GEMS®

OCEAN SCIENCES SEQUENCE:
The Ocean–Atmosphere Connection and Climate Change

Investigation Notebook

Unit 1:
How Do the Ocean and Atmosphere Interact?

Investigation Notebook
Table of Contents

Unit 1: How Do the Ocean and Atmosphere Interact?

Investigation Notebook
Table of Contents (continued)

Name ______________________________ **Date** ____________________

First Ideas

What do you know about what causes freshwater and ocean water to move around Earth?

(Save the lines below for notes that you will add later.)

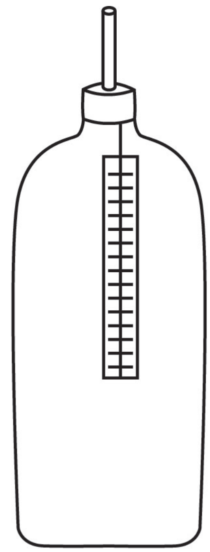
Notes: ______________________________

Name ________________________________ Date ____________________

Heat Energy in a Water Bottle

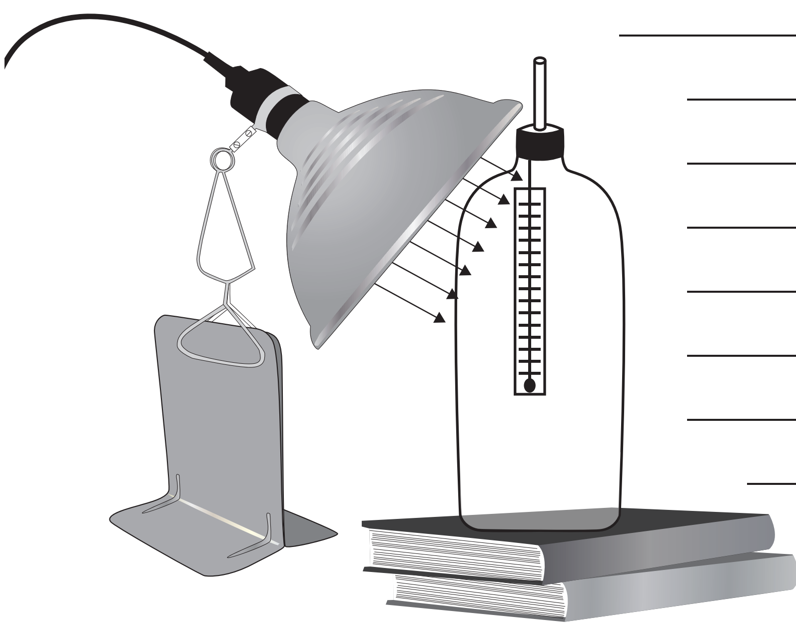
A. LAMPS OFF

Draw water molecules inside the bottle as they were before the lamps were turned on.



B: LAMPS ON

Draw water molecules inside the bottle after heat energy was added for 10 minutes. Explain why the water level in the bottle changed.



Name ______________________________ Date ____________________

Key Concepts

Below each guiding question, write key concepts and other important ideas that help answer the question.

Guiding Question #1: **How does heat energy affect water?**

Key Concepts (continued)

Guiding Question #2: **How does the ocean affect climate on Earth?**

Guiding Question #3: **What is density?**

Key Concepts (continued)

Guiding Question #4: **What causes ocean currents?**

Guiding Question #5: **How is heat energy moved around Earth?**

Key Concepts (continued)

Guiding Question #6: **What causes air currents (wind)?**

Name ______________________________ Date ____________________

Daily Written Reflection

What happens to water molecules when heat energy is added to them? Explain how you know.

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Make a drawing if it helps you explain. Label your drawing.

Name ________________________________ Date ____________________

Water vs. Air Temperature Data

Time at Start	Air (°C)	Water (°C)

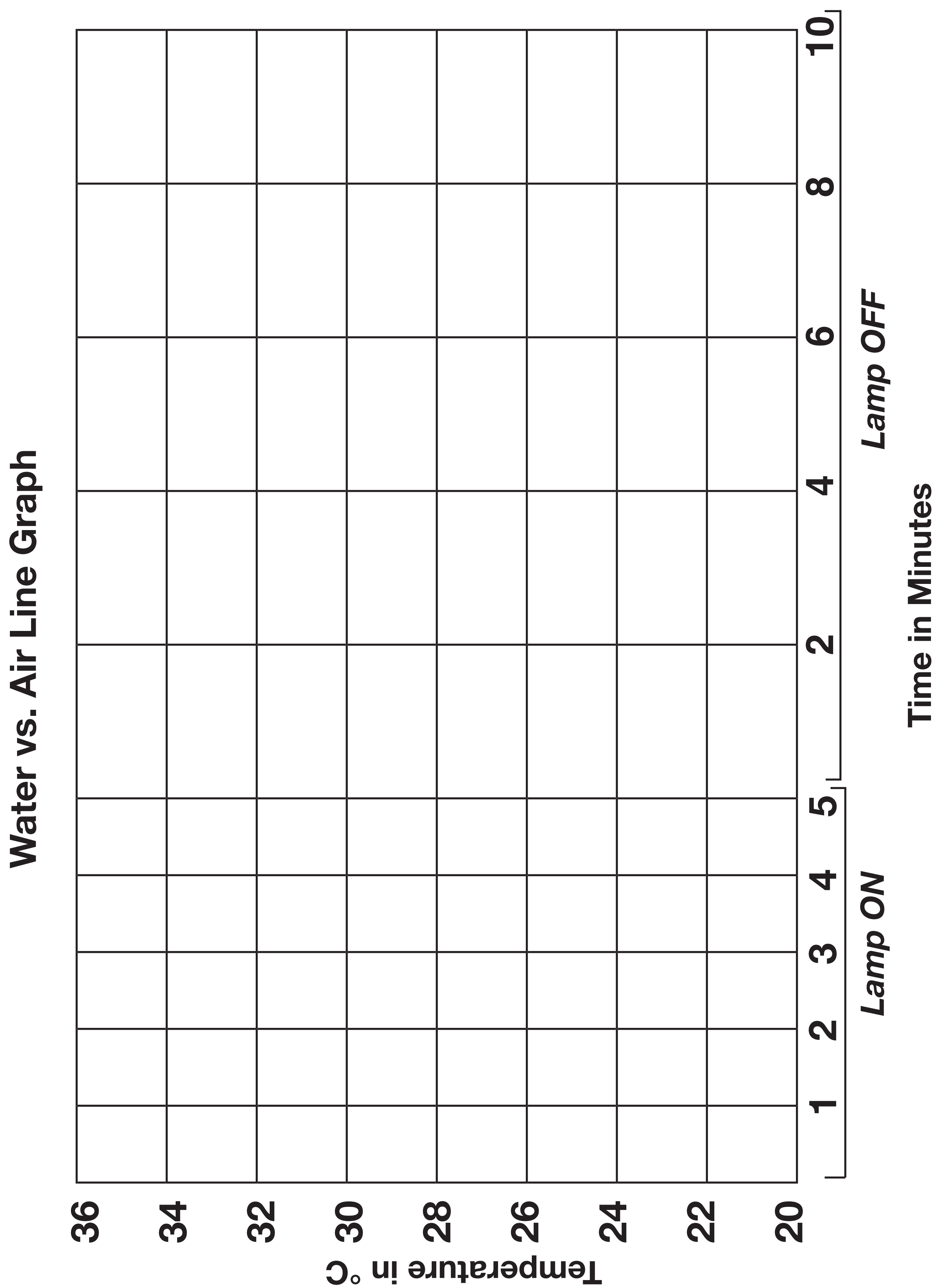
Lamp ON

Time	Air (°C)	Water (°C)

Lamp OFF

Time	Air (°C)	Water (°C)

Name ________________________________ Date ____________________

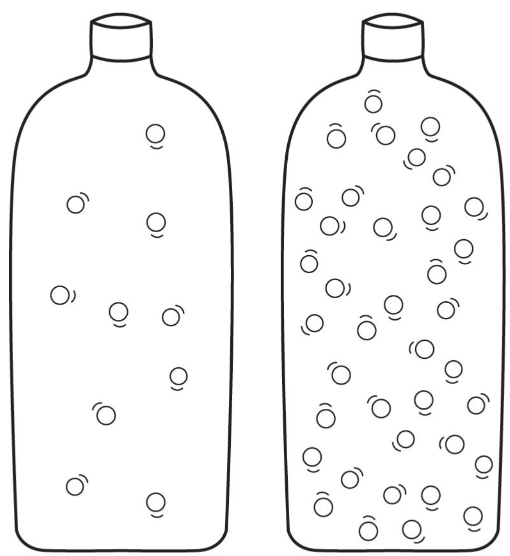


Water vs. Air Line Graph
Temperature in °C
36
34
32
30
28
26
24
22
20
1
2
3
4
5
Lamp ON
2
4
6
8
10
Lamp OFF
Time in Minutes

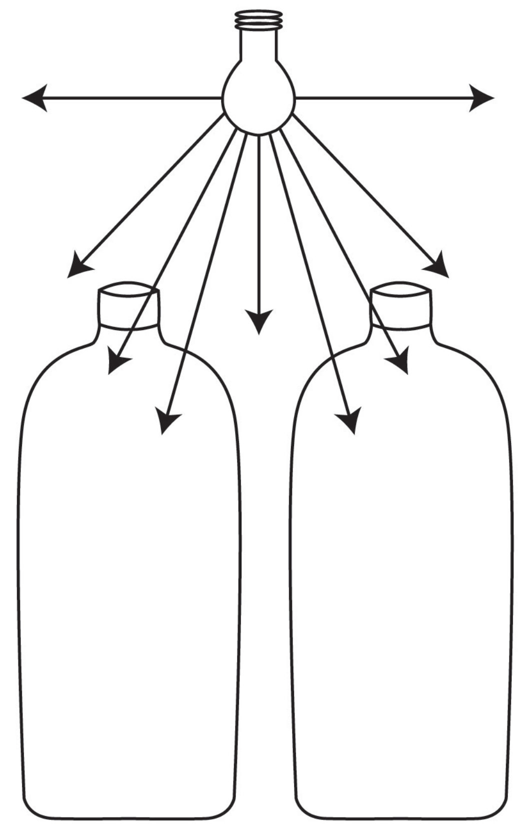
Name ______________________ Date ______________

Water vs. Air Molecule Model

Bottles at start



Bottles after 5 minutes of receiving heat energy



Name ________________________________ **Date** ____________________

Daily Written Reflection

Why is water called a heat reservoir? Support your ideas with evidence.

Make a drawing if it helps you explain. Label your drawing.

Name ______________________________ Date ____________________

The Ocean: A Giant Heat Reservoir

Solar Energy Absorbed by Earth

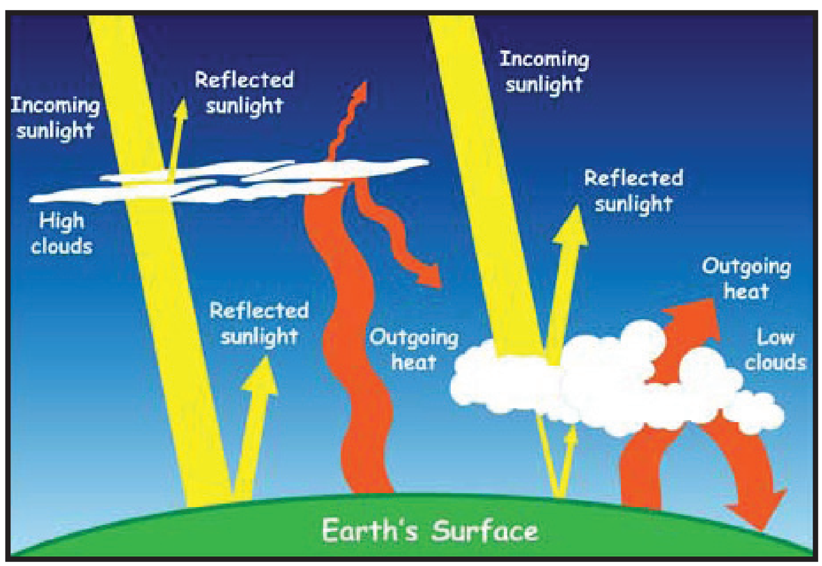
Sunlight, or energy from the Sun, travels in straight lines through space at 186,000 miles per second. Only a tiny fraction of the energy that leaves the Sun reaches Earth, but still, a huge amount of energy reaches our planet.

When the Sun's energy reaches Earth, it interacts with matter. Matter can be anything that has mass and occupies space, such as air, water, or land. Energy from the Sun has three main ways it interacts with matter on Earth: it can be transmitted, reflected, or absorbed. If the energy is **transmitted**, it passes through the matter. If energy is **reflected**, it bounces off the matter. If energy is **absorbed**, it is taken in by the matter, and the molecules of the matter move faster. When molecules move faster, the matter gets warmer. In fact, that is what temperature measures—how fast the molecules are moving.

Most objects have all three interactions, but the amount to which each occurs is different. Some kinds of matter, such as air, transmit most of the energy from sunlight. Other matter, such as ice, mainly reflects energy, and others, such as rock or water, absorb a lot of the Sun's energy.

When the Sun's energy strikes Earth's atmosphere, some energy is absorbed, warming the air, and some is reflected back into outer space by clouds. But more than half the Sun's energy transmits through the atmosphere, going all the way to Earth's surface. A lot of this energy is absorbed by the land and ocean.

If so much of the Sun's energy is absorbed by Earth's surface, why don't we heat up to unbearable temperatures and fry? Something else must be going on to keep Earth's temperature from being too hot to support life.

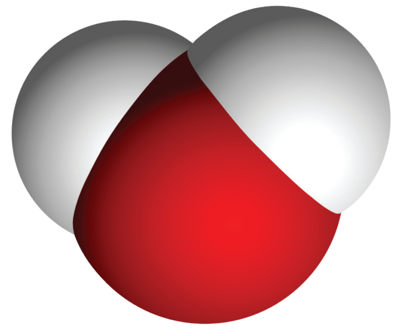


Solar Energy Absorbed		Solar Energy Reflected	
Clouds	3%	Clouds	20%
Atmosphere	16%	Atmosphere	6%
Land and ocean	51%	Land	4%
TOTAL ABSORBED	70%	TOTAL REFLECTED	30%

The Ocean: A Giant Heat Reservoir (continued)

Water Absorbs a Lot of Heat Energy

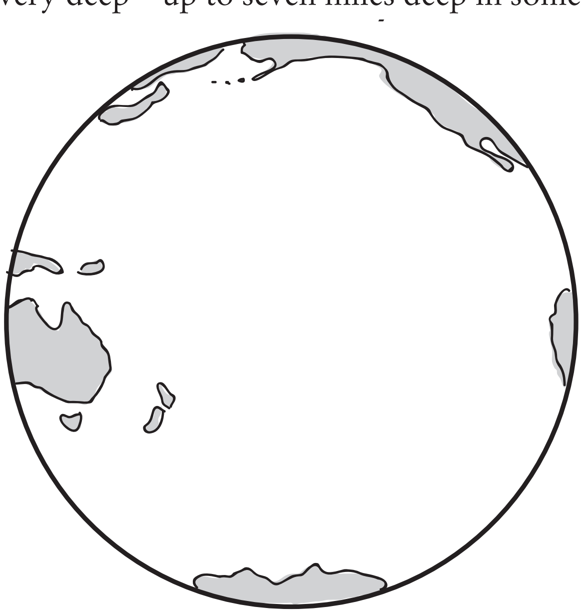
Water can absorb a lot of heat energy without much change in temperature. If air and water each absorb the same amount of energy, the air will heat up much more than the water will. This can be demonstrated by adding heat energy to two balloons, one filled with air and one with water. The air balloon will pop immediately, but the water balloon will not. One reason is that water has a lot more molecules in the same amount of space than air does. Each water molecule absorbs some of the energy and moves a little faster. In air, there are fewer molecules, so each air molecule gets a bigger share of the energy to absorb. The air molecules move a lot faster, and faster moving molecules mean a higher temperature. When the air molecules in the balloon can't absorb more energy, which happens very fast, the rubber of the balloon absorbs the energy, and that makes the balloon pop. The water molecules in the balloon continue to absorb energy without getting much warmer. The rubber stays cool, and the balloon doesn't pop.



A water molecule has one oxygen and two hydrogen atoms. Water molecules have several unusual properties; one is that they can absorb a lot of heat.

The Ocean Acts as a Heat Reservoir

About 70 percent of the surface of Earth is covered by ocean, and some of the ocean is very deep—up to seven miles deep in some places. That's a lot of water on our planet, and water soaks up heat like a sponge. All that water in the ocean helps keep our planet from getting too hot because water is able to absorb a lot of the Sun's heat energy without much change in temperature. The ocean keeps our planet from getting too hot for life to exist. The ocean also helps keep our planet from getting too cold. When the air is cold, such as during winter or at night, energy stored in the ocean is released back into the air. Compared to other matter, it takes a long time for water to heat up, and it also takes longer for it to cool down. The ocean is called a heat reservoir because it stores so much heat energy. The ocean is what keeps temperatures on our planet moderate.



The ocean covers 70 percent of Earth's surface.

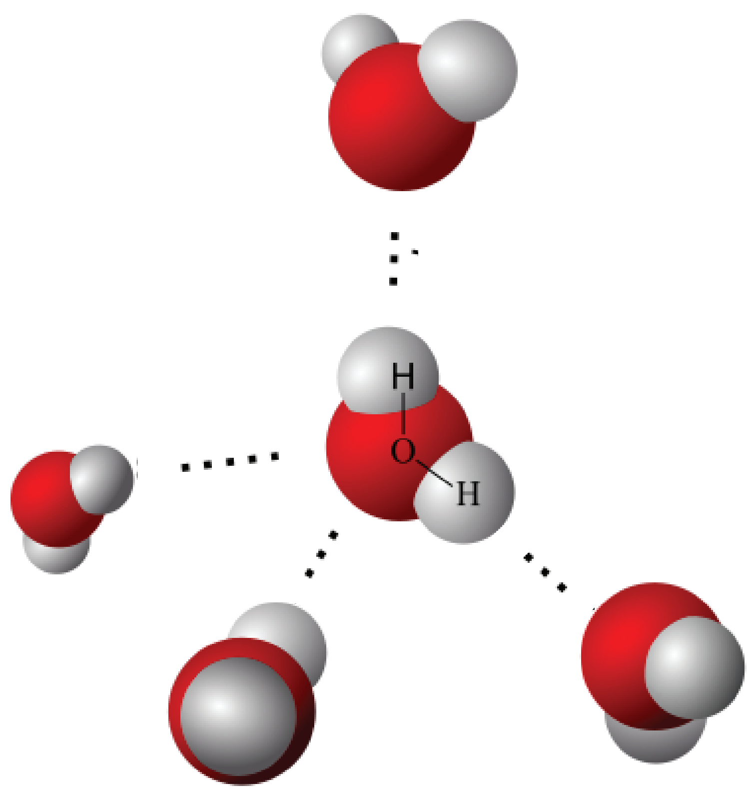
Water Molecules Absorb Heat Energy Differently Than Other Molecules Do

Water heats up and cools off more slowly than other kinds of matter, such as rock, even though rock can have about as many molecules in the same amount of space as water does. Water can absorb more energy without changing temperature because of the shape of water molecules and because water molecules stick together.

The shape of a water molecule helps it absorb a lot of energy before it really starts moving around and colliding into other water molecules. Rather than zipping off in different directions and colliding with other molecules when it absorbs heat energy, a water molecule first just starts wobbling in one place. The bonds between the hydrogen and the oxygen atoms in a water molecule are flexible. Most other kinds of molecules don't have these flexible bonds and can't wobble in place in the way that water molecules can.

Water molecules are also really attracted to other water molecules. This is because there are bonds called hydrogen bonds between water molecules. These bonds aren't as strong as the bonds that hold the atoms in a molecule together, but they still keep water molecules from separating from one another easily. It takes a whole lot of heat energy before the water molecules separate and can start zipping around.

One water molecule is attracted to four other water molecules. The hydrogen bonds are flexible, but strong and make water molecules stick to one another. This is why it takes a lot of energy to make water boil. Liquid water molecules have to get unstuck to turn into a gas. Water also forms in drops (raindrops or faucet drips) because of this sticky quality. Water's unusual properties, especially absorbing great amounts of heat, help keep your body (also about 70% water) and our planet cool.



Name ________________________________ Date ____________________

Explaining the Difference between London and Voronezh

London is near the ocean. Voronezh (Vuh-ROH'-neesh) is not near the ocean.

The chart shows average temperatures in each city in the summer and winter.

Location	Average winter temperature	Average summer temperature	Difference in average temp between summer and winter
London, England	6°C	18°C	12 degrees
Voronezh, Russia	11°C *below zero*	22°C	33 degrees

How can the ocean affect temperatures in London? Use evidence to back up your explanation.

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Name ______________________________ **Date** ____________________

Daily Written Reflection

Why do scientists use models?

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Make a drawing if it helps you explain. Label your drawing.

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Name ______________________________ **Date** ____________________

Earth Is Heated Unevenly

- The Sun heats Earth unevenly.
- Places near Earth's equator are generally warmer than the poles.
- Places near Earth's equator change less in temperature from winter to summer than places near the poles do.
- When it's summer north of the equator, it's winter south of the equator. When it's winter in the north, it's summer in the south.

Name ______________________ Date ______________

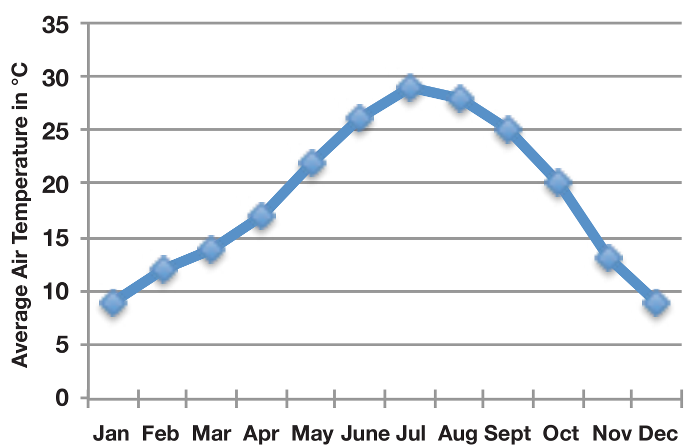
Mystery Locations

Mystery #1: Which is Bakersfield, California, and which is Morro Bay, California?

Location G is ______________________.

Location H is ______________________.

Location G



What evidence did you use to solve the mystery of location G?

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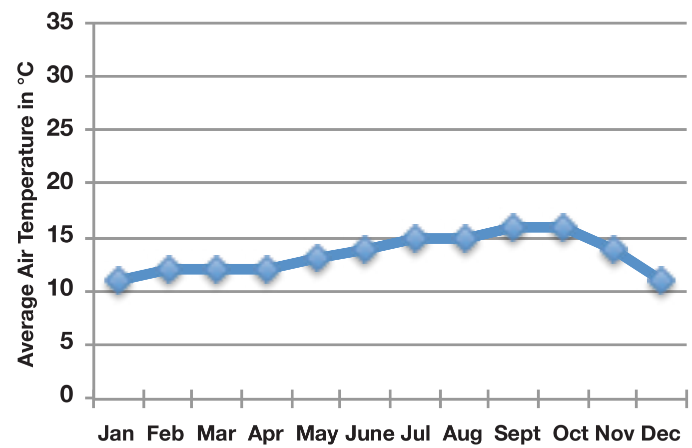
Location H



What evidence did you use to solve the mystery of location H?

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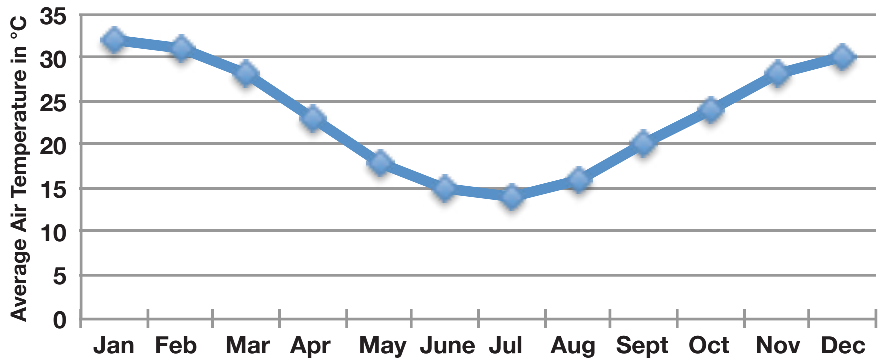
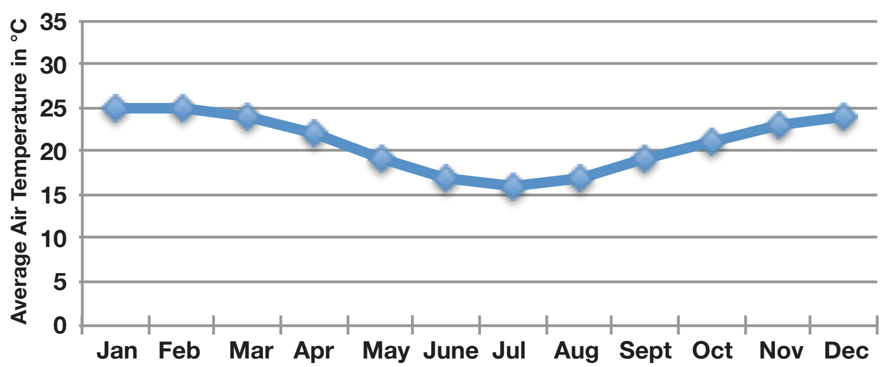
Name ________________________________ Date ____________________

Mystery #2: Which location is Singapore; which is Noosa Heads, Australia; and which is Birdsville, Australia? Explain your answers on the opposite page.

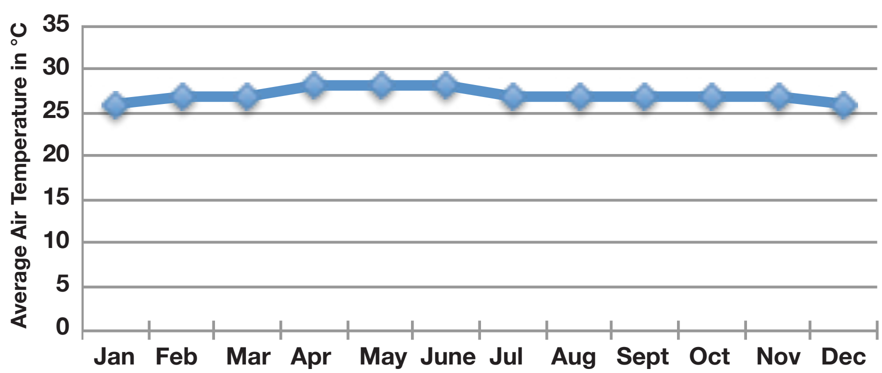
Location X is ________________________________



Location Y is ________________________________



Location Z is ________________________________



Name ____________________________________ Date ______________________

Mystery Locations (continued)

What evidence did you use to solve the mystery of location X?

What evidence did you use to solve the mystery of location Y?

What evidence did you use to solve the mystery of location Z?

Name ________________________________ Date ____________________

Daily Written Reflection

What did you discover about molecules and heat energy from the simulations and activities that we have done so far?

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Make a drawing if it helps you explain. Label your drawing.

Name ______________________________ Date ____________________

Daily Written Reflection

Write what you have learned so far about the density of different liquids.

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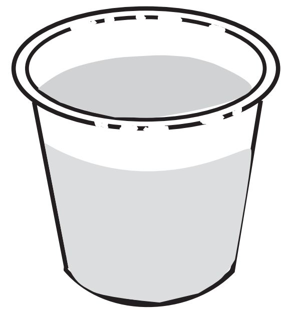
Make a drawing if it helps you explain. Label your drawing.

Name ________________________________ Date ____________________

A Cup of Water

This is a cup of freshwater at room temperature. What are two ways you could make this water denser?



Be sure to use the words *dense* and *molecules* in your explanation.

Name ______________________ Date ______________

Balloon Simulations

Substance in balloon	Substance in tank	Prediction	Why do you think that?	Result	Why do you think it did that? Use the term *dense*.

Name ______________________________ **Date** ____________________

Daily Written Reflection

When freshwater from a river flows into the ocean, do you think the freshwater flows to the bottom, stays near the top, or do the fresh and salt water mix together quickly? Why do you think that?

Make a drawing if it helps you explain. Label your drawing.

Name ____________________________________ Date ____________________

Daily Written Reflection

Write one or two sentences showing what you learned in the last session about currents when you investigated the Model Ocean stations.

Make a drawing if it helps you explain. Label your drawing.

Name ______________________________ Date ____________________

Investigating Currents

MODEL OCEAN # Room-Temperature Water in Tank +	PREDICTION Predict how the current will move (up, down, on surface, or across bottom). Explain your idea and use the word *density*.	RESULT Did you make a current? Describe its movement. Explain why you think that happened and use the words *density* and *molecules* in your answer.	DRAW RESULTS Use a colored pencil to show the current's movement.
1 Hot Freshwater Cup			
2 Cold Freshwater Cup			
3 Blue Ice in Basket			
4 Room-Temperature Saltwater Cup			

Name ______________________________ Date ____________________________

Investigating Currents (continued)

5 Cold Saltwater Cup	6 Hot Saltwater Cup	7 Room-Temperature Freshwater Cup	8 Room-Temperature Saltwater Tank + Cold Saltwater Cup	9 Room-Temperature Saltwater Tank + Hot Freshwater Cup

Name ____________________ Date ____________

Daily Written Reflection

What is the most interesting or surprising thing about ocean currents that you have learned so far in this unit?

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Make a drawing if it helps you explain. Label your drawing.

Name ________________________________ Date ____________________

Revised Ideas, Part 1

Write about how differences in water density cause some ocean currents. (Use what you know about density, molecules, and currents in your explanation.)

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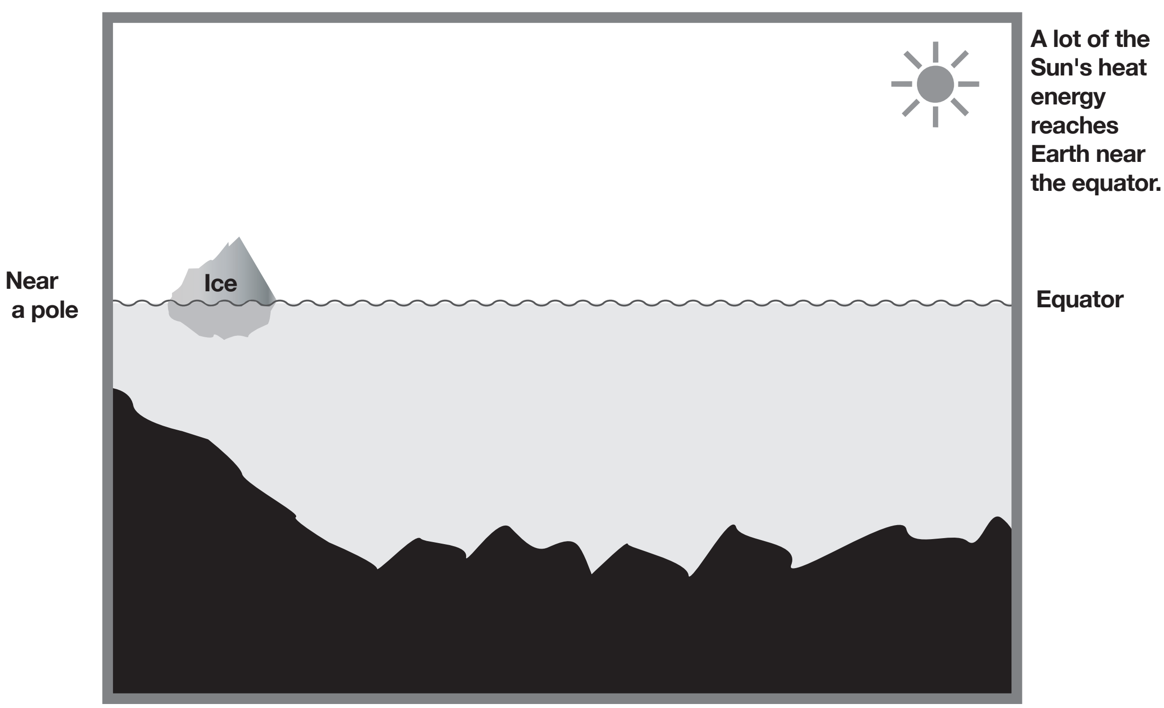
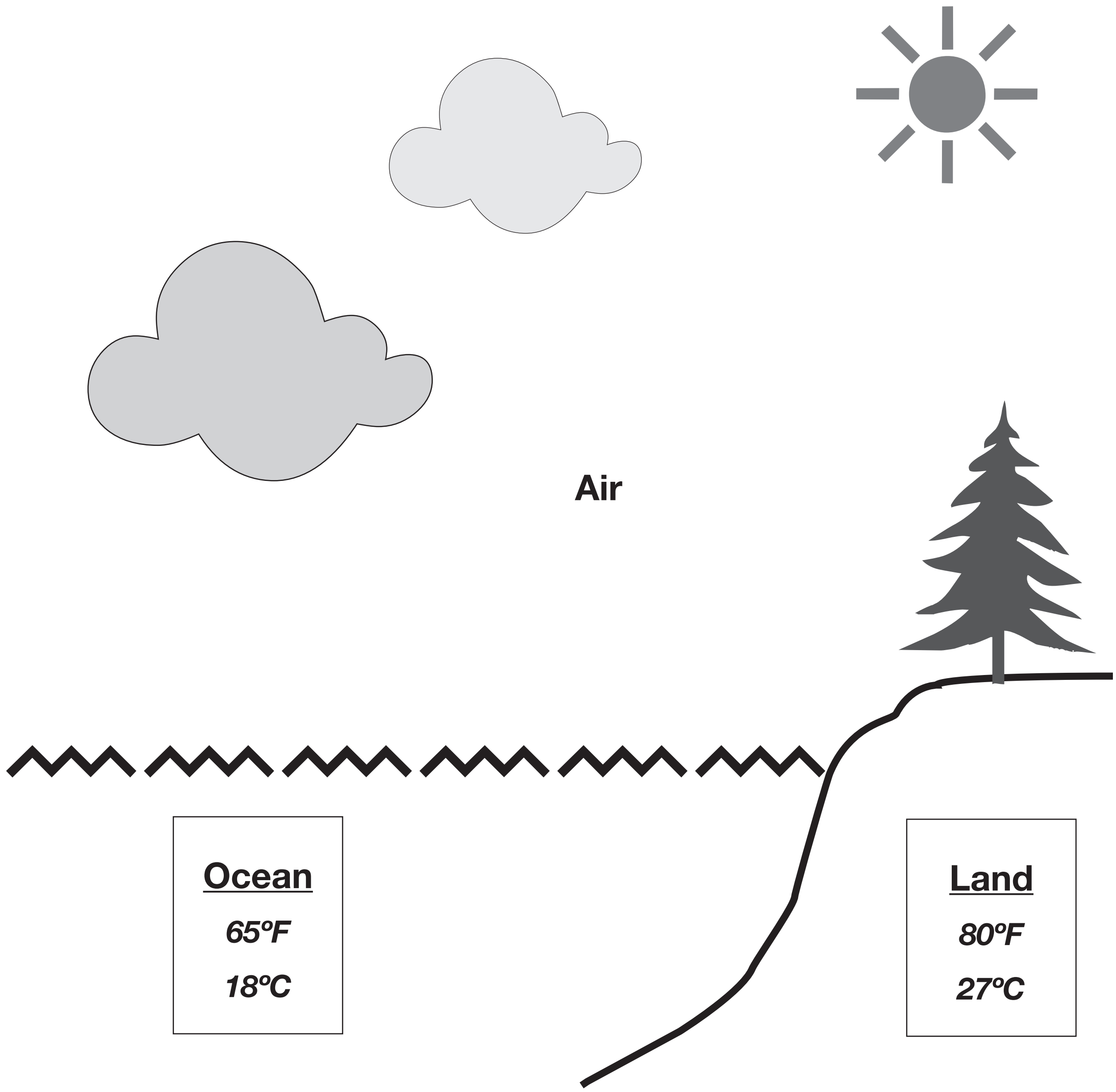
Imagine you are "underwater" looking sideways at the water in the ocean and could see currents moving at the poles and at the equator. Draw arrows on the diagram to show one place where water would sink, another place where it would rise, and any other water movements you want to include. Add labels to help explain why the water moves the way it does.



Name ______________________________ Date ____________________

Day

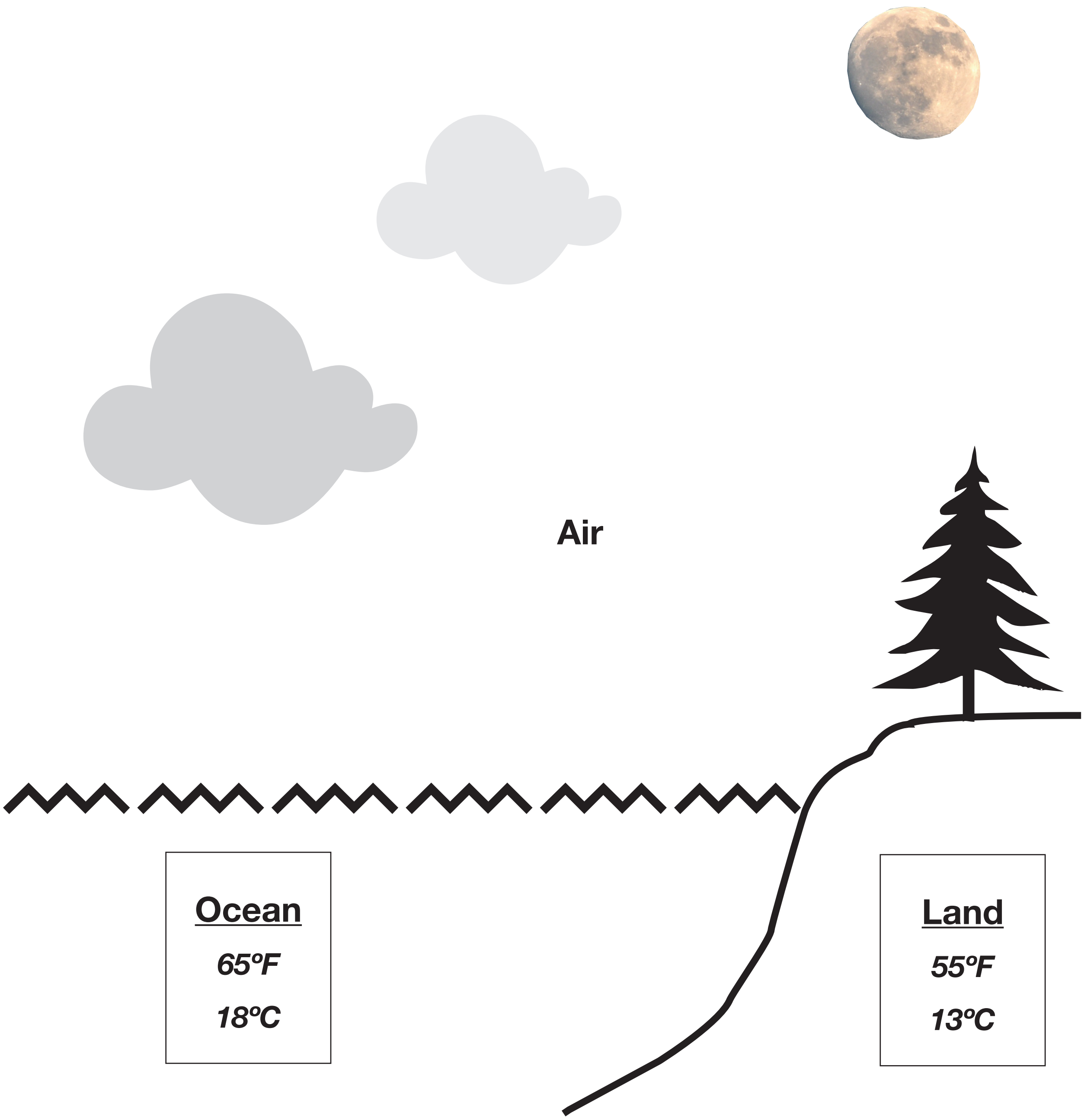
Predict how air will move in this area during the daytime.



Name ________________________________ Date ____________________

Night

Predict how air will move in this area during the nighttime.



Name ___________________________ Date ___________________

Daily Written Reflection

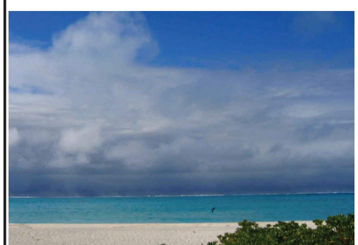
What similarities do you think there are in how water and air move around Earth? Why do you think this is so?

Make a drawing if it helps you explain. Label your drawing.

Name ______________________________ Date ____________________

The Puzzling Case of the Daily Rains

Solve the mystery by explaining what's going on in each picture. Use what you know about molecules, density, evaporation, and condensation.

Morning: Clear 	
Afternoon: Clouds 	
Late Afternoon: Rain 	
Evening: Clearing 	
Night: Clear 	

Name ________________________________ Date ____________________

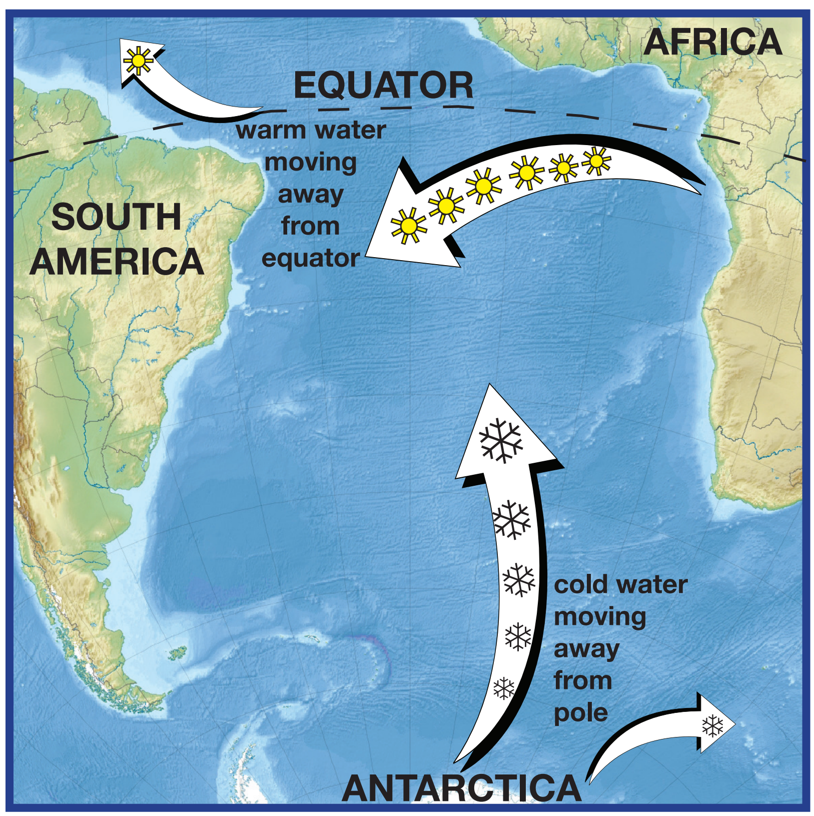
How the Ocean and Atmosphere Move Heat Energy around Earth

Hot Equator, Cold Poles

At the North and South Poles, average air temperatures are between 60° Celsius (°C) *below* zero and 0°C. The coldest air temperature ever recorded at the South Pole was 82°C *below* zero, cold enough to freeze spit even before it hits the ground! At the equator, average air temperatures are much warmer—about 27°C or about 81° Fahrenheit. The ocean and the atmosphere are responsible for distributing heat energy around Earth, which evens out temperatures. If it weren't for this, the poles would be even colder, and the equator would be even hotter.

Air Currents and Ocean Currents Spread Heat Energy

Air currents move warm air from the equator northward and southward, spreading the heat toward both poles. Near the equator, the sun's rays are most direct, so a large amount of heat energy from sunlight reaches Earth and warms the air there. As the air warms, the molecules in the air move faster and get farther apart from one another. This makes the air less dense. This less-dense air rises and flows in currents high in the atmosphere away from the equator. Wind patterns move air around Earth, carrying warm air to places that would otherwise be cool and cool air to places that would otherwise be warm.



Ocean currents also spread heat energy. Currents on the ocean's surface move cold water from near the poles toward the equator and warm water from near the equator toward the poles. When warm water is carried by currents to a cold place, the warm water gives off heat energy to the atmosphere, making the air in that place warmer. Deep ocean currents also carry cold, dense water away from the poles. As this cold water gets farther from the poles, it starts to warm up, and then rises as it becomes less dense.

How the Ocean and Atmosphere Move Heat Energy around Earth (continued)

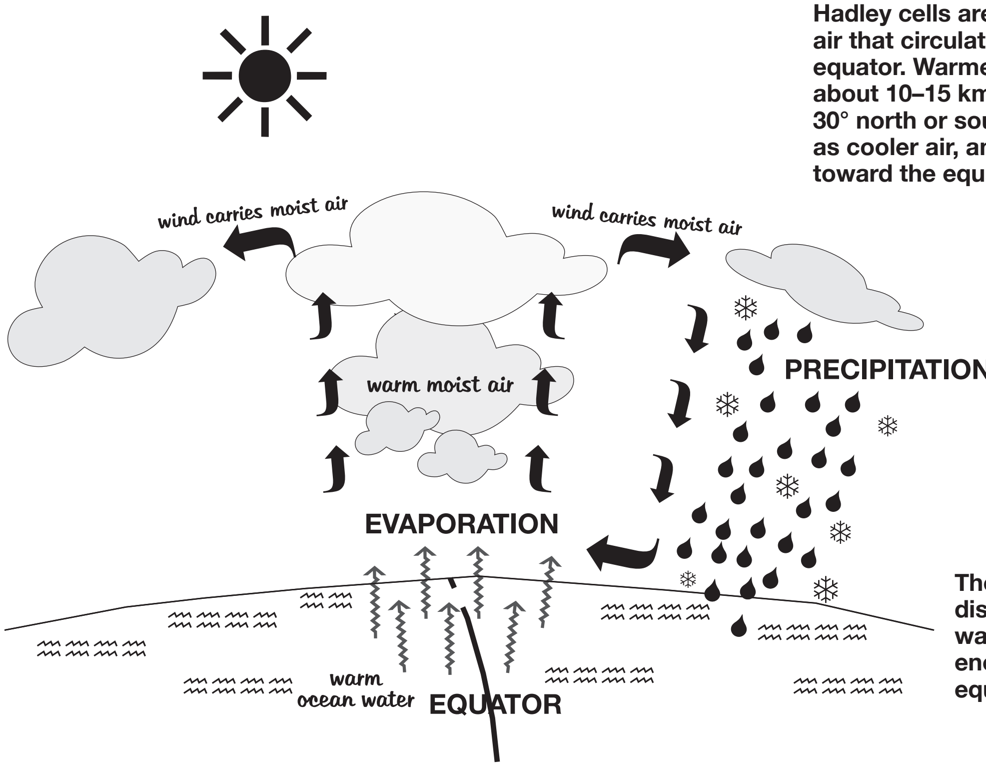
The Water Cycle Spreads Heat Energy

When heat energy from sunlight hits the ocean, liquid water molecules at the ocean's surface move faster, and can evaporate into water vapor. A large amount of heat energy from sunlight hits Earth near the equator, so a lot of ocean water evaporates here. Once water molecules have evaporated, they become part of the warm air above the ocean. This warm air rises higher and higher in the atmosphere. But temperatures are cooler higher in the atmosphere. As the temperatures cool, the water molecules in the air slow down and don't move as far apart from one another. If they cool enough, the water vapor molecules will condense back into liquid water drops, which form clouds.

A lot of this water falls as precipitation (rain) right back at the equator. On the other hand, a lot of this water is also moved by air currents and then falls as rain in other places on Earth. In fact, most rain that falls on land, originally evaporated from the warm ocean near the equator.

When water evaporates, heat energy moves from the ocean into the atmosphere with the water vapor molecules. Winds move this heat energy (contained in the water vapor molecules) around the world. When the water vapor cools and condenses, the heat energy that was originally in the ocean is then released into the atmosphere. In this way, the water cycle spreads heat energy from the equator to other parts of Earth.

Hadley cells are currents of air that circulate near the equator. Warmed air rises up about 10–15 km, flows about 30° north or south, descends as cooler air, and flows back toward the equator.



The water cycle distributes both water and heat energy from the equator.

Name ______________________________ Date ____________________

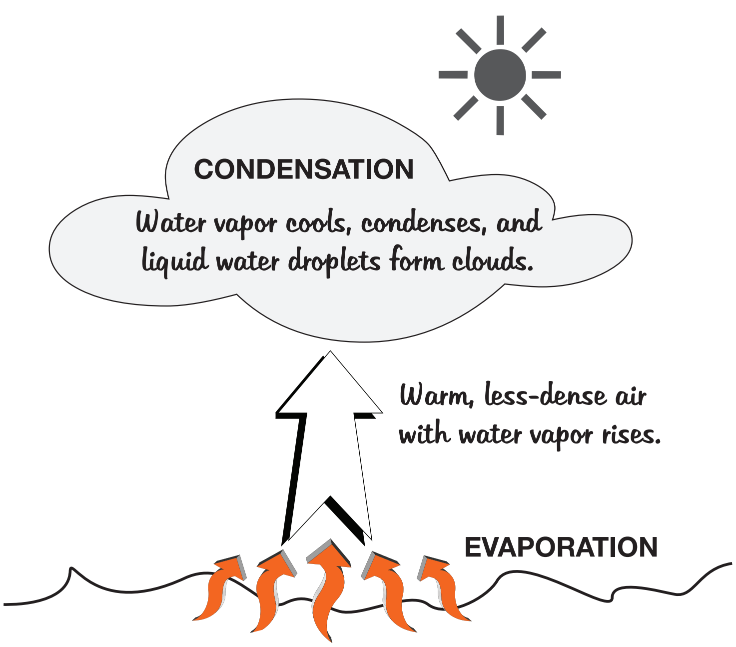
Hurricanes: Storms from Warm Ocean Water

Powerful Storms

Wind moving faster than a speeding racecar blows down trees and rips apart buildings. Rain dumps from the sky and floods streets. Huge waves from the ocean crash in over the land. A hurricane has hit with its destructive power. A hurricane is a large storm that forms over the ocean and can then move to land, causing terrible damage.

Damage caused by Hurricane Katrina (2005) in Biloxi, Mississippi. More than 1,800 Americans died, and severe damage occurred across states near the Gulf of Mexico and along the Atlantic coast.

How Clouds Form from Ocean Water

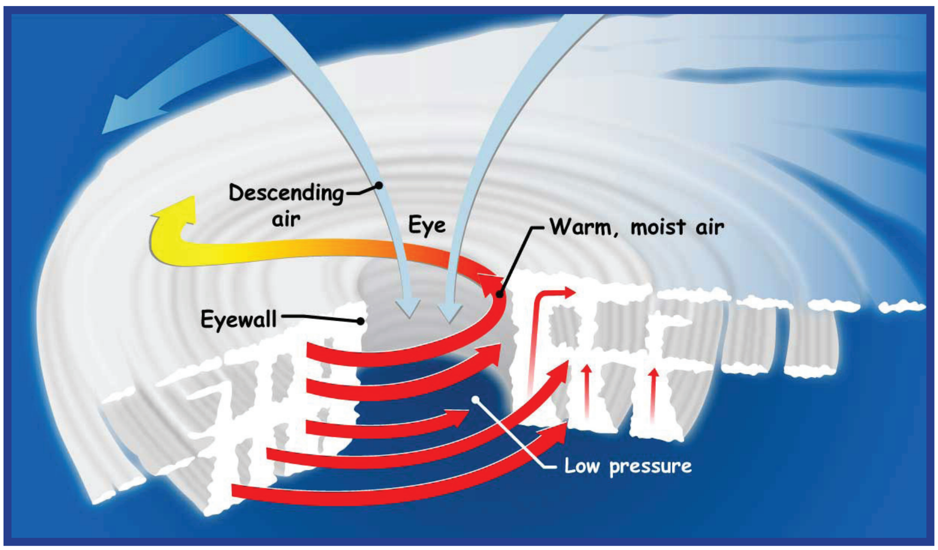


When heat energy from sunlight hits the ocean, liquid water molecules at the ocean surface move faster, and can evaporate into water vapor. Energy from the warm water and from the Sun warms the air above the water. The warm air is less dense than the colder air above it, so the warm air rises. The warm air rises, carrying water vapor with it. Higher in the atmosphere, the temperature is much colder. As the water vapor moves higher with rising air, it also becomes cooler. As the water vapor molecules cool, they slow down and don't move as far apart from one another. The water vapor then condenses or freezes to form clouds of liquid water droplets or ice crystals.

Hurricanes: Storms from Warm Ocean Water (continued)

Hurricanes from Very Warm Ocean Water

Hurricanes form in areas near the equator when there is a large patch of especially warm water at the surface of the ocean. This very warm ocean water powers a cycle that pumps water vapor, rising air, and energy up into the atmosphere above the ocean. Huge clouds form that can be over twice as tall as Mount Everest—that's 20 kilometers, or 12 miles high! The growing hurricane begins to spin because of the way Earth spins. The hurricane can move across the ocean and reach land. Hurricanes can cause huge destruction when they reach land, but they also get less powerful as soon as they are over land. Without ocean water below to continue fueling the cycle of rising water vapor and warm air, hurricanes over land quickly break up.

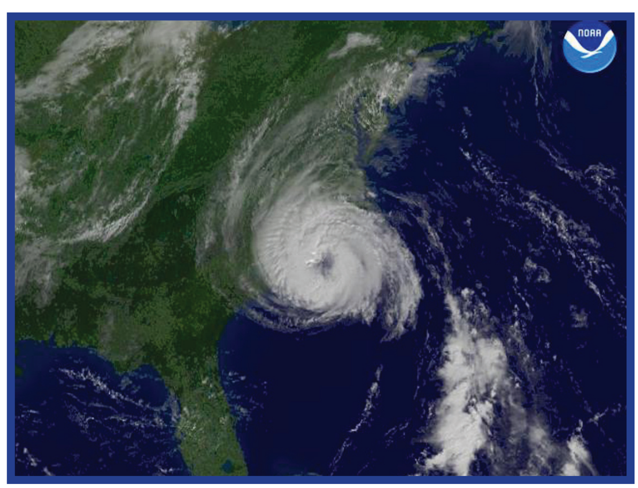


(*left*) Hurricanes (or tropical cyclones or typhoons) are destructive storms with winds greater than 74 mph that form over warm ocean water near the equator. The center (eye) is relatively calm, but the outer bands of clouds spin either counterclockwise (north of the equator) or clockwise (south of the equator).

(*below*) Hurricane Ophelia (2005) from 22,000 miles above Earth's surface as tracked by the GOES weather satellites.

Predicting Hurricanes

Predicting when hurricanes will form can help cities and towns prepare and keep people safe. Scientists carefully study the temperature of ocean water where hurricanes often form in order to predict when these dangerous storms will occur. Scientists can also predict the direction the hurricanes will move and where they will reach land so that they can warn people who are in the path of the hurricane's destructive power.



Name ______________________________ Date ____________________

Daily Written Reflection

What do you think might cause the currents at the surface of the ocean? What could move water at the surface of the ocean?

Make a drawing if it helps you explain. Label your drawing.

Name ______________________________ **Date** ____________________

Surface Currents in a Model Ocean

Each rectangle below shows a top view of your group's tank. As you take turns creating surface-current patterns, use one rectangle and some arrows to record one pattern for each group member. Label drawings with group members' names and mark their straw's location.

______________________________	______________________________
______________________________	______________________________

Name ________________________________ Date ____________________

Nautical Challenge Route Map A

Name ________________________________ Date ____________________

Nautical Challenge Route Map B

DEEP CURRENTS

Water rising to surface

Water sinking

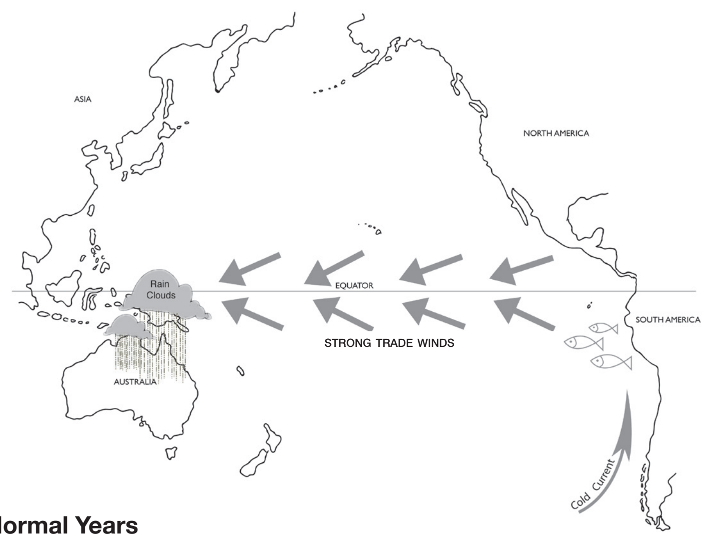
Name ________________________________ Date ____________________

El Niño: Wind, Water, and Wild Weather

Wild Weather

Along the west coast of South America in an area that is normally desert, extreme rainfall causes floods and mudslides that destroy houses, roads, and bridges. And fish that were abundant seem to disappear from the ocean. In normally moist parts of Australia, almost no rain comes. Crops dry up and die. Huge fires burn. Unusual weather happens all over the world, from Africa to North America to Antarctica. A year like this could be caused by El Niño, a change in the trade winds that happens once every three to seven years. How can a change in the winds have such devastating effects all over the world?

Trade Winds in Normal Years



Normal Years

During normal years, trade winds over the Pacific blow steadily from South America west across the ocean toward Australia. This pushes warm, moist air and warm surface ocean currents toward Australia. The east coast of Australia has a lot of rain because of this. As long as the trade winds blow in the usual way, this rain supports many farms as well as large forests.

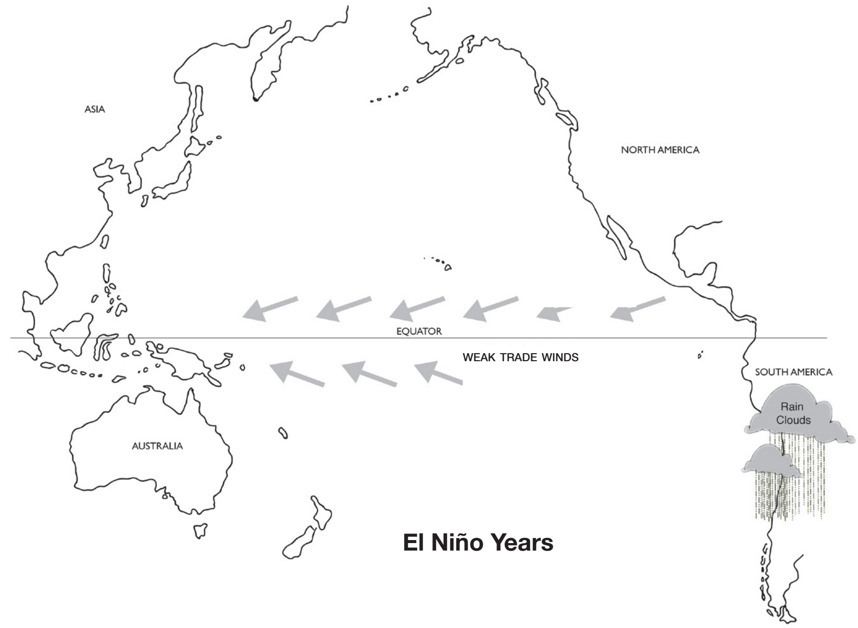
Ocean currents caused by the trade winds bring cold water from near Antarctica northward along the west coast of South America. This cold ocean water helps create a dry, desert climate in much of western South America. Cold ocean waters also mean more nutrients, providing a daily feast that can support abundant sea life. As long as the trade winds blow in the usual way, the ocean near South America is one of the richest fisheries in the world.

Trade Winds in El Niño Years

In El Niño years, trade winds that normally blow from South America toward Australia become weaker or stop blowing. Decreased trade winds mean much less warm, wet air gets pushed toward Australia. Ocean surface currents flowing toward Australia slow down, so much less warm ocean water gets pushed in that direction. This affects living things, such as coral and fish, along the Great Barrier Reef near Australia. The changed air and ocean currents mean less water vapor is in the air around eastern Australia, so much less rain falls. Farm crops dry up, and fires may burn the dry forests. This can be hard on the people who live there, and on the plants and animals in the forests.

El Niño: Wind, Water, and Wild Weather (continued)

Ocean surface currents bringing cold water from the Antarctic along the west coast of South America decrease. Fish that count on this nutrient-rich water for food have trouble getting nourishment in the warmer waters, so not nearly as many fish can survive. People that make their living by fishing have a hard time. Birds and other animals that eat fish may die off or move to other areas as they follow the colder currents and look for food.



With warmer water at the ocean's surface near South America, more evaporation happens and more rain falls on what is normally a desert. Floods wash away soil and plants and damage cities. During El Niño, weather patterns change all over the world. Many places get more rain than usual, causing floods. Many other places get less rain than usual causing fires and loss of crops. People, plants and animals feel the effects of El Niño.

Worldwide El Niño Effects 1982–83

1. Drought and fires
2. Failed crops, starvation
3. Drought, fresh water shortages
4. More tropical cyclones
5. Fishing industry devastated
6. Coral reefs die
7. Flooding, mudslides
8. Torrential rains cause death, property damage
9. Floods, landslides
10. Drought, disease, malnutrition

Earth's Ocean and Atmosphere Are Connected

El Niño is an example of how changes in the atmosphere cause many other changes—changes in air currents, ocean currents, and weather throughout the world. And all of these changes affect living things. Earth's ocean and atmosphere are connected in many ways. The more we learn about how the ocean and atmosphere are connected, the more we can predict and plan for what may happen.

Name ______________________________ Date ____________________

Upwelling Zones and El Niño

Ocean Water is Not All the Same

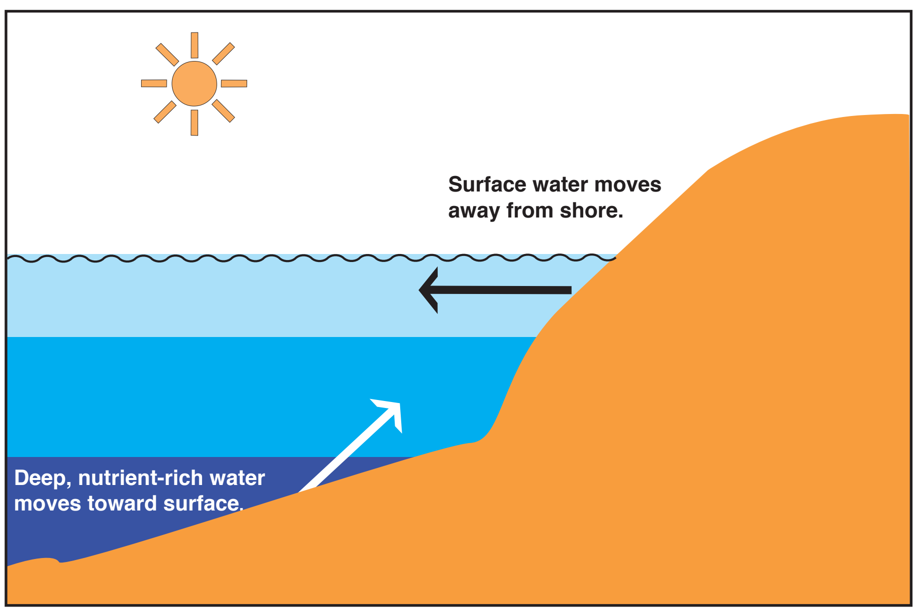
There are layers in the ocean made of water of different temperatures. Usually, there is a layer of warmer water at the surface, with layers of colder water below. This is because cold water is more dense than warm water. The surface water is warmed by the Sun, but down below the water remains cold and dense.

Cold water usually has more nutrients in it than warm water. Many nutrients in the ocean come from organisms that die. They start to decompose and then sink into the deeper, colder water. The nutrients from the dead organisms are trapped in the cold, dense water far below the warm water at the surface.

Upwelling Zones

Living things in the ocean need nutrients to survive. Many organisms in the ocean also need sunlight to make their own food. The problem is that the sunlight is at the surface, but the nutrients are in the colder, deeper layers. For many living things, it would be great if some of the colder, nutrient-rich water came up near the surface. And that's exactly what does happen in a few special places in the world. These places are called **upwelling zones.**

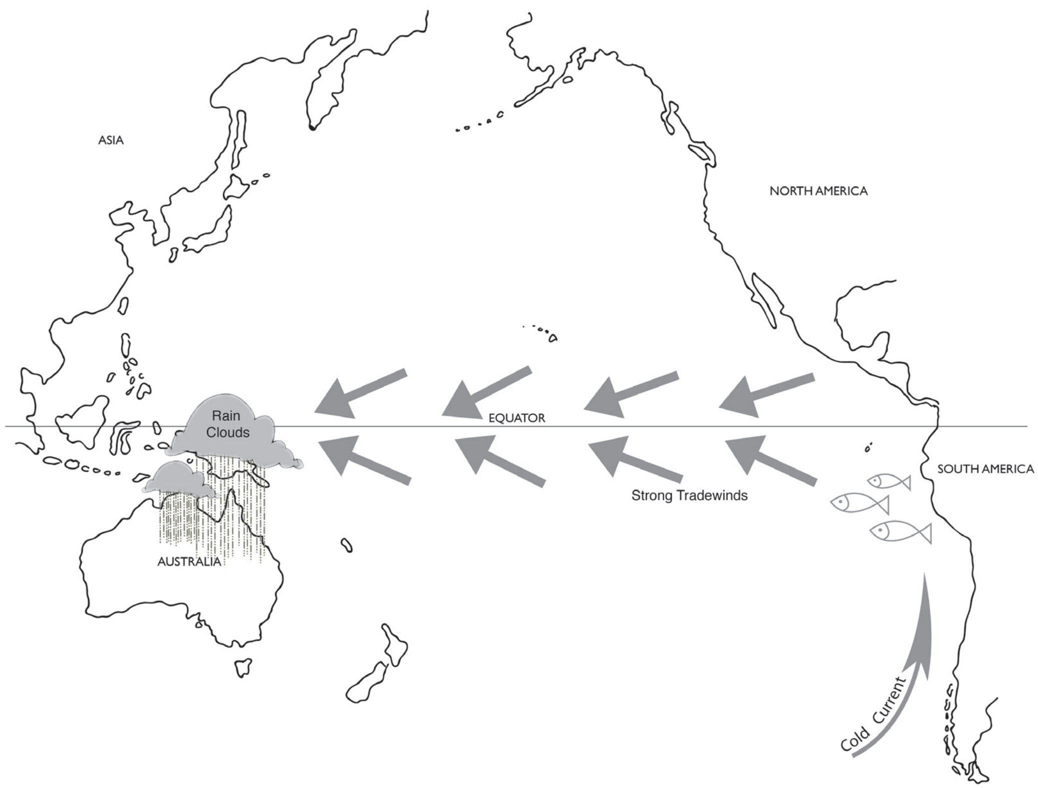
In upwelling zones, the wind and the spinning Earth work together to move the warmer surface waters away, and then colder water comes up to the surface to replace it. Cold water brings a lot of nutrients up to the surface where more organisms can use them. Upwelling zones are rich with all kinds of living things. A lot of the seafood we eat comes from upwelling zones.



One upwelling zone is in the Pacific Ocean near South America. Normally, the trade winds blow steadily from South America toward the west along the equator toward Australia. They move the warmer surface water away from South America, and the colder, deeper water comes closer to the surface there. With all those nutrients and plenty of sunlight, the surface ocean water along the west coast of South America becomes full of living things.

A Change in the Trade Winds

Every three to seven years, the trade winds weaken or even reverse direction. Because of this change, the ocean currents that usually move water away from South America across the Pacific weaken, too. This is called an El Niño. Scientists don't completely understand what causes an El Niño, but they are getting very good at predicting when one might happen. It is very important to be able to predict El Niños because they can have huge effects on people and other living things around the world.



During an El Niño, upwelling of cold water near South America decreases. The warmer surface water is no longer blown west, away from South America. The cold water stays deeper below the surface. This means the nutrients are trapped below in the colder, more dense water. During an El Niño year, there are far fewer organisms in the area because there are not enough nutrients in the water to feed them. Many organisms, including fish of all sizes, birds and sea mammals who eat the fish, leave the area in search of places with colder, more nutrient-rich water. Fewer organisms mean that people who fish can't catch enough to earn a living.

Name ______________________________ Date ____________________

Daily Written Reflection

What are two things you have learned so far in this unit that you think would be important and/or interesting for other people to know? Why are these ideas interesting or important to you?

Make a drawing if it helps you explain. Label your drawing.

Name ______________________________ Date ____________________

Revised Ideas, Part 2

Choose three of the six diagrams. For each one you choose, explain how it illustrates (*1*) what makes air and water move and (*2*) how the ocean and atmosphere are connected.

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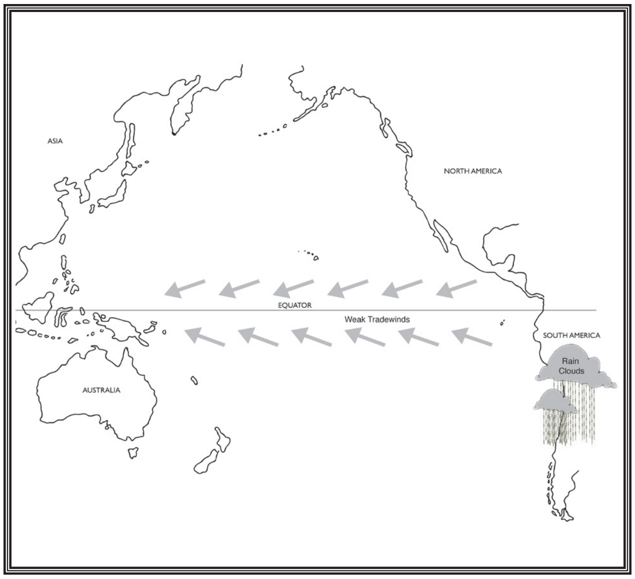

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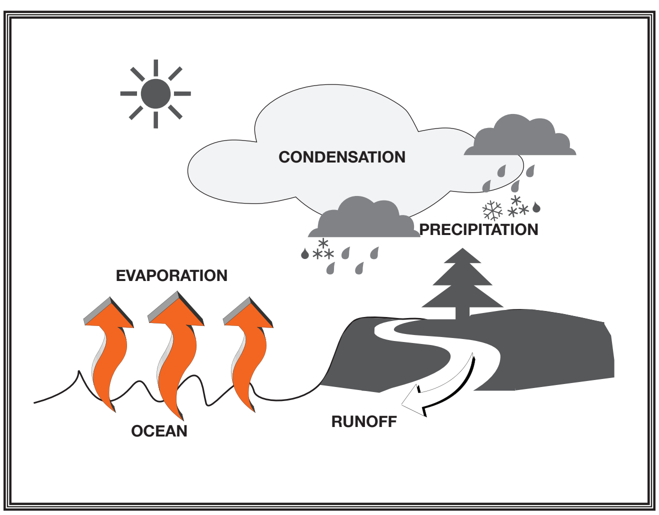

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Revised Ideas, Part 2 (continued)

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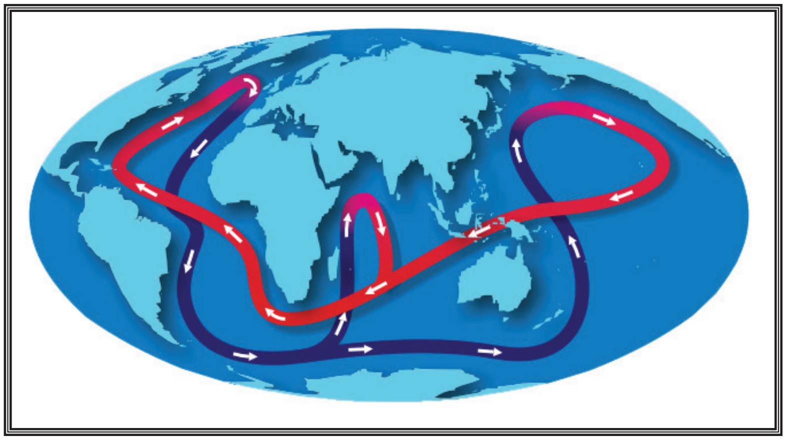

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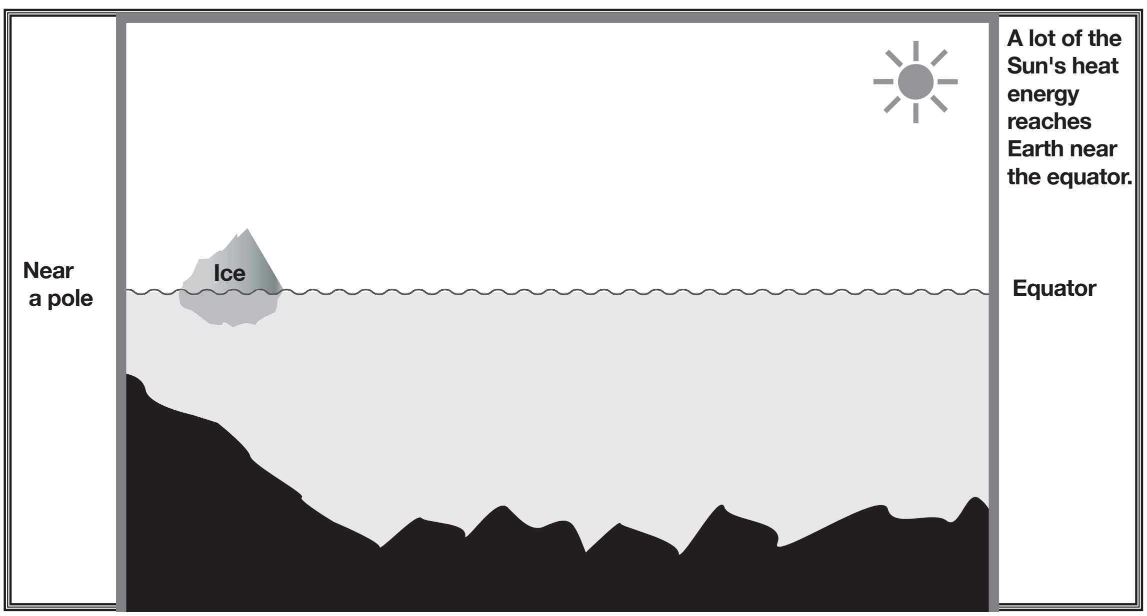

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Revised Ideas, Part 2 (continued)

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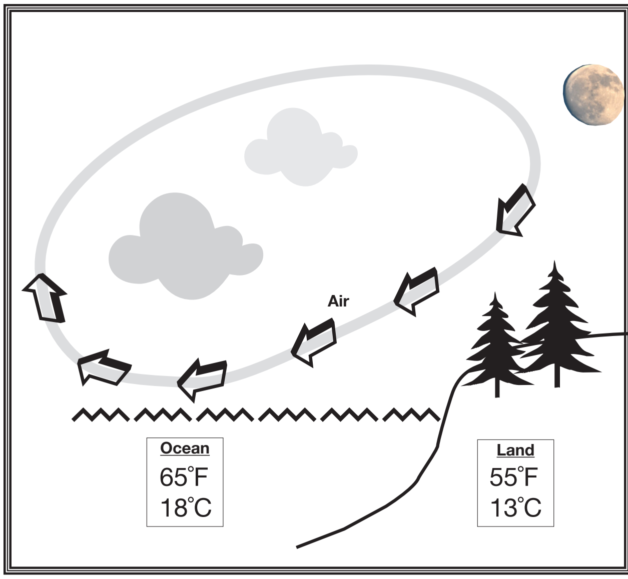

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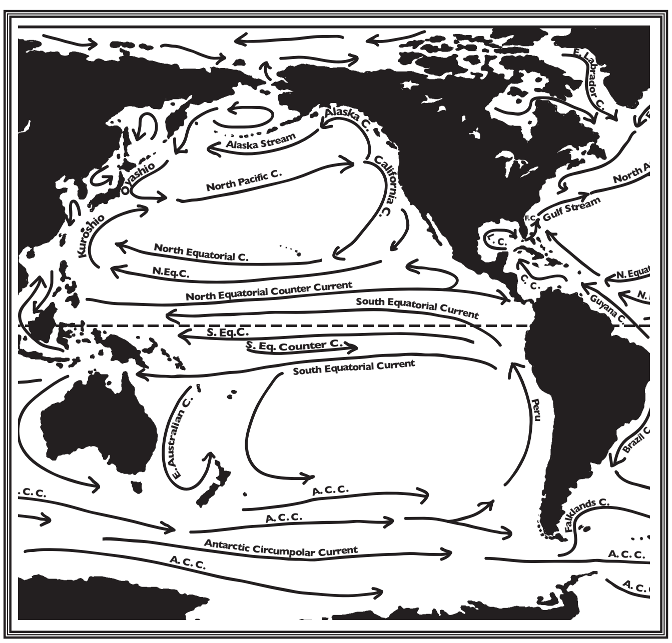

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