assist our fish! Support our marine preserves and follow fishing and hunting rules.

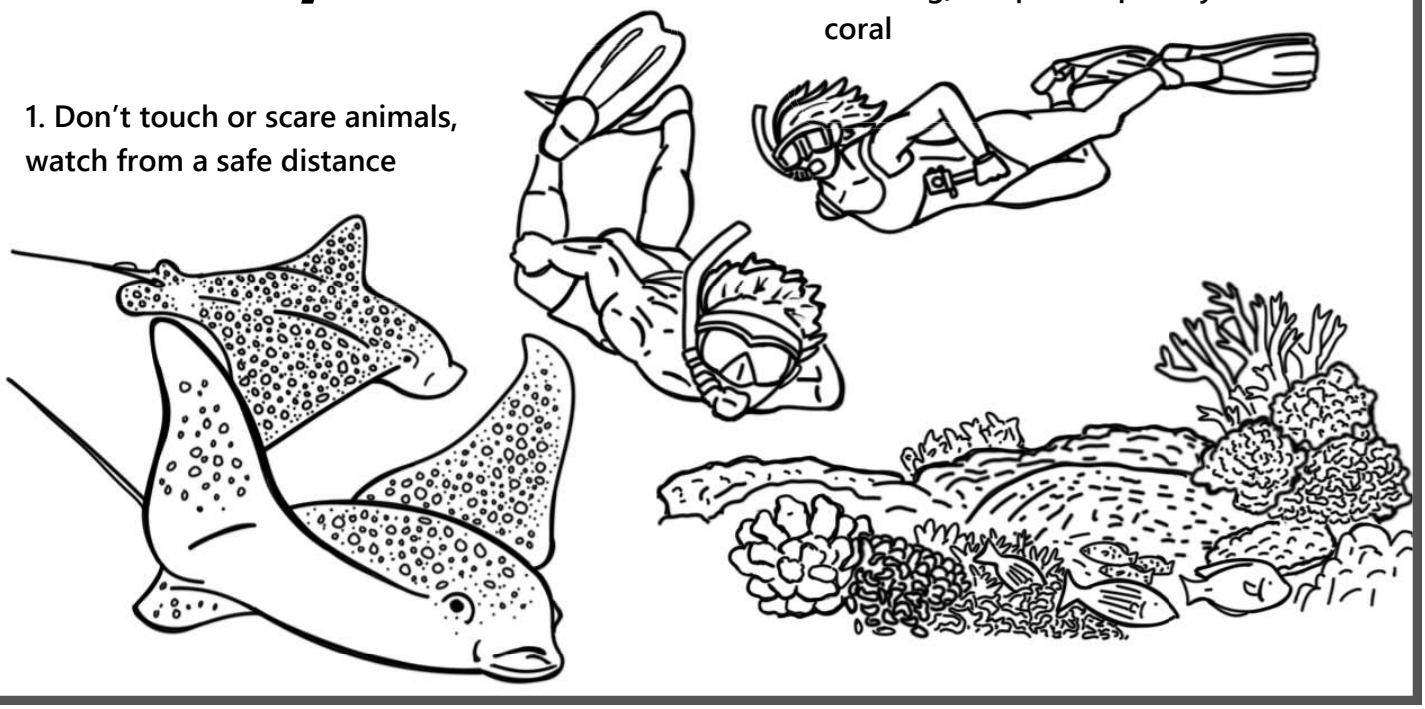
R - _____

D - Do you part! You can volunteer to plant trees, use less plastic, educate others, and more!

Be a savvy snorkeler!

1. Don't touch or scare animals, watch from a safe distance

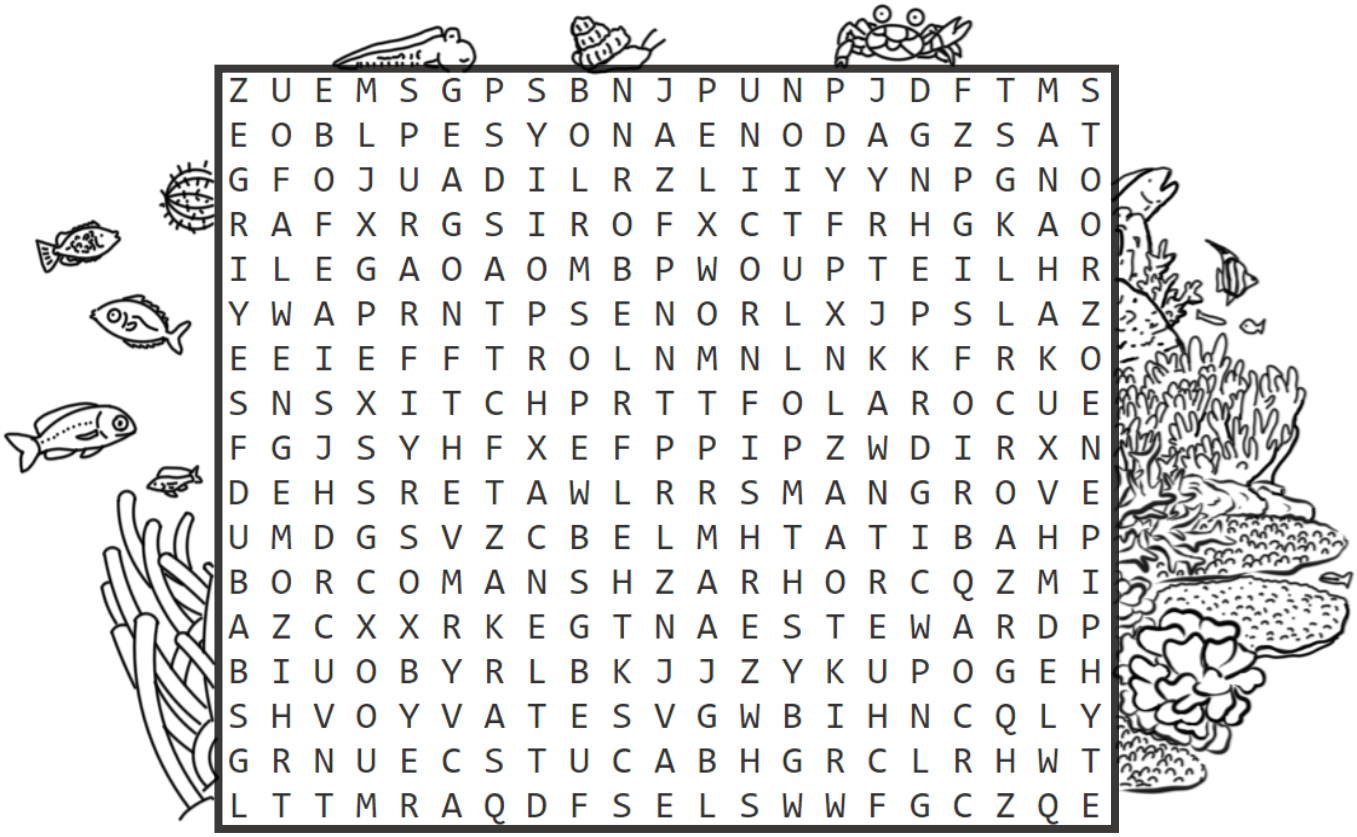
2. Stay horizontal (flat instead of standing) Keep fins up away from coral



Wrap-up Word search

Did you see some new things and learn some new words on our adventure?

See if you remember what these words mean, and find them in the word search.



Z	U	E	M	S	G	P	S	B	N	J	P	U	N	P	J	D	F	T	M	S
E	O	B	L	P	E	S	Y	O	N	A	E	N	O	D	A	G	Z	S	A	T
G	F	O	J	U	A	D	I	L	R	Z	L	I	I	Y	Y	N	P	G	N	O
R	A	F	X	R	G	S	I	R	O	F	X	C	T	F	R	H	G	K	A	O
I	L	E	G	A	O	A	O	M	B	P	W	O	U	P	T	E	I	L	H	R
Y	W	A	P	R	N	T	P	S	E	N	O	R	L	X	J	P	S	L	A	Z
E	E	I	E	F	F	T	R	O	L	N	M	N	L	N	K	K	F	R	K	O
S	N	S	X	I	T	C	H	P	R	T	T	F	O	L	A	R	O	C	U	E
F	G	J	S	Y	H	F	X	E	F	P	P	I	P	Z	W	D	I	R	X	N
D	E	H	S	R	E	T	A	W	L	R	R	S	M	A	N	G	R	O	V	E
U	M	D	G	S	V	Z	C	B	E	L	M	H	T	A	T	I	B	A	H	P
B	O	R	C	O	M	A	N	S	H	Z	A	R	H	O	R	C	Q	Z	M	I
A	Z	C	X	X	R	K	E	G	T	N	A	E	S	T	E	W	A	R	D	P
B	I	U	O	B	Y	R	L	B	K	J	J	Z	Y	K	U	P	O	G	E	H
S	H	V	O	Y	V	A	T	E	S	V	G	W	B	I	H	N	C	Q	L	Y
G	R	N	U	E	C	S	T	U	C	A	B	H	G	R	C	L	R	H	W	T
L	T	T	M	R	A	Q	D	F	S	E	L	S	W	W	F	G	C	Z	Q	E

*Answers on page 27

Habitat

Coral

Seagrass

Mangrove

Nursery

Rhizome

Erosion

Polyp

Watershed

Roots

Steward

Sediment

Carbon

Epiphyte

Propagule

Zooxanthellae

Pollution

Preserve

HINT: some words may be backwards and diagonal!

BONUS!

Parrotfish

Pånglao

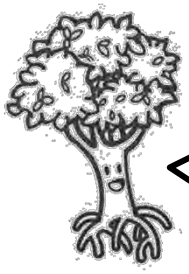
Nipa

Unicornfish

Mañåhak

HINT: If you don't remember what a word means, you can go back and look for it, look for words in CAPITAL letters

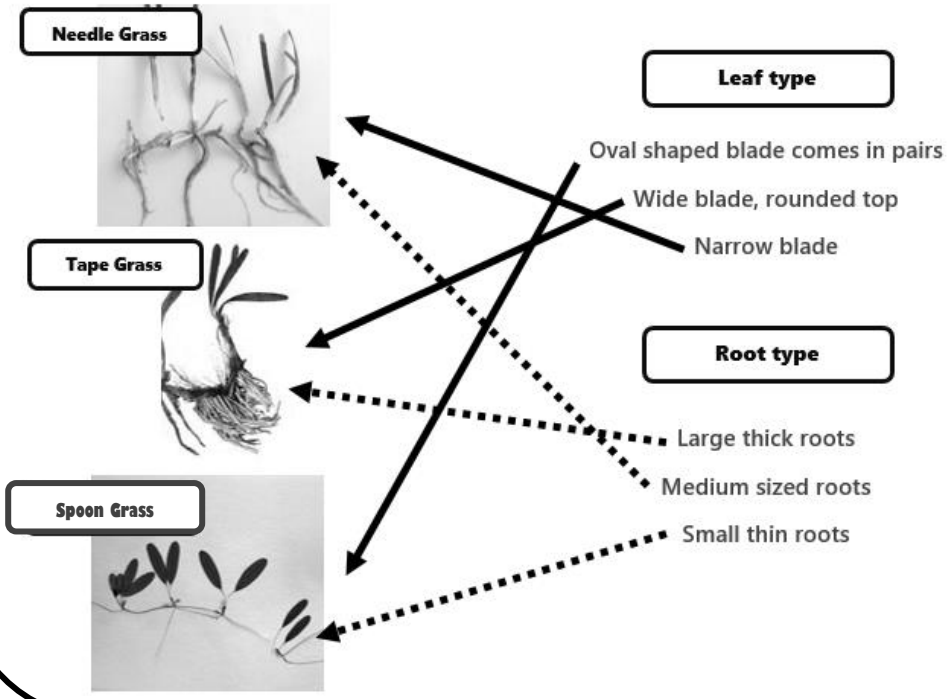
Answers Pages:



Great job working on these challenges!

Some underlined challenges were creative challenges with many answers, so don't worry if not every challenge has an answer here.

Page 3- What are seagrasses?

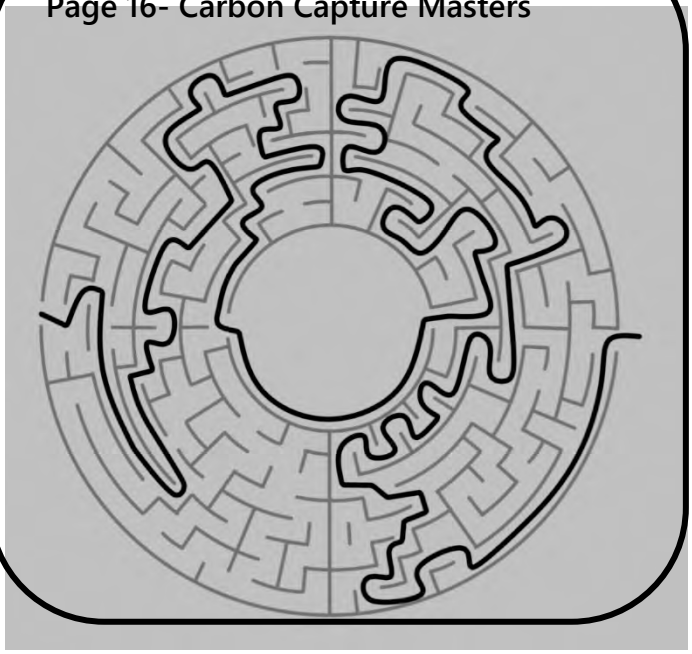


Page 4- Super Seagrass roots!
Top- tape grass
Bottom- spoon grass

Page 6- What is a mangrove?
A= large-leafed orange mangrove
B= red mangrove
C= grey mangrove

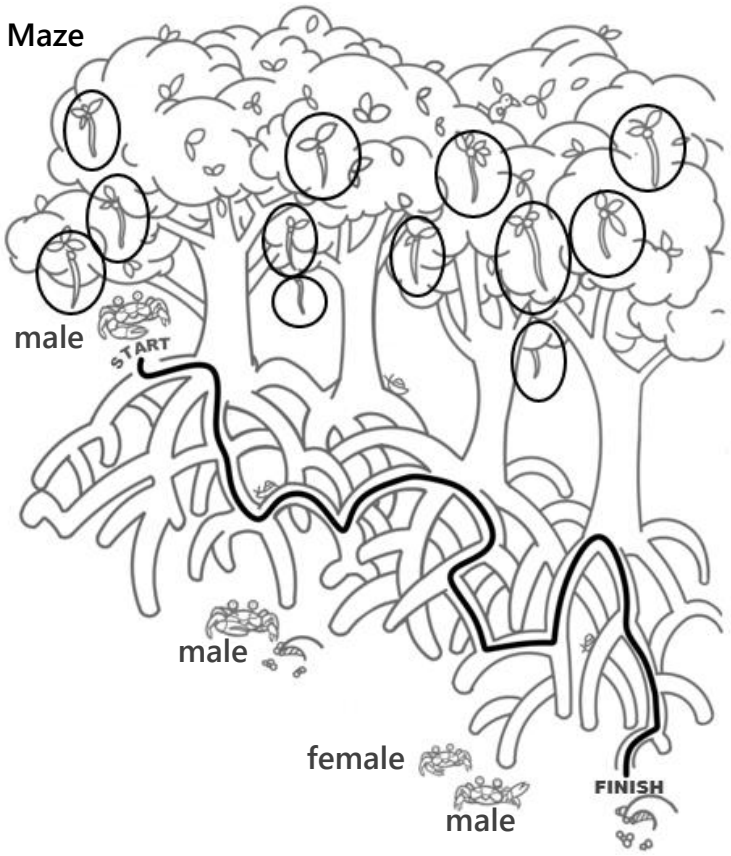
Page 12- Growing up in a nursery
A = streamlined spinefoot
B= barracuda
C= blacktail snapper
D= little spinefoot

Page 16- Carbon Capture Masters

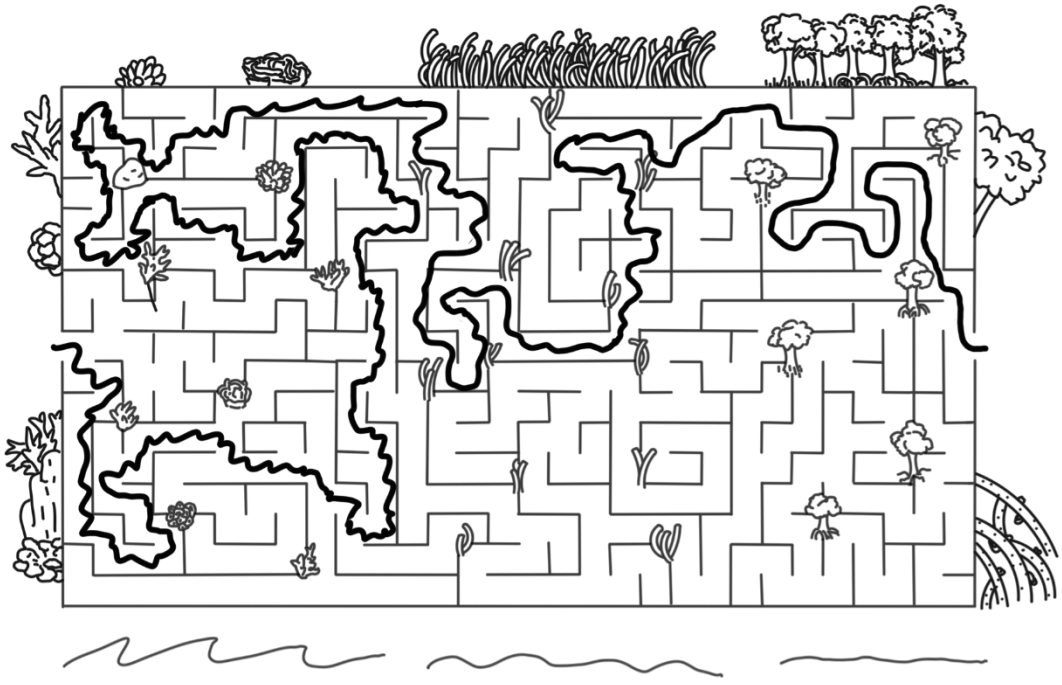


Page 8- Mangrove Root Maze

12 mangrove propagules



Page 17- Wave Absorbers Maze



Page 21- Hidden Litter

- Bottle cap
- Plastic Bottle
- Plastic Bag
- Glass Bottle
- Plastic Straw
- Candy Wrapper
- Paper cup
- Plastic fork
- Cigarette
- Plastic Spoon
- Aluminum can
- Fishing line and hook

How do I know what I can recycle?

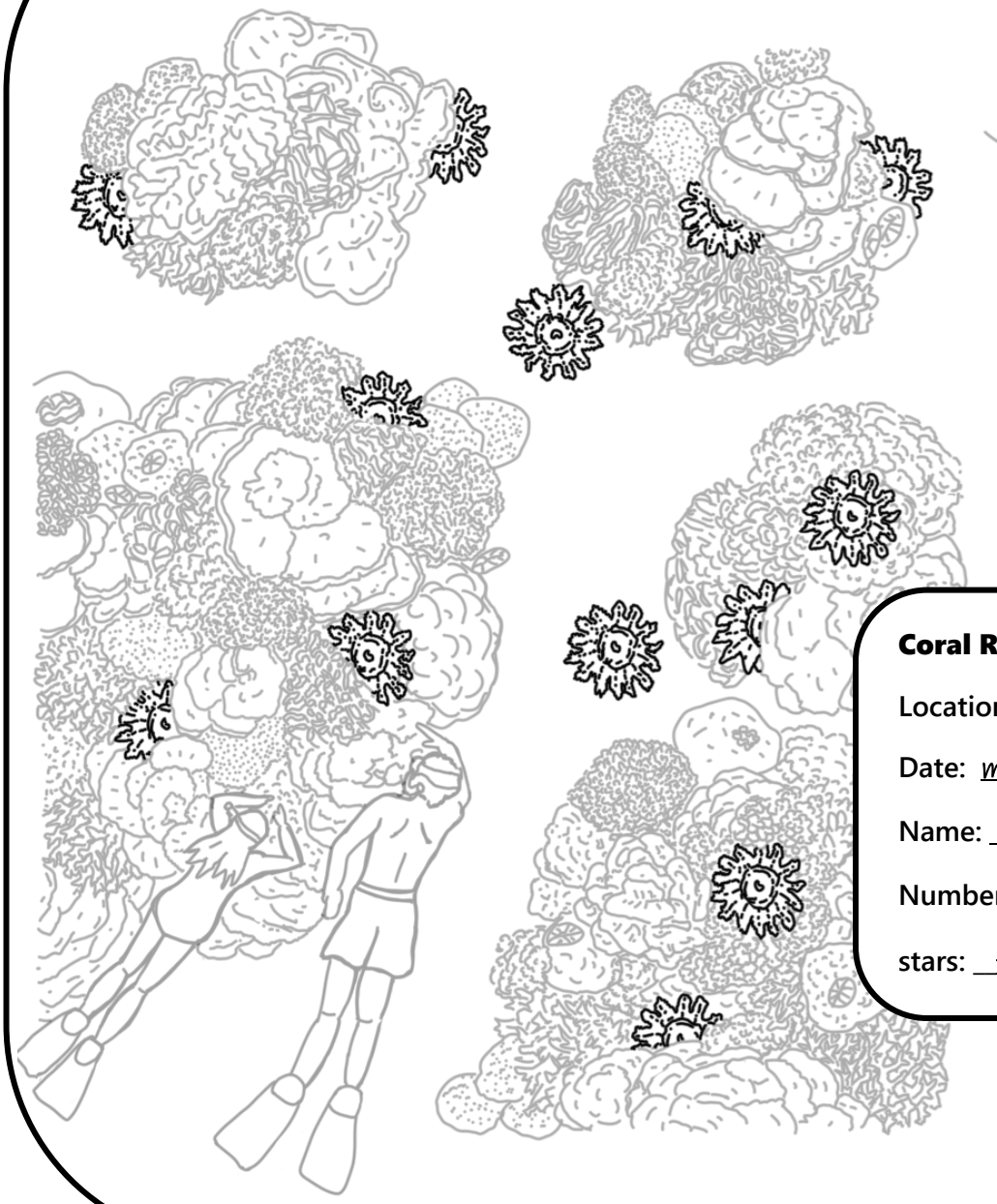
Recycling can be a complex process. The types of materials that are accepted for recycling may change with new advances in technology and changes in government policies.

For the most up to date information, check out the Guam Solid Waste Authority website.

Page 24- Wrap-up Word Search

Z	U	E	M	S	G	P	S	B	N	J	P	U	N	P	J	D	F	T	M	S
E	O	B	L	P	E	S	Y	O	N	A	E	N	O	D	A	G	Z	S	A	T
G	F	O	J	U	A	D	I	L	R	Z	L	I	I	Y	Y	N	P	G	N	O
R	A	F	X	R	G	S	I	R	O	F	X	C	T	F	R	H	G	K	A	O
I	L	E	G	A	O	A	O	M	B	P	W	O	U	P	T	E	I	L	H	R
Y	W	A	P	R	N	T	P	S	E	N	O	R	L	X	J	P	S	L	A	Z
E	E	I	E	F	F	T	R	O	L	N	M	N	L	N	K	K	F	R	K	O
S	N	S	X	I	T	C	H	P	R	T	T	F	O	L	A	R	O	C	U	E
F	G	J	S	Y	H	F	X	E	F	P	P	I	P	Z	W	D	I	R	X	N
D	E	H	S	R	E	T	A	W	L	R	R	S	M	A	N	G	R	O	V	E
U	M	D	G	S	V	Z	C	B	E	L	M	H	T	A	T	I	B	A	H	P
B	O	R	C	O	M	A	N	S	H	Z	A	R	H	O	R	C	Q	Z	M	I
A	Z	C	X	X	R	K	E	G	T	N	A	E	S	T	E	W	A	R	D	P
B	I	U	O	B	Y	R	L	B	K	J	J	Z	Y	K	U	P	O	G	E	H
S	H	V	O	Y	V	A	T	E	S	V	G	W	B	I	H	N	C	Q	L	Y
G	R	N	U	E	C	S	T	U	C	A	B	H	G	R	C	L	R	H	W	T
L	T	T	M	R	A	Q	D	F	S	E	L	S	W	W	F	G	C	Z	Q	E

Page 22- Be the eyes of the reef



Coral Reef Monitoring Report:

Location: Gun Beach

Date: month/ day / year

Name: your name

Number of crown of thorn sea stars: 13

Take the Ocean Pledge!

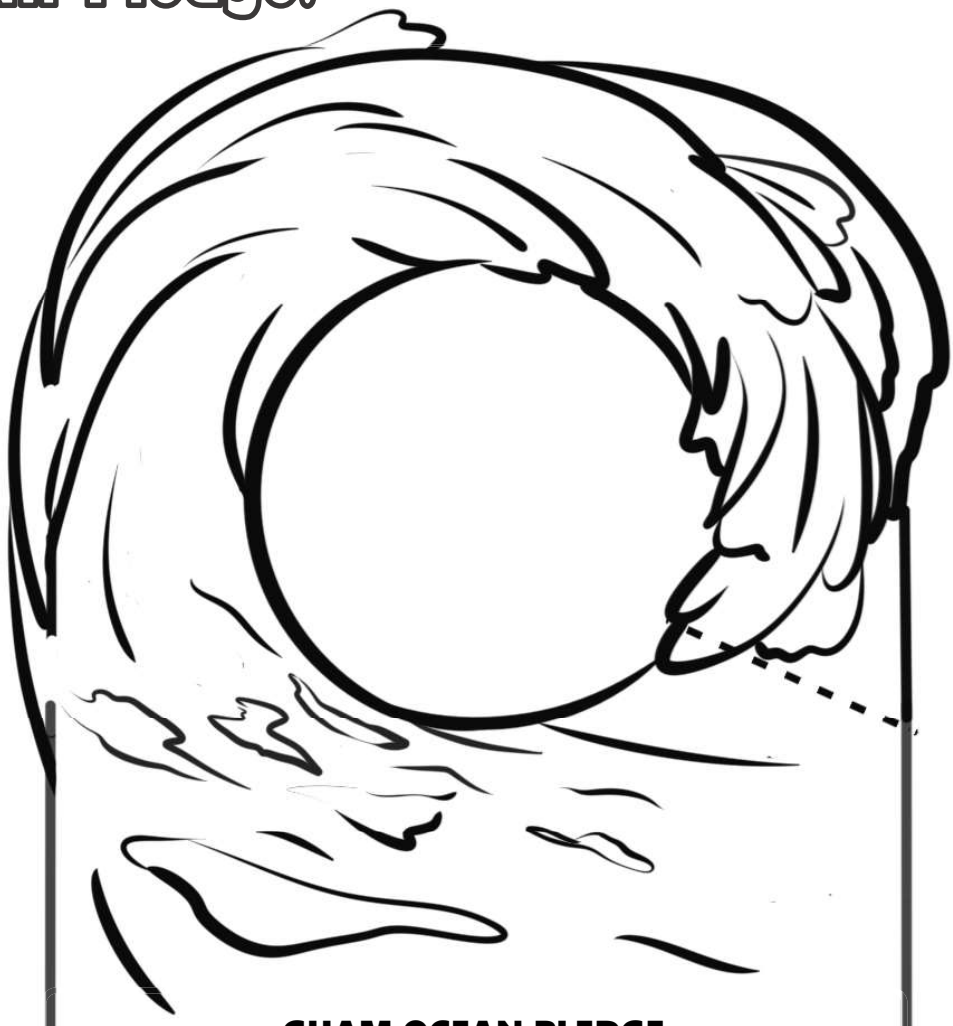
Thank you so much for joining us on our adventure!

As someone living on Guam, YOU have the power to help keep our seagrasses, mangroves, and corals healthy.

By protecting these habitats, you also protect animals and people that live near the water.

<u>Take the pledge</u> by reading and checking off each of the ways you will protect Guam's ocean.

Decorate and color, cut around the edge and on the dotted line to hang it up on a door knob as a reminder!



GUAM OCEAN PLEDGE

MY ACTIONS MAKE A DIFFERENCE! I pledge to protect Guam's ocean and coastal habitats

- ☐ I will not feed fish or other marine life
- ☐ I will not harass or hurt sea creatures
- ☐ I will not litter
- ☐ I will not touch, break, or stand on coral
- ☐ I will encourage others to take care of our ocean

In honor of the CHamoru people, I pledge to care for this island and its coral reefs for future generations.

Sign your name here