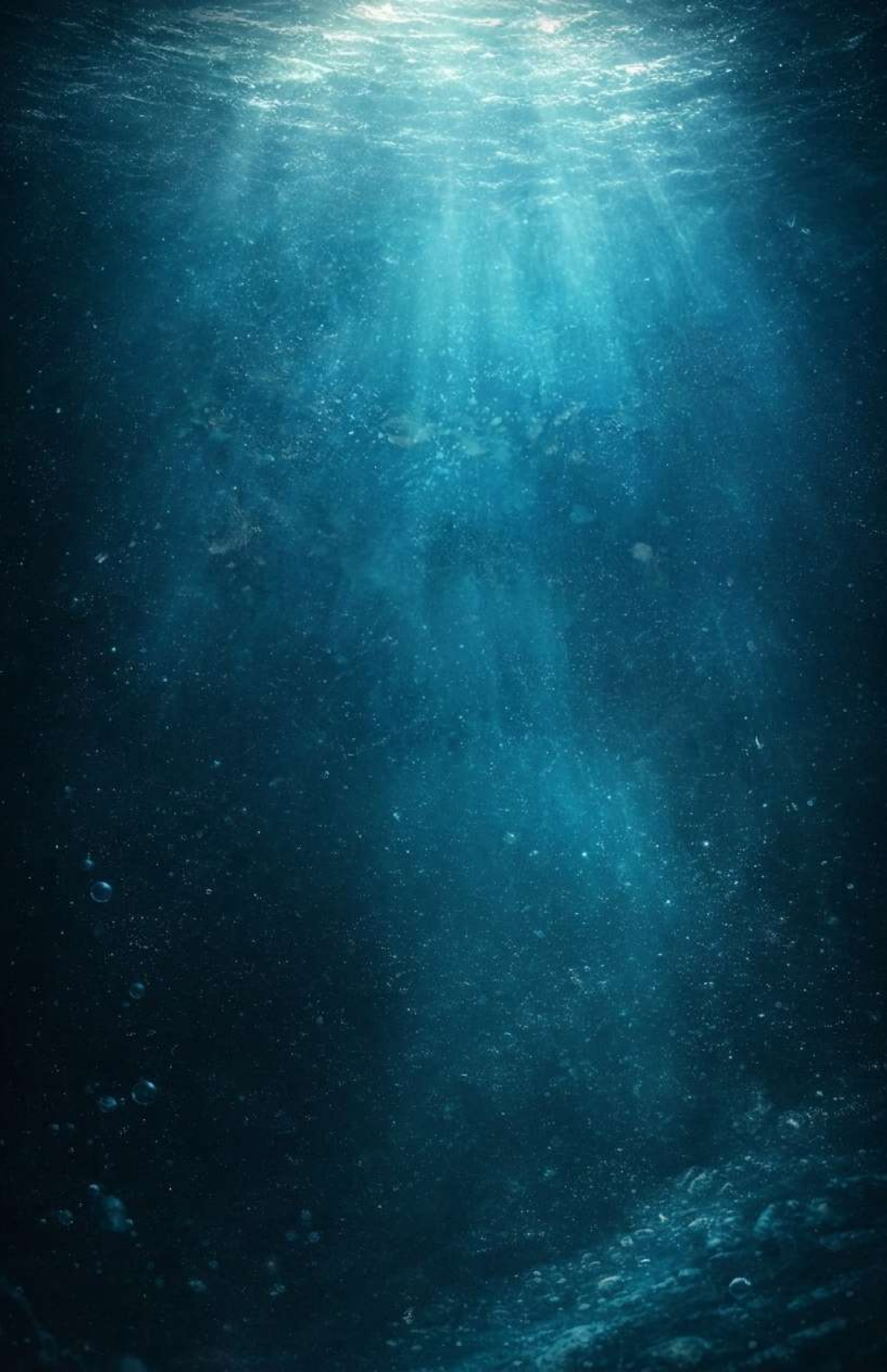


WATER CLASS

**LESSON
GUIDE**



INTRODUCTION

Welcome to Water Class!

I'm Dr. Tracy Fanara aka inspector planet and I have a mission for you. In the year 2025, something strange happened along the coast. Sea lions — fast swimmers, smart hunters, playful animals — started washing up on beaches sick and weak. Some were too tired to swim. Some were confused. Some didn't survive. Marine biologists were worried. Coastal communities were confused. And no one could explain why so many sea lions were getting sick at the same time. That's where you come in. Because today, you are not just students or campers, You are Earth System Detectives!



The Earth System has three main parts that matter for our mission: The weather system. The land system. And the ocean system. All three are connected by water. If something changes in one, it affects the others. You will investigate Weather data, Land maps, Ocean sensor readings, and Animal health clues. You will build a timeline of what happened before 2025. You will test ideas. You will follow evidence. And in the end, you will answer the big question: Why did the sea lions get sick?



Dr. Tracy Fanara



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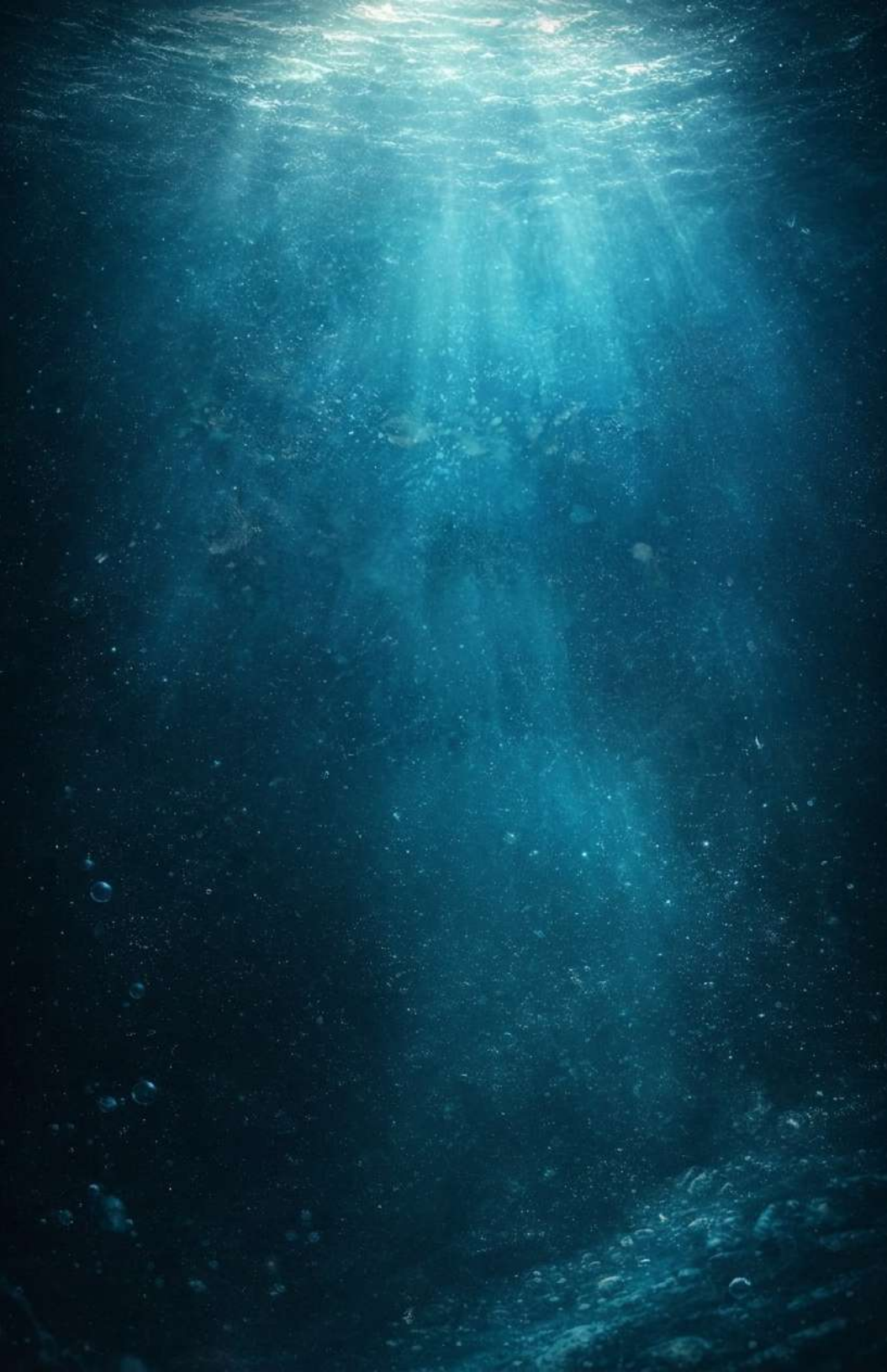
7. NUTRIENTS & ALGAE

8. ECOSYSTEM BALANCE

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10. OCEAN ANIMALS & THEIR HABITATS

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RAINFALL

HOW RAIN MOVES FROM SKY TO SEA

HOW DO CLOUDS FORM?

The Sun heats up oceans, lakes, and rivers.

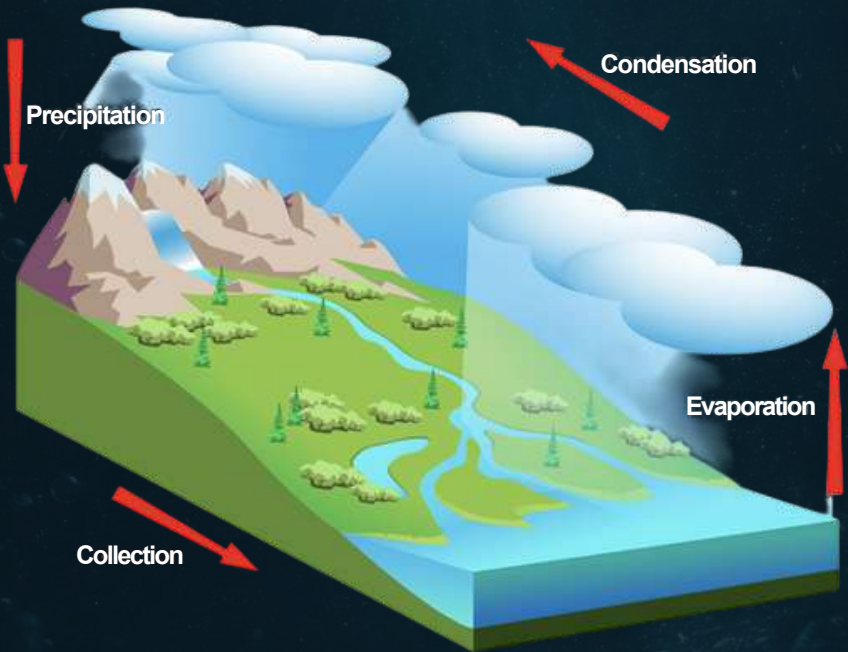
When water gets warm, it turns into an invisible gas called water vapor.

Warm air rises up into the sky. As it rises, it cools down.

When water vapor cools, it turns back into tiny drops of water which forms a cloud.

Evaporation is the process where liquid water absorbs heat and changes into water vapor (a gas) and Water Vapor is the gas form of water in the atmosphere. **Condensation** is when water vapor cools and changes back into liquid droplets or ice crystals, forming clouds

Water Cycle



NOT ALL CLOUDS ARE THE SAME

- » Some clouds are small and fluffy; These usually do not make rain.
- » Some clouds are tall and dark.; These can make heavy rain and storms.
- » Some clouds are low and gray.; These can bring light rain for a long time.

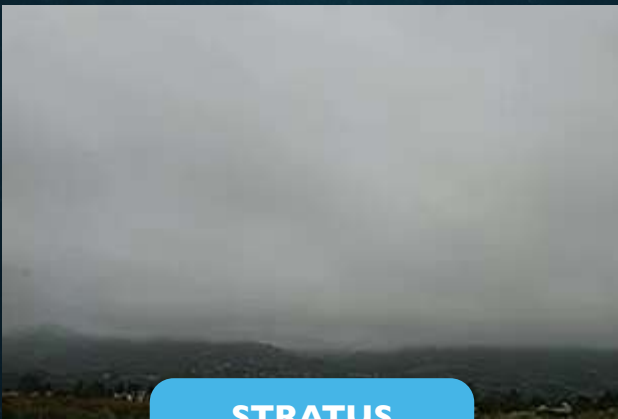
Cloud Type	What They Look Like	What They Bring
Cumulus	Low in the sky, Puffy, white	Fair weather, little rain
Cumulonimbus	Low in the sky, Tall, towering	Heavy rain, storms, lightning, flooding
Stratus	Low, gray blanket	Light, steady rain
Nimbostratus	Mid level, Thick, widespread gray	Long-lasting rain
Stratocumulus	Low, patchy gray or white clouds that often have a dark honeycomb-like appearance	Fair weather for now, but a storm might be on its way



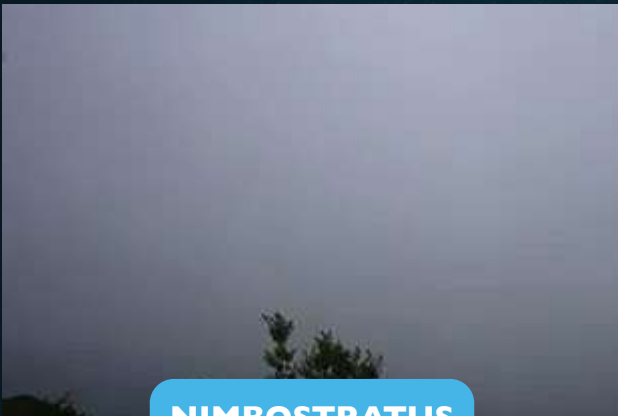
CUMULUS



CUMULONIMBUS



STRATUS



NIMBOSTRATUS



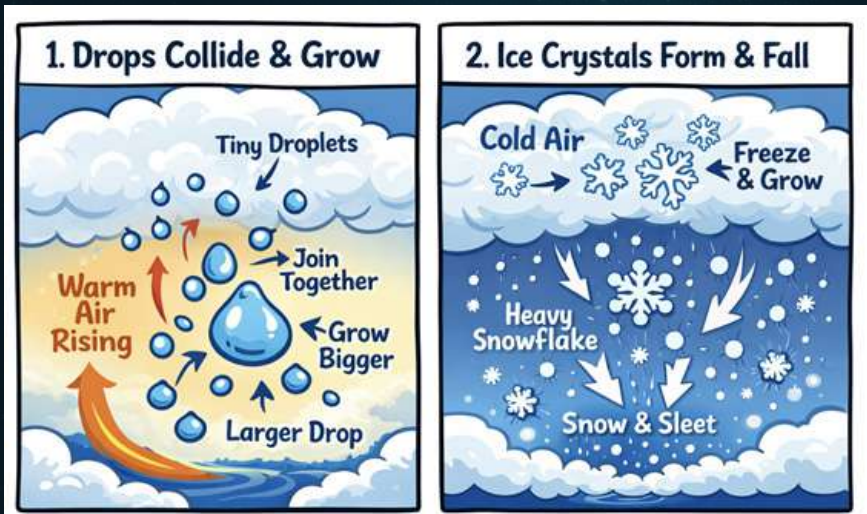
STRATOCUMULUS

Fun fact: even though clouds look light and fluffy, they can actually weigh millions of tons! They stay in the sky because warm air currents from underneath them are pushing each tiny droplet up!

HOW DO CLOUDS MAKE RAIN?

Inside a cloud, water droplets are tiny at first and too small to fall as rain. For rain to form, droplets must **Collide, Stick together, and Grow larger.**

This is called **collision and coalescence.**



Once droplets become heavy enough, gravity pulls them down as **precipitation**.

Precipitation is any form of water that falls from clouds to Earth — rain, snow, sleet, or hail.

Where Does Rain Go?

When rain hits the ground, it can:

Soak into the soil OR Flow over the land

When water flows over land, it is called **runoff**.

Runoff can carry dirt, trash, and chemicals into rivers, lakes, or the ocean.

Water connects everything.



THINK LIKE A DETECTIVE

1. How do clouds form?
2. What makes rain fall from a cloud?
3. What is runoff?
4. How could rain change the ocean?



2

WIND

AIR ON THE MOVE

WHY DOES AIR MOVE?

Air is made of tiny pieces called molecules.

When air gets warm, the molecules move faster and spread out. The air becomes lighter.

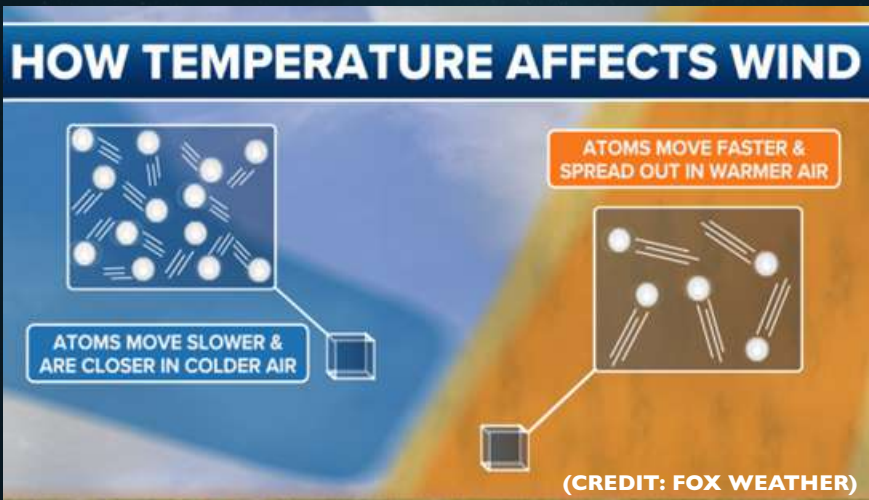
When air gets cold, the molecules slow down and move closer together. The air becomes heavier.

↑ Warm air rises.

↓ Cold air sinks.

Air always moves from heavy air to lighter air.

That moving air is called wind.



LET'S LOOK AT THE EXAMPLE OF SEA BREEZES

During the day:

- Land heats faster than ocean water
- Air over land rises
- Cooler ocean air moves inland

This creates a **sea breeze**.



At night:

- Land cools faster than water
- Air moves back toward the ocean

This creates a **land breeze**.

Wind is always responding to temperature differences.






WIND AND THE OCEAN

Wind does not stop at the beach.

When wind blows over the ocean, it pushes the water.

Wind can:

-  Make waves
-  Move ocean water
-  Change where food goes

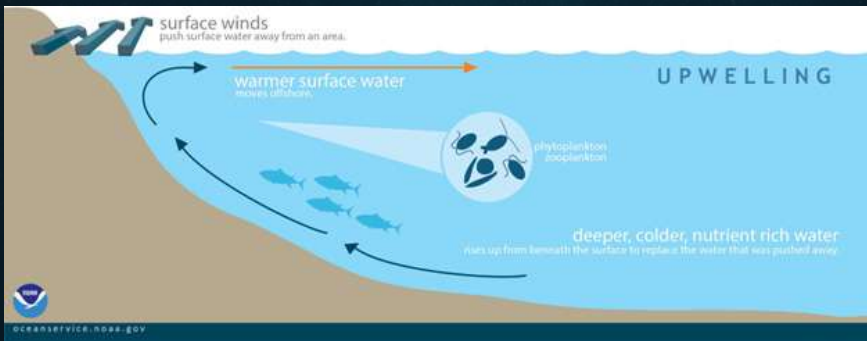
Sometimes wind pushes surface water away from shore.

When that happens, deep cold water rises up.

This is called **upwelling**.

Upwelling brings nutrients (food for tiny ocean plants).

But sometimes, too many nutrients can cause too much growth.



THINK LIKE A DETECTIVE

1. What happens to air molecules when air gets warm?
2. Why does wind move from cold air to warm air?
3. What is upwelling?
4. How could strong winds change ocean life?



3

PRESSURE

THE FORCE BEHIND STORMS

WHAT IS AIR PRESSURE?

Air may be invisible, but it has weight.

Air is made of tiny pieces pushing down on Earth.

That push is called **air pressure**.

- When there is a lot of air pushing down, it is called high pressure.
- When there is less air pushing down, it is called low pressure

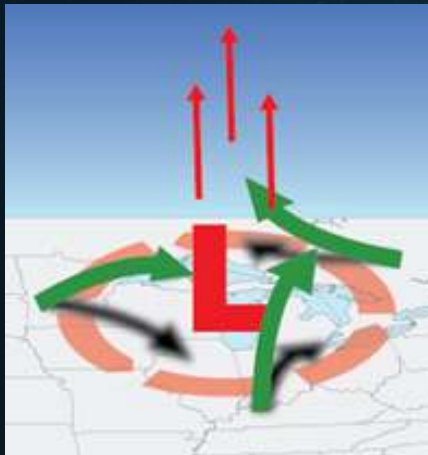
**Air always moves from high pressure to low pressure.
That moving air is wind!**

WHAT HAPPENS IN LOW PRESSURE?

Low pressure is where storms are born.





Here's why:

1. Air moves toward low pressure.
2. Air rushes in at the surface.
3. It has nowhere to go but upward.
4. As warm air rises higher in the sky, it cools.
5. Water vapor condenses into clouds.
6. Clouds grow into storms.



Low pressure creates the conditions for storms to form.

Low pressure can bring:

-  Clouds
-  Rain
-  Thunderstorms
-  Strong winds

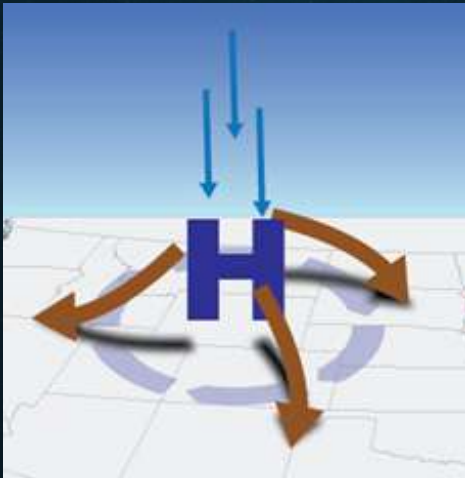
Low pressure helps storms grow.

WHAT HAPPENS IN HIGH PRESSURE?




High pressure works differently.

In high pressure systems:

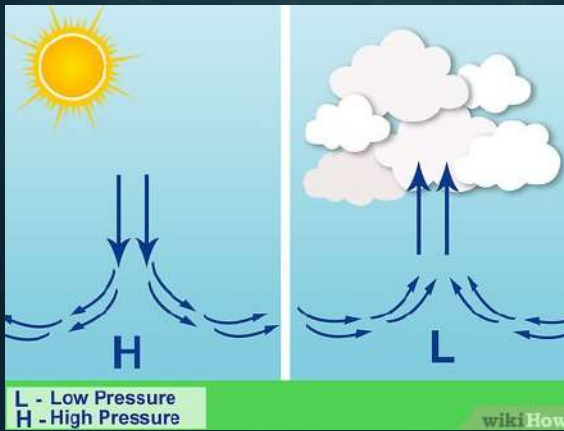
- Air sinks toward Earth.
- As cool air sinks, it warms up as it gets closer to the land
- This prevents condensation, so it prevents cloud formation.



That's why high pressure usually brings:

-  Blue skies
-  Calm weather
-  Light winds

High pressure presses the atmosphere down. Low pressure lifts it up.



High pressure = sunny & clear

Low pressure = cloudy & rainy

PRESSURE AND THE OCEAN

When pressure systems move over the ocean, they create wind.

Wind can:

- Move surface water
- Mix ocean layers
- Bring deep water up; When deep water rises, it is called upwelling.

Pressure helps control where storms form and how the ocean moves.

THINK LIKE A DETECTIVE

1. What is air pressure?
2. What happens when air rises in a low pressure system?
3. Why does high pressure usually bring sunny weather?
4. How could low pressure storms change ocean water?



4

**WEATHER SENSORS
& SATELLITES**

HOW SCIENTISTS SEE THE INVISIBLE

HOW DO SCIENTISTS KNOW WHAT'S HAPPENING?

Scientists cannot be everywhere at once.

So how do they know when it is raining, windy, or stormy?

They use tools called **sensors**. A sensor is a tool that measures what is happening in the air.

Some sensors are on the ground. Some float in the ocean. Some orbit Earth in space. And some sensors fly overhead in airplanes or drones.

GROUND WEATHER STATIONS

Weather stations are placed in cities, mountains, fields, and coastlines.

They include:



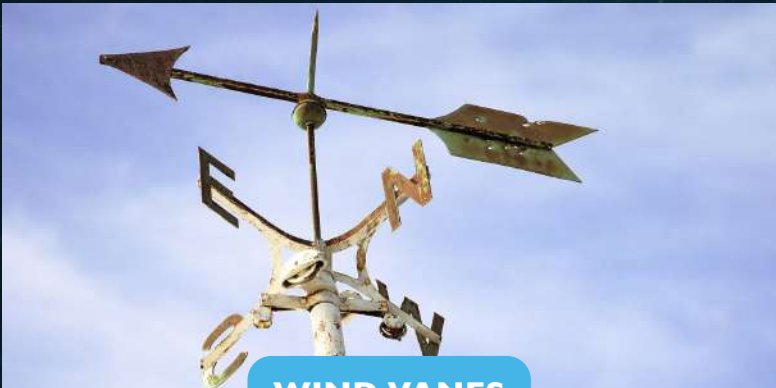
RAIN GAUGES

measure how much rain falls



ANEMOMETERS

measure wind speed



WIND VANES

measure wind direction



BAROMETERS

measure air pressure

These stations collect data every few minutes. Because stations are spread out, scientists use models and satellites to fill in the gaps.

RADAR: TRACKING RAIN

Radar sends out energy waves.

When the waves hit raindrops, they bounce back.

Radar shows:

- Where rain is falling
- How heavy it is
- How fast storms are moving





On radar maps:

- Green = light rain
- Yellow/Orange = moderate rain
- Red/Purple = heavy rain or severe storms



Scientists look for:

- Sudden spikes in rainfall
- Repeated storms
- Flood-causing events

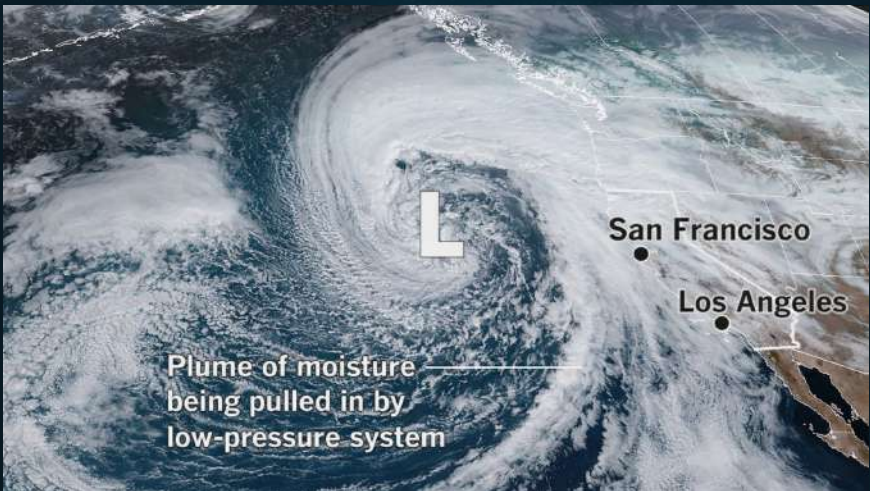
SATELLITES: THE BIG PICTURE

Satellites orbit Earth and observe:

- Cloud types
- Storm size
- Wind patterns
- Ocean surface temperature
- Moisture in the atmosphere

For our mission, satellites also help monitor the ocean, but we will get to that later.

Satellites allow scientists to track entire storm systems over the Pacific Ocean.



WHY THIS MATTERS

Scientists look for patterns.

Sensors and satellites help us understand the past weather patterns, weather conditions right now, and help us predict weather into the future.

THINK LIKE A DETECTIVE

1. What is a sensor?
2. What does a satellite measure to help us understand weather?
3. What does a ground weather station tell us about weather?
4. Why do scientists look for patterns instead of just one number?



5

LAND

ROCKS, SOIL & RUNOFF

WHAT HAPPENS WHEN RAIN HITS THE GROUND?

When Rain Reaches the Land

Rain falls from the sky.

But once it hits the ground, the land decides what happens next.

Water can:

- Soak into the ground. This is called **infiltration**.
- Flow over the ground. This is called **runoff**.

How water moves depends on:

- The rocks under the soil
- The type of soil
- The shape of the land
- What people have built there

The land controls where water goes.

ROCKS AND SOIL

Some rocks have tiny spaces inside them. These are called porous rocks. Water can move through porous rocks. Like limestone that may have once been a coral reef.



LIMESTONE

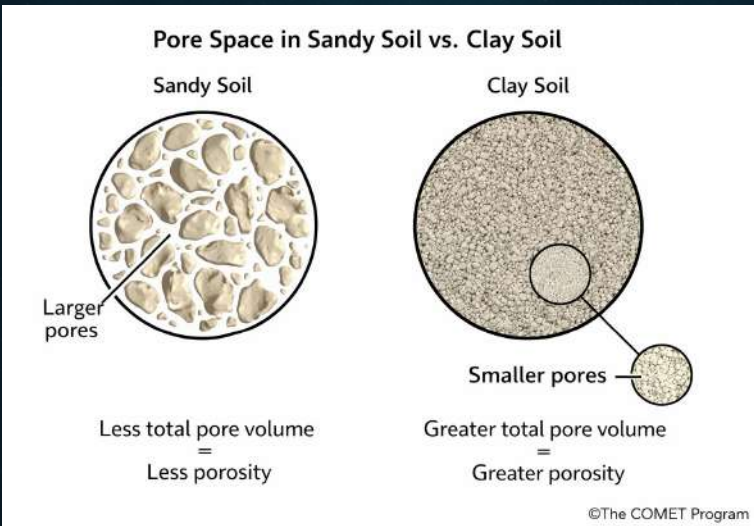
Other rocks are solid. Water cannot move through them easily. Like granite that people use for countertops.



GRANITE

Soil matters too.

- Sandy soil has big spaces. Water moves through it quickly.
- Clay soil has tiny spaces. Water cannot move through it easily.



Clay soil makes more runoff.

To find the geology (type of rocks) in your area:

<https://ngmdb.usgs.gov/mapview/>

To find the soils in your location:

<https://websoilsurvey.sc.egov.usda.gov/app/WebSoilSurvey.aspx>

CITIES CHANGE WATER

When we build Roads, Parking lots, and Buildings water cannot soak into the ground. That creates more runoff.

Runoff can carry:

- Trash
- Oil from cars
- Chemicals
- Nutrients

All of this can reach rivers and the ocean.

FIRE CHANGES LAND

After a wildfire, soil can become hydrophobic.

Hydrophobic means water-repelling.

Water cannot soak in easily. Even small rainstorms can cause flooding and mudslides. Water can carry ash and nutrients to the ocean.

Wildfire Burn Scars are a Flood Risk

Before Fire
Litter
Subsurface Soil

During Fire
Burning vegetation and Litter
Soil particles coated with water-repellent compounds
Subsurface Soil

After Fire
Ash & Burnt Top Soil
Water Repellent Soil
Subsurface Soil

During Heavy Rain
Top layer becomes saturated, ash layer slides downhill.
Ash
Water Repellent Soil
Subsurface Soil

Water cannot penetrate water repellent soil layer, so it runs off like pavement which causes dangerous:
**Flash Flooding
Mud & Debris Flows
Mudslides**

Litter: organic material such as needles, leaves, grass, brush, bark.
Water Repellent Soils: formed when organic material such as trees, scrubs, plants and litter burn at high intensity, water repellent compounds are vaporized, and condense on cooler soil layers below, which prevents soil from absorbing water.

THINK LIKE A DETECTIVE

1. What is infiltration?
2. What is runoff?
3. Why does clay soil create more runoff than sandy soil?
4. How could wildfires change where water goes?



6

LAND SURVEYING

HOW SCIENTISTS MAP WHERE WATER WILL GO

MEASURING THE LAND

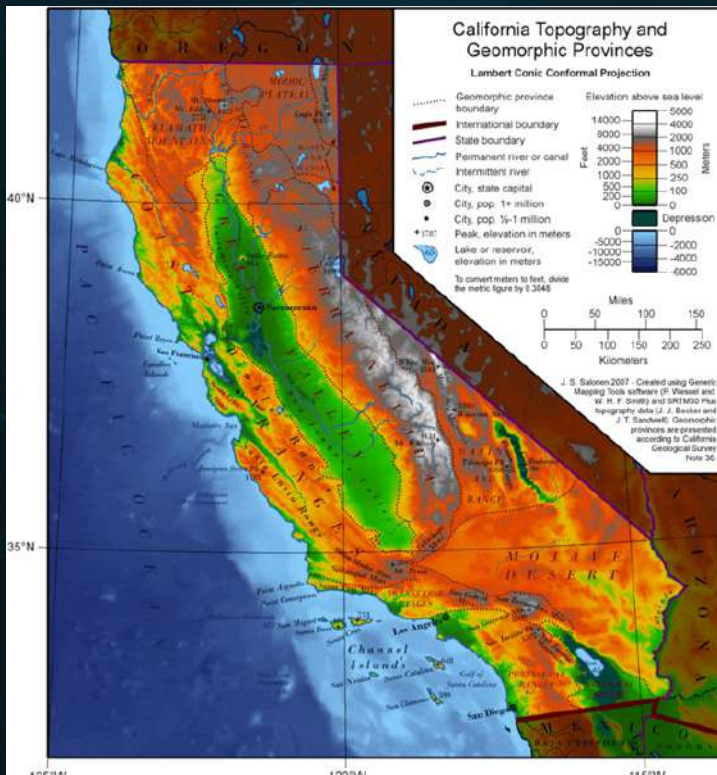
Rain does not choose where it goes. The land decides. Scientists study the land using a science called land surveying.

Land surveying means measuring:

- How high or low the land is (Elevation)
- How steep the land is
- Where water will flow

When scientists measure land, they turn the shape of Earth into numbers.

Those numbers help predict floods and pollution.



ELEVATION AND GRAVITY

Elevation means how high land is above sea level.

Water always moves from high elevation to low elevation.

This happens because of gravity.

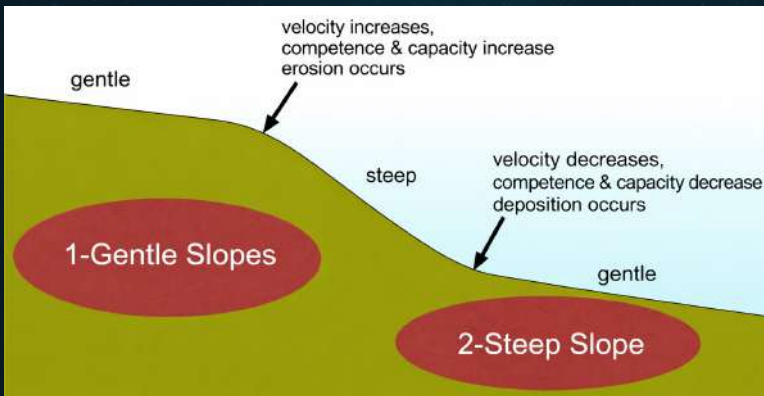
Even a small difference in height can change where water flows.

SLOPE CHANGES SPEED

Slope means how steep the land is. A steep slope is like a big playground slide-you slide down that quickly. A gentle slope is like a ramp or a sidewalk.

- Steep slope →→ water moves fast (higher speed which is also called velocity)
- Gentle slope → water moves slow (lower velocity)

Fast water can carry Dirt, Trash, and Nutrients. Slow water gives time for infiltration of water into the ground.



To find the topography in your location:
<https://ngmdb.usgs.gov/topoview/viewer/>

SLOPE CHANGES SPEED

A **watershed** is an area of land where all the water drains to the same place.

Water does not follow city borders.

Water follows elevation.

If pollution happens upstream, it can travel downstream to the ocean.

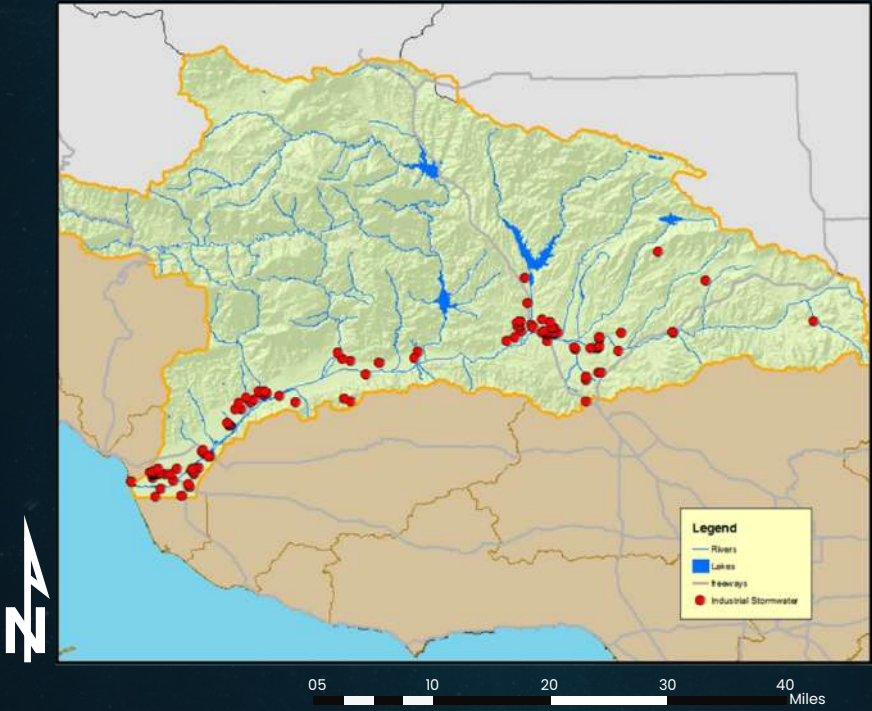


- Cuyama River Watershed
- Ventura River Watershed
- Santa Clara River Watershed
- Calleguas Creek Watershed
- Malibu Creek Watershed



Find your watershed and how safe your waterbody is for you and wildlife:
<https://mywaterway.epa.gov/>

Locations of industrial stormwater discharges in the santa clara river watershed



Find your watershed and how safe your waterbody is for you and wildlife:
<https://mywaterway.epa.gov/>

WHY THIS MATTERS

After a wildfire or big storm, scientists measure the land again.

Fire and floods can change:

- Slopes (how steep the ground is)
- Flow paths (where the water goes)
- Erosion, which is when water or wind moves sand, dirt or rocks, and changes or wears away the land

Mapping the ground helps scientists predict where water and pollution will go next.

THINK LIKE A DETECTIVE

1. What is elevation?
2. Why does water always flow downhill?
3. What is a watershed?
4. How can steep slopes change flooding?



7

NUTRIENTS & ALGAE

HOW OCEAN WATER FEEDS LIFE

THE OCEAN IS ALWAYS MOVING

The ocean may look calm, but it is always moving.

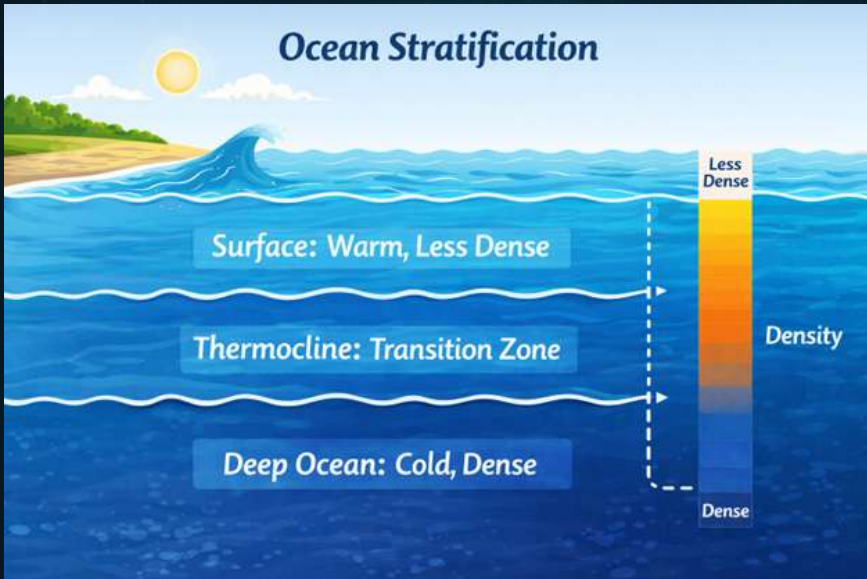
Ocean water forms layers because of density.

Density means how tightly packed something is.

- 🕒 Warm water is lighter and stays near the top.
- 🕒 Cold water is heavier and sinks.
- 💧 Saltier water is heavier than fresh water.

These layers are called stratification.

Stratification can trap nutrients deep below the surface.



UPWELLING BRINGS FOOD

Sometimes wind pushes surface water away from the coast.

When that happens, deep water rises. This is called upwelling.

Upwelling brings nutrients to the surface.

Nutrients are like food for tiny ocean plants.

WHAT ARE ALGAE?

Plant-like organisms in the in the water or damp places that can range from tiny (microscopic) or big seaweed like kelp.

Algae use sunlight and nutrients to grow.

They are the base of the ocean food web.

Sometimes, when there are too many nutrients, algae grow very fast.

This is called an **algae bloom**.

Some blooms are helpful. Some blooms are harmful and can block out sunlight, lower oxygen in the water, or release a toxin that harms wildlife or humans.

These are called harmful algal blooms (**HABs**).



Image Above:

Bloom of pseudo nitchia (a HAB of microscopic algae that releases a toxin) on the coast of California

WHEN BLOOMS BECOME DANGEROUS

Some algae can make toxins.

Small fish eat the algae.

Bigger fish eat the small fish.

Sea lions eat the bigger fish.

Toxins build up as they move up the food web.

This is called bioaccumulation.

Too much algae can also lower oxygen in the water.

Fish need oxygen to survive.

THINK LIKE A DETECTIVE

1. What is density?
2. What is an algae bloom?
3. What is a HAB?
4. How can too many nutrients affect sea lions?



8

**ECOSYSTEM
BALANCE**

HOW EVERYTHING IN THE OCEAN IS CONNECTED

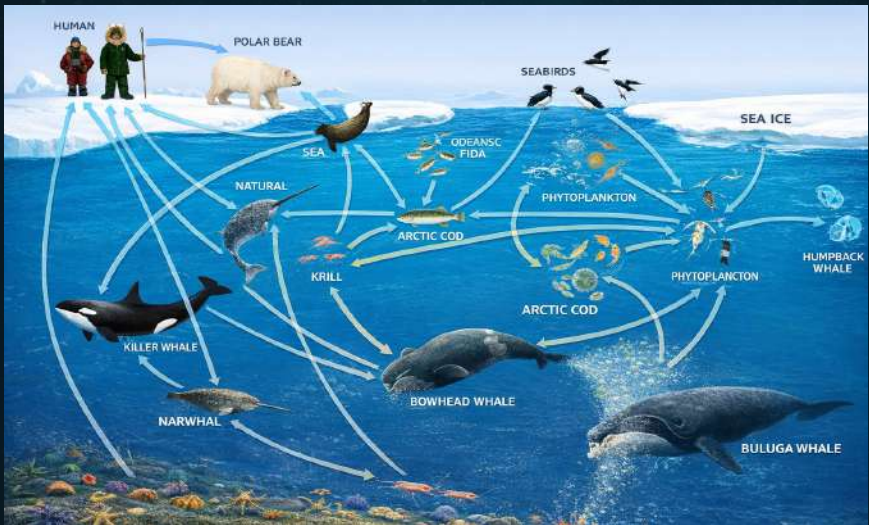
WHAT IS AN ECOSYSTEM?

An **ecosystem** is a group of living things and the place where they live.

In the ocean, this includes:

- 🐟 Tiny plants called phytoplankton
- 🐟 Fish
- 🦈 Sea lions and other mammals
- 🌿 Kelp
- 🦠 Bacteria

An ecosystem is not just one animal. It is a web of life. If one part changes, other parts change too.






ENERGY STARTS AT THE BOTTOM

Every ecosystem runs on energy. In the ocean, energy starts with Sunlight and Phytoplankton. Phytoplankton use sunlight to make food. This energy moves up the **food web**. If there is not enough food at the bottom, animals at the top will struggle.

BALANCE AND CHANGE

Healthy ecosystems are in balance.

That means:

-  Enough food
-  Clean water
-  Good oxygen levels

Ecosystems can handle small changes. This ability is called resilience.

But if too many changes happen at once, the system can reach a tipping point.

A tipping point is when the system cannot easily recover.

SEA LIONS AS CLUES

Sea lions are near the top of the food web. They eat many types of fish. Because they are near the top, they are called an indicator species.

An indicator species shows us when something is wrong. When sea lions get sick, it often means something changed lower in the ecosystem. They are a signal.

THINK LIKE A DETECTIVE

1. What is an ecosystem?
2. What is a food web?
3. What is a tipping point?
4. Why are sea lions an indicator species?



9

OCEAN SENSORS

HOW SCIENTISTS WATCH THE OCEAN

HOW DO SCIENTISTS SEE OCEAN CHANGES?

The ocean is always moving. It can change quickly. So how do scientists know when something is wrong?

They use tools called sensors. A sensor is a tool that measures what is happening.






Some sensors float on the ocean. Some are underwater. Some are on satellites in space. And some are on airplanes or drones in the air.

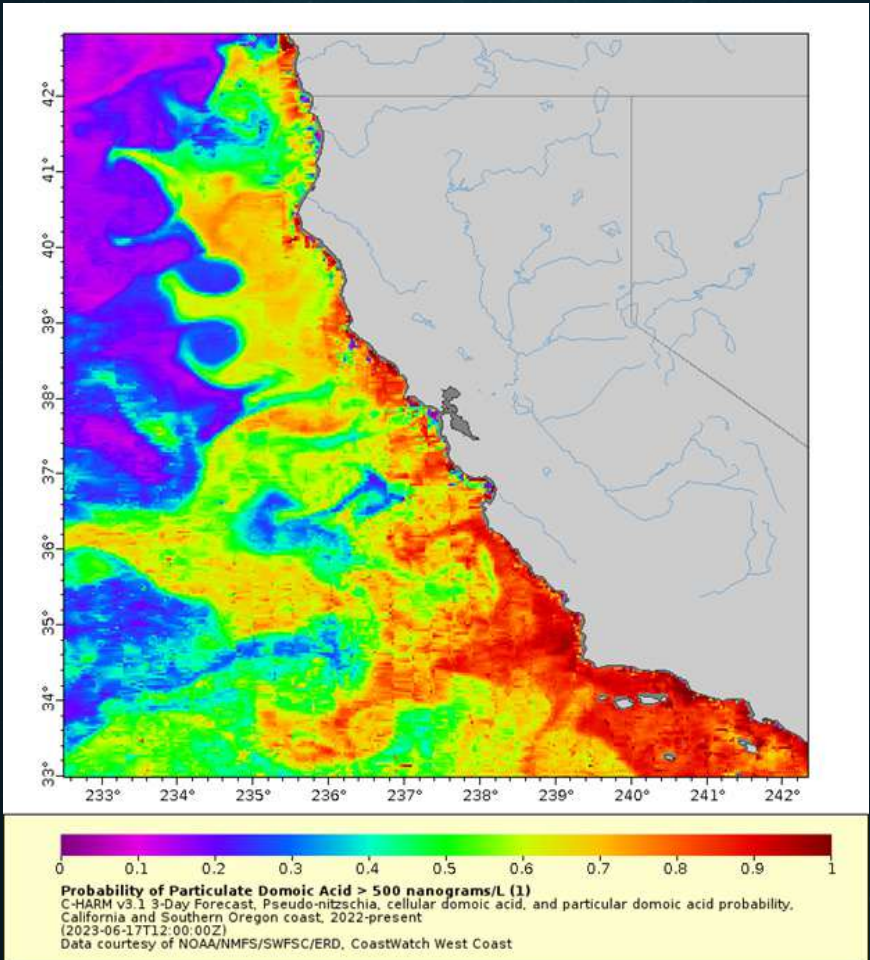
These tools collect data day and night.



WHAT DO OCEAN SENSORS MEASURE?

Ocean sensors can measure:

-  Water temperature
-  Salinity (how salty the water is)
-  Currents (how water moves)
-  Oxygen levels
-  Chlorophyll (a sign of algae)



Sensors send this information to scientists in real time.

That means scientists can see changes as they happen.

WATCHING FOR WARNING SIGNS

High chlorophyll levels can mean algae are growing.

Low oxygen levels can stress fish and sea lions.

Changes in temperature can affect where animals live.

When scientists see many changes at once, they know the ecosystem may be under stress.

WHY THIS MATTERS




Scientists look for patterns.

For example:




Storm → More nutrients → More algae → Low oxygen and possibly toxins
Sensors often detect problems before animals get sick. Sensors help us listen to the ocean.

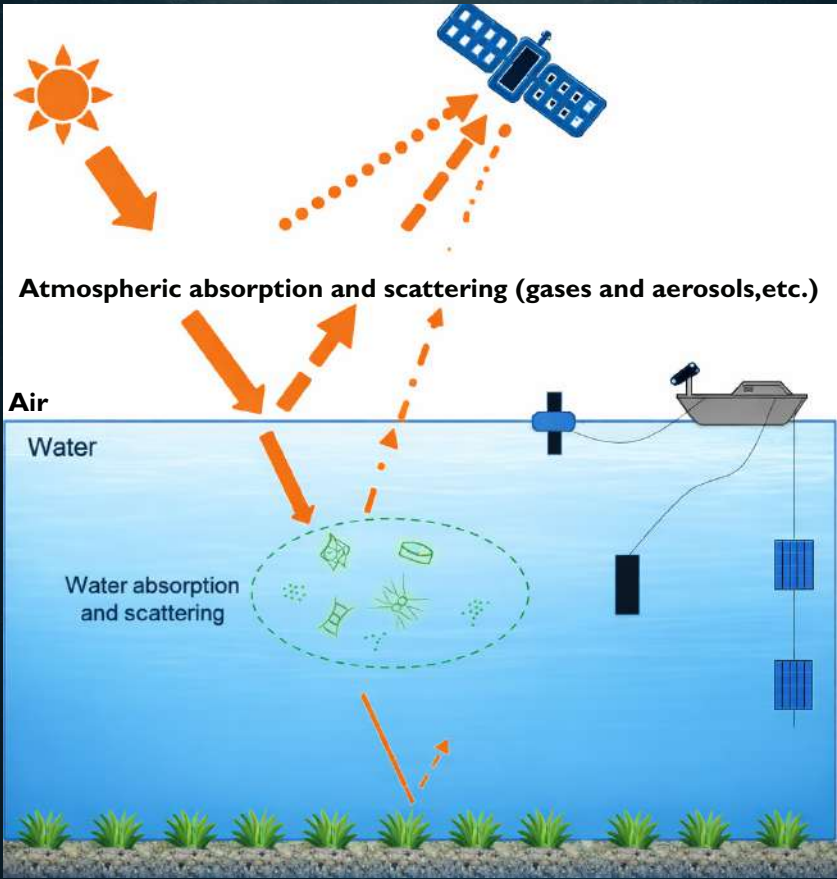
SATELLITES HELP TOO

We actually learn a lot about the ocean from space! For our mission, satellites also help monitor the ocean, they track:

-  Ocean Currents
-  Ocean Temperatures (like Cold water from upwelling)
-  Chlorophyll-a (a measure of algae)

So in satellites can help us see:

-  How water is moving on the surface
-  Ocean surface temperature that can tell us how water is moving underneath the surface
-  Where big algae blooms are



Satellites show the big picture. Buoys show the details.

Together, they help scientists understand what is happening.

THINK LIKE A DETECTIVE

1. How do satellites help us monitor the ocean?
2. What does a buoy measure?
3. Why is low oxygen dangerous for ocean animals?
4. What can buoys and satellites tell us about sea lion habitat?





An underwater scene featuring a large whale swimming in the upper right and a sea turtle swimming in the lower left. The water is dark blue with light rays filtering down from the surface. The number '10' is prominently displayed in a white, cloud-like shape in the center.

10

**OCEAN ANIMALS &
THEIR HABITAT**






SOLVING THE SEA LION MYSTERY: HOW EVERYTHING IS CONNECTED

WHAT HAPPENED IN 2025?

-  Sea lions became sick.
-  Many were weak.
-  Some had seizures.
-  Some washed up on shore.

Scientists asked: Why? To solve this mystery, we had to follow the water.




Water connects everything.

-  Rain falls from the sky.
-  Water flows over land.
-  It carries nutrients and chemicals.
-  It reaches the ocean.
-  Ocean currents move nutrients and algae.

Water is the driver of everything

WHAT CHANGED?

In early 2025:

-  Large wildfires burned the land.
-  Heavy rainstorms followed.
-  Strong winds caused upwelling.

Upwelling brought a lot of deep ocean nutrients to the surface.

Wildfire runoff may have added even more nutrients.

Too many nutrients helped algae grow quickly.

THE ALGAE BLOOM

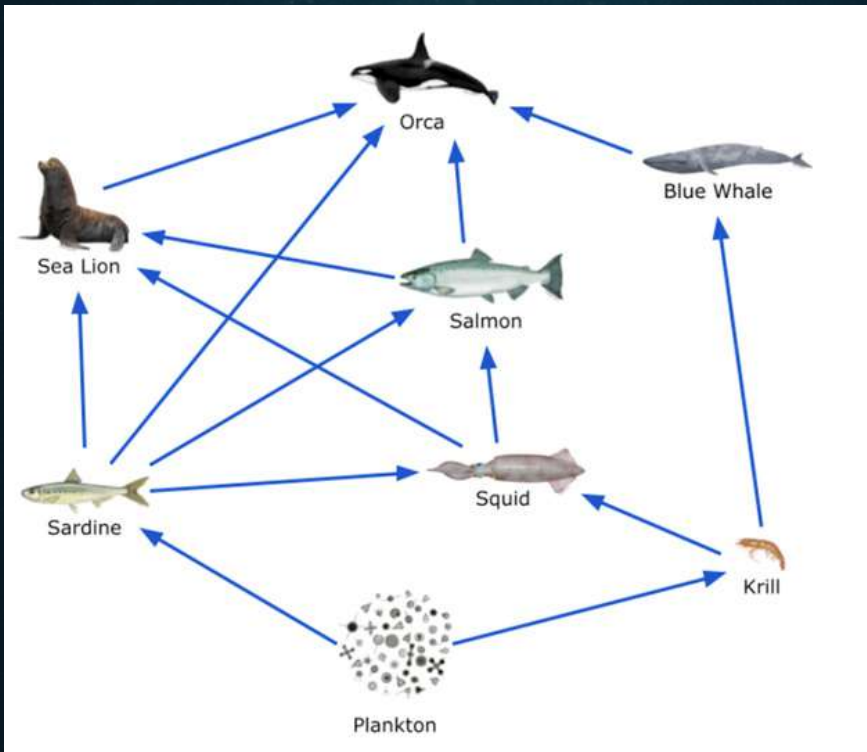
Groups of algae called Pseudo-nitzschia grew earlier and stronger than usual.

This algae can make a toxin called **domoic acid**.

Small fish were exposed. Bigger fish ate them. Sea lions ate the fish.




The toxin built up in their bodies. This is called **bioaccumulation**.

Sea lions became sick from the toxin.



WHAT DID WE LEARN?

Ecosystems respond to:

-  Physical changes (like wind and storms)
-  Chemical changes (like nutrients)
-  Biological changes (like algae growth)



Sea lions did not cause the problem.

They showed us the problem.

Everything is connected.

When water changes, the whole system feels it.

THINK LIKE A DETECTIVE

1. What is domoic acid?
2. What is bioaccumulation?
3. How is the sky, the sea, and the land all connected to sea lions?
4. What were your leading hypotheses? Were you right?



REVIEW

RAINFALL

1. How do clouds form?

- Clouds form when warm water vapor rises, cools, and turns into tiny water droplets or ice crystals.

2. What makes rain fall from a cloud?

- Droplets bump together, grow larger, and become heavy enough for gravity to pull them down.

3. What is runoff?

- Runoff is water that flows over the land instead of soaking into the ground.

4. How could rain change the ocean?

- Rain can carry nutrients, pollution, and freshwater from land into the ocean.

WIND

1. What happens to air molecules when air gets warm?

- They move faster and spread farther apart.

2. Why does wind move from cold air to warm air?

- Cold air is denser and pushes toward lower-density warm air.

3. What is upwelling?

- Upwelling is when wind pushes surface water offshore and deep, cold, nutrient-rich water rises to the ocean surface.

4. How could strong winds change ocean life?

- They can move water, and cause upwelling, bringing nutrients to the surface, and trigger algae growth.

PRESSURE

1. What is air pressure?

- Air pressure is the weight of air pushing down on Earth.

2. What happens when air rises in a low pressure system?

- The air cools and forms clouds and storms.

3. Why does high pressure usually bring sunny weather?

- Sinking air warms and prevents clouds from forming

4. How could low pressure storms change ocean water?

- They create strong winds that mix ocean layers and move water.

WEATHER SENSORS

1. What is a sensor?

- A sensor is a tool that measures conditions like temperature, wind, or rainfall.

2. What does a satellite measure to help us understand weather?

- Satellites measure clouds, storms, ocean temperature, and wind patterns.

3. What does a ground weather station tell us about weather?

- It measures rainfall, temperature, wind speed, wind direction, and pressure.

4. Why do scientists look for patterns instead of just one number?

- Patterns help scientists understand how conditions change over time.

LAND: ROCKS, SOIL, RUNOFF

1. What is infiltration?

- Infiltration is when water soaks into the ground.

2. What is runoff?

- Runoff is water flowing across land toward rivers or the ocean.

3. Why does clay soil create more runoff than sandy soil?

- Clay has very small spaces, so water cannot soak in easily.

4. How could wildfires change where water goes?

- Fires can make soil repel water and cause faster runoff.

LAND SURVEYING

1. What is elevation?

- Elevation is how high or low land is compared to sea level.

2. Why does water always flow downhill?

- Gravity pulls water from higher places to lower places.

3. What is a watershed?

- A watershed is an area where all water drains to the same river, lake, or ocean.

4. How can steep slopes change flooding?

- Steep slopes make water move faster and increase flood risk.

NUTRIENTS & ALGAE

1. What is density?

- Density is how much matter is packed into a space.

2. What is an algae bloom?

- An algae bloom is when algae grow very quickly in the water.

3. What is a HAB?

- A HAB is a Harmful Algal Bloom, which is an algae bloom that can harm aquatic life and may produce toxins.

4. How can too many nutrients affect sea lions?

- They can cause toxic algae blooms that poison the fish that sea lions eat

ECOSYSTEM BALANCE

1. What is an ecosystem?

- An ecosystem is a community of living things interacting with their environment.

2. What is a food web?

- A food web shows how energy moves between many organisms that eat each other.

3. What is a tipping point?

- A tipping point is when a system changes so much it cannot easily recover.

4. Why are sea lions an indicator species?

- When sea lions get sick, it often means something changed in the ecosystem.

OCEAN SENSORS

1. How do satellites help us monitor the ocean?

- They can see ocean temperature, currents, and algae blooms from space.

2. What does a buoy measure?

- Buoys measure water temperature, waves, currents, oxygen, and nutrients.

3. Why is low oxygen dangerous for ocean animals?

- Aquatic wildlife need oxygen in the water to breathe and survive.

4. What can buoys and satellites tell us about sea lion habitat?

- They show changes in ocean conditions that affect fish and sea lions.

OCEAN ANIMALS & THEIR HABITAT

1. What is domoic acid?

- Domoic acid is a toxin produced by certain algae.

2. What is bioaccumulation?

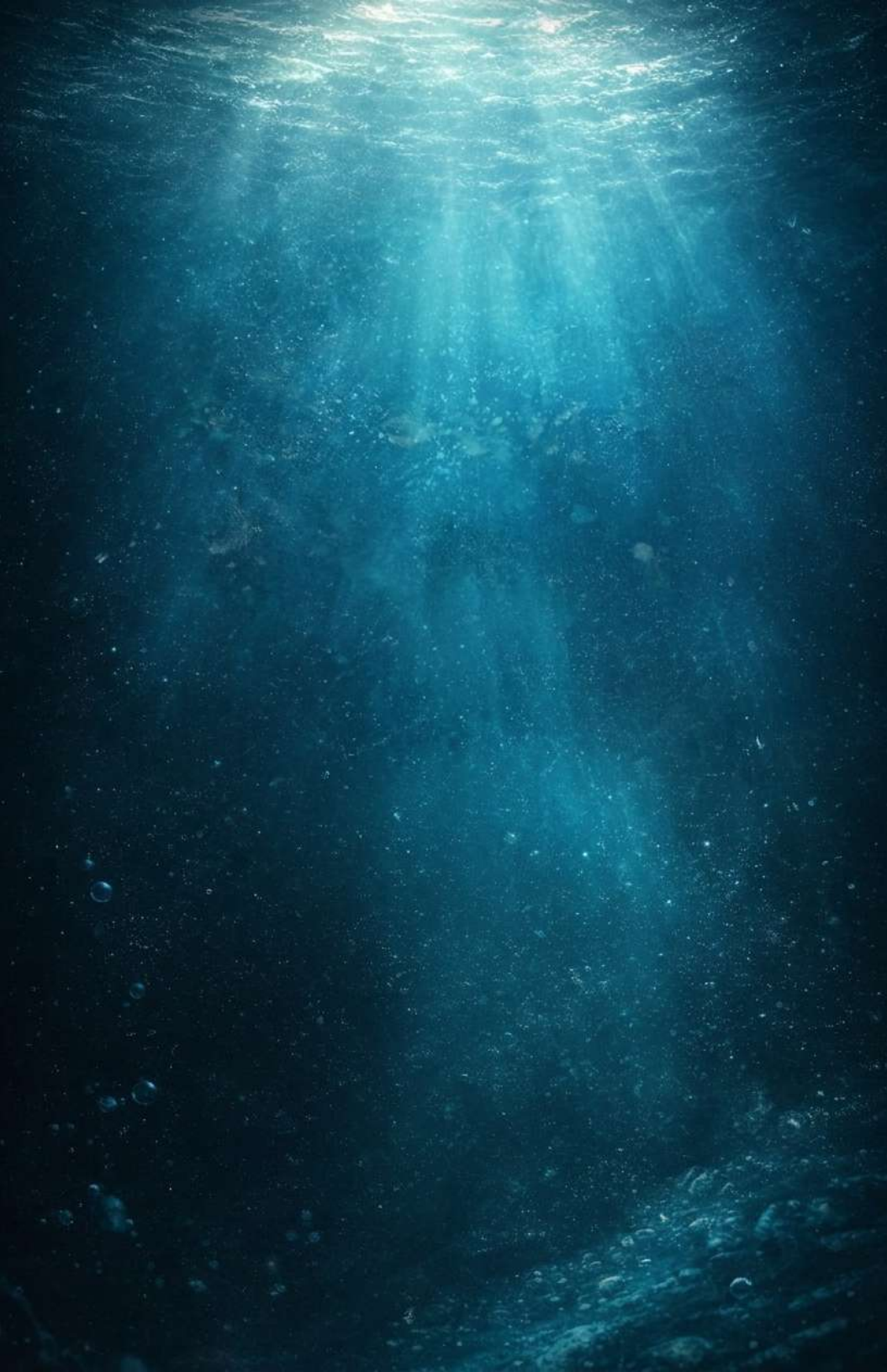
- Bioaccumulation is when toxins build up in animals as they move up the food web.

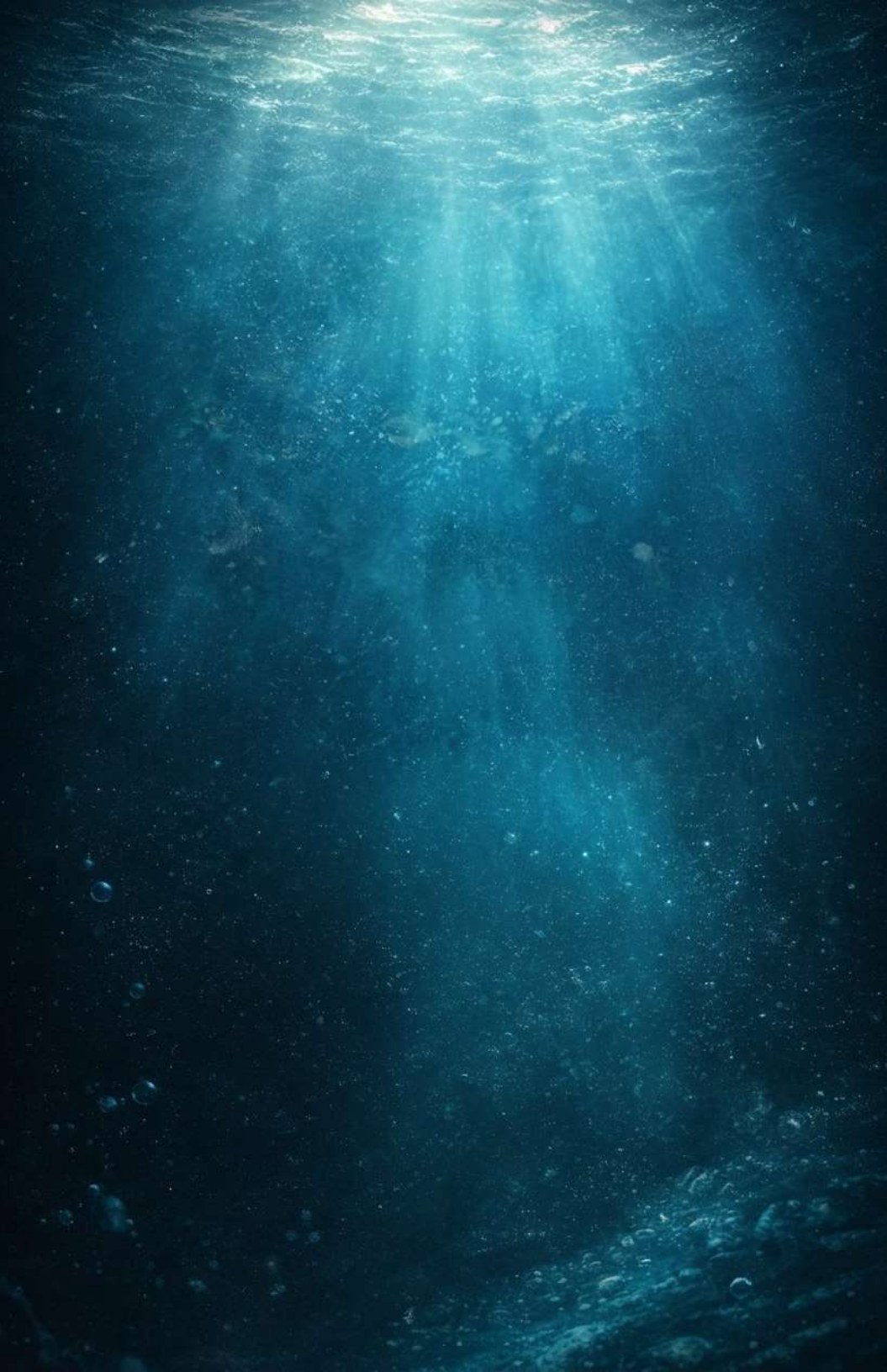
3. How is the sky, the sea, and the land all connected to sea lions?

- Water moves nutrients and chemicals from the sky and land into the ocean ecosystem.

4. What were your leading hypotheses? Were you right?

- Students may answer differently, but many found that upwelling and nutrient changes caused the toxic algae bloom.





An underwater scene with sunlight rays filtering down from the surface, creating a blue and green color palette. Bubbles are visible on the left side, and a rocky seabed is at the bottom.

**WATER
CLASS**