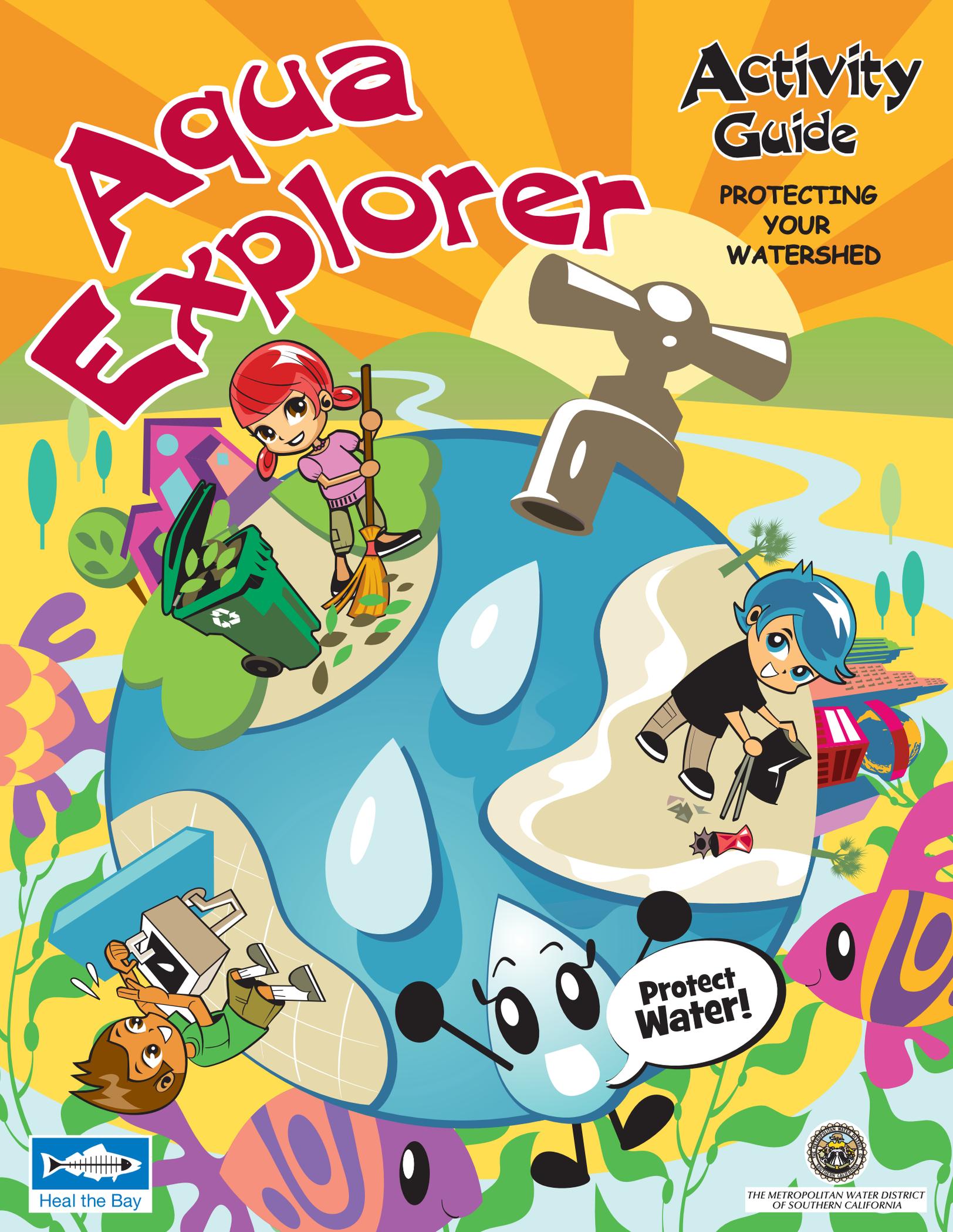


Aqua Explorer

Activity Guide

PROTECTING
YOUR
WATERSHED



THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Take Action & Get Involved!

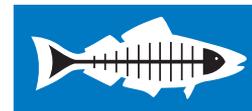
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(Try to find the Heal the Bay logo hidden on each page)

California Coastal Cleanup Day

Come to any one of the many cleanup sites in Los Angeles County on the third Saturday of September and you won't be alone. You will be a part of a global effort—500,000 people strong—to prevent marine pollution. Check our website for a cleanup site near you www.healthebay.org/ccd or call **800.HEAL BAY (800.432.5229)**.



Heal the Bay



Get in touch with the many marine animals and plants that make the Santa Monica Bay their home at the Santa Monica Pier Aquarium, located beach-level at the east end of the Santa Monica Pier.



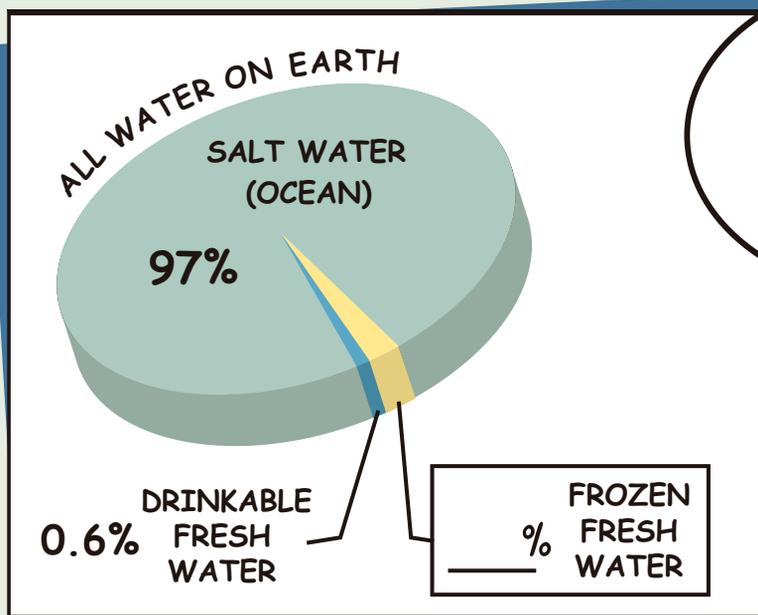
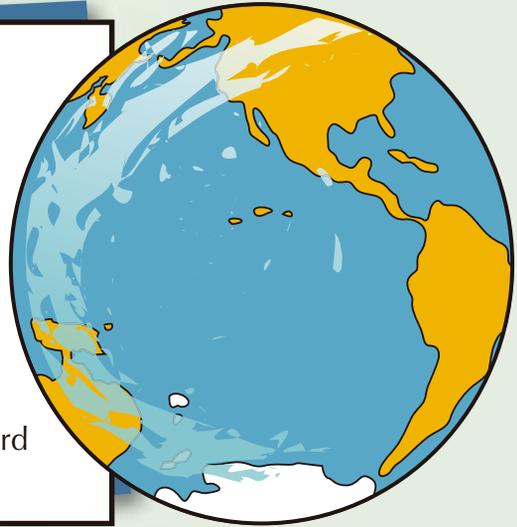
1600 Ocean Front Walk (Under the carousel) Santa Monica Pier
For more information call 310.393.6149 or visit www.healthebay.org/smpa



Water World

Water is Everywhere

It covers the majority of the earth's surface (75%) and makes up the majority of the human body (70%). All of this water sounds promising; however, 97% of the earth's water is contained in the ocean as salt water, leaving only 3% as fresh water. Of that 3% fresh water, 2.4% is frozen in ice sheets, leaving less than 1% of our planet's fresh water in lakes, rivers or underground. That's less than 1% of fresh, drinkable water for over 6 billion people on earth. We can't afford to waste a single drop!



This pie chart represents water on earth. Fill in the missing percentage.



Why is the Ocean Important?



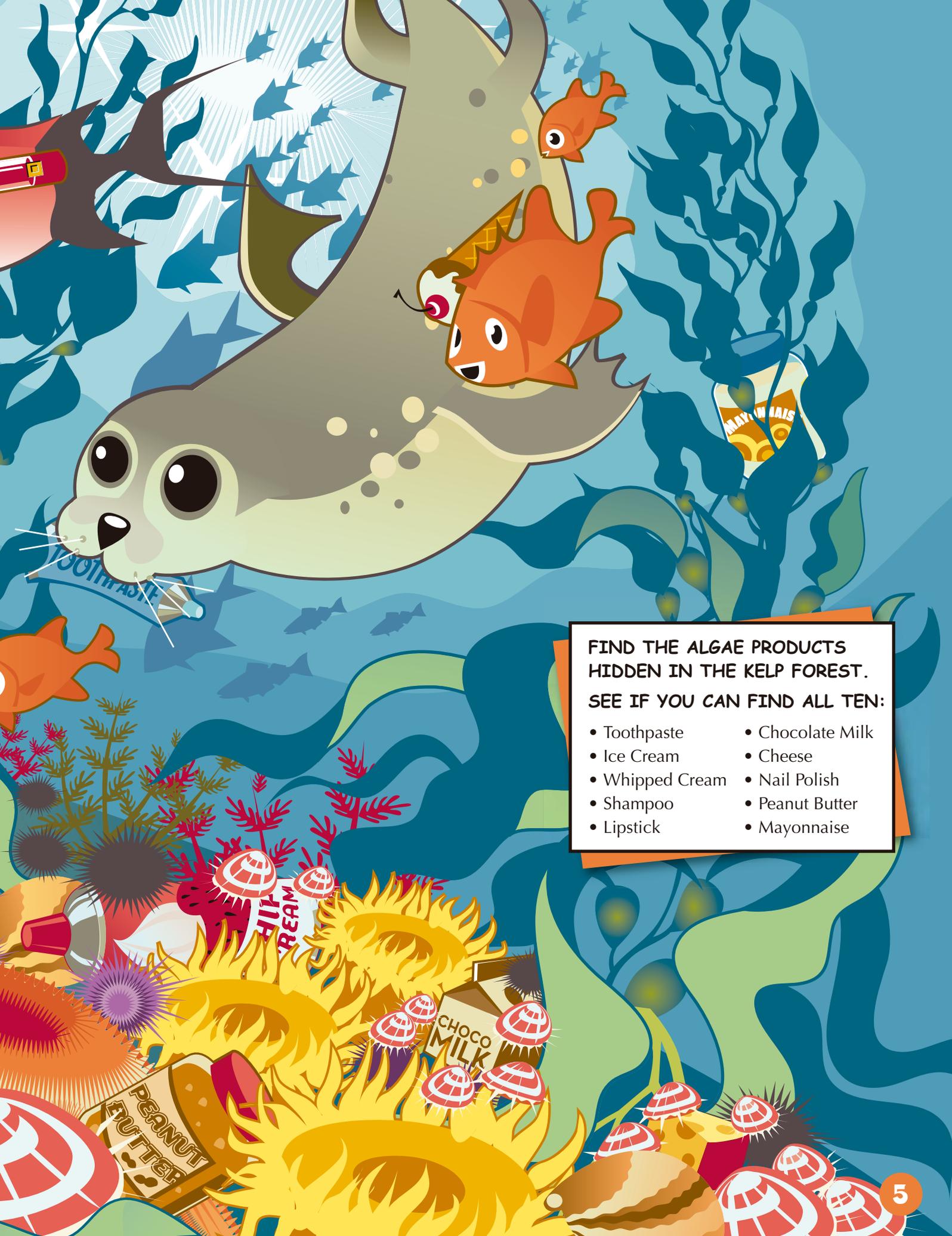
It's a funny!
What does seaweed
do in an emergency?
It calls for
KELP!!!



Water is important because every living thing on earth needs it to survive. The ocean is the largest body of water and provides food, animal habitats, energy, transportation and recreation. The underwater kelp forests along our coast are home to 550 different types of fish. This kelp forest habitat provides food and shelter for other animals besides fish and humans. The kelp, which is a type of algae, produces oxygen for us to breathe and we harvest it to use in hundreds of products we eat or use everyday. Algae ingredients you might find in your food are alginate, agar, carrageenan, and even beta-carotene. Algae is used to help hold ingredients together and to make them thicker and creamier.



Heal the Bay



**FIND THE ALGAE PRODUCTS
HIDDEN IN THE KELP FOREST.
SEE IF YOU CAN FIND ALL TEN:**

- Toothpaste
- Ice Cream
- Whipped Cream
- Shampoo
- Lipstick
- Chocolate Milk
- Cheese
- Nail Polish
- Peanut Butter
- Mayonnaise



Water stored underground is called groundwater. It supplies water to springs and wells.



Water on the Move

The Three Forms of Water

All water on earth is connected and constantly moving. It can be found throughout the world in three different forms. To find out what the forms are, unscramble the words below. Then draw a line from the word to its definition.



— — — — —
D L O I S



— — —
A S G



— — — — —
U I D L Q I

- Rain, like the water flowing through our rivers and in our oceans.
- Snow and ice, like on the top of Mount Everest.
- Steam, like when you boil water in a pot or kettle.

The Water Cycle

Water moves from humans, animals and plants, through creeks, rivers and streams, out to oceans and lakes. It ventures up to the sky forming giant clouds and then falls back to the earth as rain and snow. This movement of water is a continuous cycle with no beginning and no end. It's called the Water Cycle! To see how it's connected, number the parts of the water cycle in the watershed picture with the terms below.

- 1 Evaporation** - The process, caused by heat, where liquid is transformed into gas.
- 2 Condensation** - The process, caused by cooling temperatures, where clouds form from gas changing to a liquid.
- 3 Precipitation** - When clouds get too heavy with liquid they produce rain, snow, sleet, or hail.
- 4 Infiltration** - The process where water soaks into the ground and helps to replenish our ground (drinking) water.
- 5 Runoff** - Water that doesn't infiltrate into the ground flows down to streams, creeks and rivers and eventually to the ocean.

What is a Watershed?

Everyone lives in a watershed. In fact, you are sitting in one right now. A watershed is an area of land that drains downward through a series of creeks and rivers into a common body of water such as a lake or ocean. Watersheds can vary greatly in size and shape.

It's important to understand that wherever you live, the beach, the city, or the mountains, you are connected to the ocean! That means it's up to **YOU** to help keep your watershed clean. By stopping pollution and picking up trash, you show pride in your neighborhood and respect for the ocean. It's easy, everyone just has to do their part.

You and Your



LEGEND

- Ballona Creek watershed
- Dominguez Channel watershed
- Los Angeles River watershed
- San Gabriel River watershed
- Santa Monica Bay watershed
- Freeway
- Waterway (river, creek or channel)

Watershed



SAN GABRIEL MOUNTAINS

Let's find your watershed

- 1 Use the watershed map to find the name of your city. If you can't find your city, use a freeway or a nearby city to help find your location.
- 2 Put an **X** with a marker or pencil on the location of your city and write it in the space below.
My city is: _____
- 3 Notice the color of where your city is located. Go to the legend and use that color to determine the name of your watershed.
My watershed is: _____
- 4 Trace a line from your **X** to the nearest water way within your watershed. Follow that water way down to see which bay your watershed drains into.
My bay is: _____

As you can see, we're all in this watershed together. No matter where you live we all have an impact on the ocean.

Is Your Trash Go

The Storm Drain System

Most of Los Angeles is covered with hard solid surfaces like parking lots, streets, and buildings. When rain falls on any of those surfaces it can't soak or infiltrate into the ground. Water that doesn't infiltrate into the ground is called **runoff**. Runoff water can gather very quickly and endanger our cities with floods. To prevent flooding and help protect our cities, drains on our streets and a maze of underground pipes was created, called the **storm drain systems**. Through this system water is moved from our streets to the ocean.

When you walk down the street you may have noticed openings in the curb. These openings are called **catch basins** and are the entrance to the storm drain system. The problem is that it's not just water running off our streets; the water picks up trash like food wrappers, cigarette butts, animal waste, and chemicals along curbs and sidewalks. This trashy water enters a catch basin and will then either empty out into the ocean or onto the beach through a concrete pipe called an **outfall**.

Rain isn't the only water that pushes trash into the ocean. On a sunny day, things like washing our cars on a street, over-watering our yards, or hosing down sidewalks are all activities that create **dry weather runoff**.

What About Sewage?

The storm drain system is separate from the sewage system. Sewage is dirty water that comes from a toilet, sink or any drain from the inside of a building or home. Unlike the sewage system which does clean the water, storm drain run off rarely gets cleaned before entering the ocean.



ing to the Ocean?

Circle the catch basin, outfall, and runoff in the picture.

You can make a difference. Help keep the storm drains clean!

Hey beach goers, find and highlight the definitions of the words in bold.

Heal the Bay

Journey to the Ocean

START

GROUNDWATER PATH

STORM DRAIN PATH

Fall in Park. Slide to the groundwater path.

Fall on concrete. Slide to the storm drain path.

Land in grass and soak into the ground.

Absorbed by tree roots.
-1 pollution point



Filter down through soil, gravel and clay.

Bubble up through floor of natural creek. Slide to ocean.

Concrete river channel covers river spring.
+1 pollution point

Illegal dumping in the creek.
+2 pollution points

Enter underground aquifer. Move forward 2 spaces.

Leave aquifer through natural spring

Natural spring adds clean water. Move forward 1 space.

Sea turtle mistake popped balloons for food. **+2 pollution points**

Leaky oil tank pollutes groundwater. Lose a turn. **+2 pollution points**

Recharge drinking water.
-1 pollution point

ENTER OCEAN

An aquifer is an underground area of rock, sand, or gravel that can hold water. Groundwater is held within an aquifer.



DIRECTIONS

You're a rain drop in the water cycle and you're trying to reach the ocean. Choose a rock, button, or other object to use as a game piece. Take turns flipping a coin to move along the paths. HEADS = 1 space, TAILS = 2 spaces.

Keep track of your pollution points along the way. When you reach the ocean, add up your points. The player with the **LEAST** amount of pollution points is the winner. Which path do you think is less polluted?



POLLUTION POINTS			
PLAYER 1		PLAYER 2	
(+)	(-)	(+)	(-)
TOTAL		TOTAL	



Pollution has

1 MISTAKEN IDENTITY:

When trash, like plastic bags and balloons, end up in the ocean, turtles, fish, birds and other marine life mistake it for food. If they eat enough plastic, their stomachs can fill up, tricking them into feeling full. Animals stop eating when they think they're full and can starve to death.

Ocean Food Imposters

Solve the problems to find the ocean food imposters. Place the letter on the line of the matching number.

$$\begin{array}{r} 8 \\ \times 2 \\ \hline \end{array} = P$$

$$\begin{array}{r} 3 \\ \times 4 \\ \hline \end{array} = L$$

$$\begin{array}{r} 6 \\ \times 5 \\ \hline \end{array} = F$$

$$\begin{array}{r} 7 \\ \times 3 \\ \hline \end{array} = N$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array} = S$$

$$\begin{array}{r} 4 \\ \times 6 \\ \hline \end{array} = G$$

$$\begin{array}{r} 8 \\ \times 7 \\ \hline \end{array} = Y$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline \end{array} = R$$

$$\begin{array}{r} 5 \\ \times 3 \\ \hline \end{array} = A$$

$$\begin{array}{r} 39 \\ \times 1 \\ \hline \end{array} = M$$

$$\begin{array}{r} 10 \\ \times 2 \\ \hline \end{array} = B$$

$$\begin{array}{r} 6 \\ \times 9 \\ \hline \end{array} = O$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline \end{array} = I$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array} = T$$

$$\begin{array}{r} 198 \\ \times 0 \\ \hline \end{array} = C$$

- 20 15 12 12 54 54 21 81

- 16 12 15 81 49 64 0 20 15 24 81

- 81 49 56 4 54 30 54 15 39



Consequences



2

ENTANGLEMENT:

Animals can get tangled up in trash like six-pack rings, ribbons and fishing line, which makes it hard to swim, fly, and eat. Imagine how you would feel to be trapped in trash. Try this game to find out. Place a rubber band on



your left thumb. Pull it around the back of your left hand across your knuckles and loop it onto your pinky finger. Now using your left hand only, try getting the rubber band off. How many people in your class were able to get untangled? Were you?



3

HABITAT DESTRUCTION:

In order to control and prevent flooding, natural creeks and rivers were replaced by concrete channels. The channels took away the natural habitat from animals living on land and in the water. The animals are left without shelter or shade. Since there is nothing to absorb the water in a concrete channel, the water flows much faster which increases the danger to both humans and animals.

4

BIOACCUMULATION:

Would you ever eat pesticides or cleaning products? NO WAY, that would make you sick. BUT, when those chemicals end up in the ocean fish and birds eat them by accident. The chemicals build up as they move up the food chain through a process called bioaccumulation.



What Can You Do?

Slash Your Trash

- 1 Don't litter. Put trash in the can.
- 2 Recycle and turn trash into cash. To find out how, visit www.consrv.ca.gov or call (800)-RECYCLE.
- 3 Create less trash. Bring your own bag to the market.
- 4 Reuse! Refill your water bottle and use grocery bags over and over.
- 5 Buy recycled products. Look for this symbol. 

Carlos has a can he wants to recycle. Help him get to the recycle bin by correctly answering the questions along the way.



START

Most of the trash in the ocean is plastic.

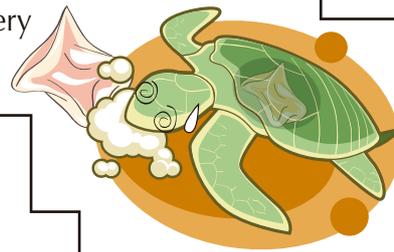
FALSE

TRUE

FALSE

TRUE

Marine animals can mistake plastic grocery bags for food



21 billion plastic water bottles are thrown in the trash each year.

FALSE

TRUE



TRUE

In some parts of the ocean there is six times as much plastic as plankton.

FALSE





14 billion pounds
of trash is dumped
into the ocean
each year?

T

F

TRUE FALSE

California recycling
centers pay 5¢ for
every bottle or
can you recycle.



TRUE Plastic trash in FALSE
the ocean never
truly biodegrades.

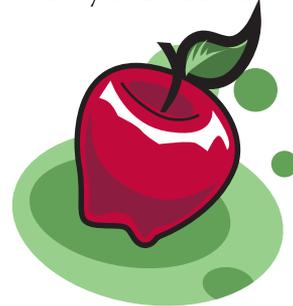
FALSE It is okay to throw
apple cores on the
ground because
they are natural.

TRUE

It is better to bring
a reusable grocery
bag from home than
to use paper or plastic.

TRUE

FALSE



What Can You Do?

There are 9.5 million people in Los Angeles County and if everyone picked up just one piece of trash it would make a HUGE difference.

The 3 R's Reduce Reuse Recycle

What are the 3 R's?

The 3 R's stand for reduce, reuse, and recycle. You can do many things to prevent pollution and save energy. Following the 3 R's makes it easy.

Reduce: It is the best choice! Do you really need a plastic bag from the grocery store? Save resources and just say, "No thanks!"

Reuse: Bring a bag from home to the store and use it over and over again.

Recycle: We hear about Recycling all the time, but it's not always the best choice. Recycling requires a lot of energy and not all materials can be recycled. Keep in mind, recycling is still better than throwing paper, a can or bottle in the trash.

What is Recyclable?



Most communities recycle clean, dry paper, aluminum cans, plastic bottles and glass. So look for a blue bin or a can with the chasing arrow symbol. If you can't find one call the County's recycling hotline at **1 (888) CLEAN LA**, or visit **www.888CleanLA.com**.

Do Your Part!

Connect the R to it's definition and then to it's example.

RECYCLE

Use Less —Always the best choice



Cloth Bag

REDUCE

Takes energy, but better than throwing a can or bottle away.



Just say, "No Thanks!"

REUSE

Use it again and again.



Aluminum Can



RECYCLING CENTER
888-CLEAN LA

Cha-ching \$\$\$.
Did you know you could make money by recycling? Take your bottles & cans to a recycling center and make 5¢ per item!

Save water!

Conservation



Tips to Save Water and Keep it Clean

- Turn the water off while you brush your teeth.
- Take a 3-minute shower instead of a 5-minute shower.
- Turn off the water while soaping up your hands.
- When cleaning up your front yard, use a broom instead of a hose to prevent leaves, pesticides, and fertilizers from going down the storm drain.
- Before you throw anything on the ground, think about whether you would want to see it in your drinking glass (chewed gum, banana peels, motor oil -- yuck!).
- Check your house and school for leaky faucets.

Water Consumption Chart

WHAT YOU DO	WATER IT TAKES	HOW MANY TIMES A DAY?	*TOTAL GALLONS
Flushing a toilet	1.6 gallons		
Shower <i>avg. shower length is 8 (min.)</i>	5 gallons/min. <i>(old shower head)</i>		
	2.5 gallons/min. <i>(new shower head)</i>		
Taking a bath	40 gallons <i>(if tub is full)</i>		
Brushing teeth	3 gallons <i>(water left running)</i>		
	1 gallon <i>(water turned off)</i>		
Washing dishes	10 gallons		
Watering lawn	40 gallons		
Washing a car	40 gallons		

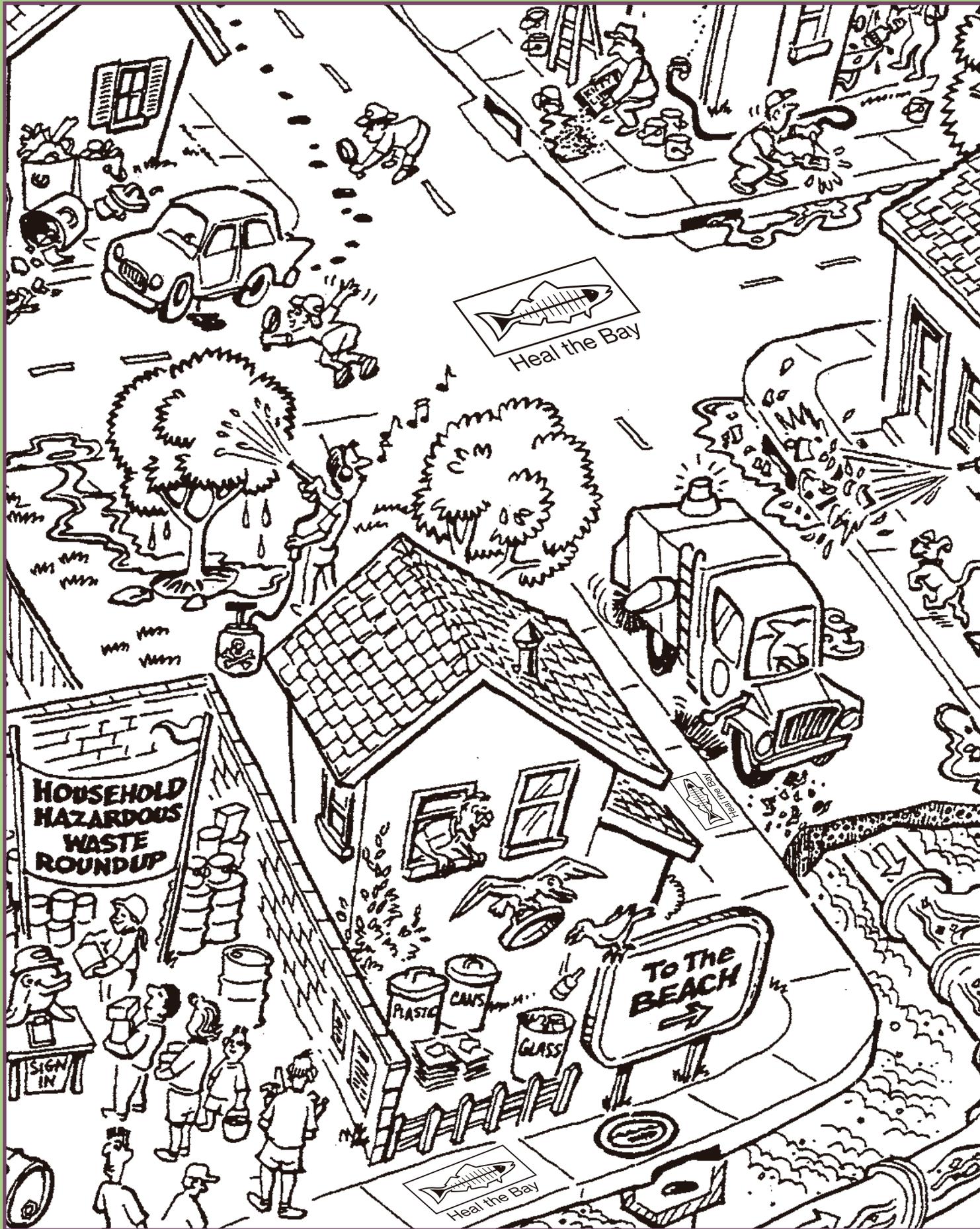
Water Use

The average person uses 120 gallons of water each day. Use the water consumption chart to find out how much water you use in one day.



Water Wise Chart adapted from the Waves, Wetlands, and Watersheds: California Coastal Commission Science Activity Guide www.coastforyou.org

* WATER IT TAKES X HOW MANY TIMES A DAY = TOTAL GALLONS





It's Everybody's Ocean

Get out your coloring markers and add some color to this page. As you color, circle whoever is keeping the ocean healthy and cross out whoever is not. Here's some things to think about:

- How does trash harm animals?
- How did the trash get there?
- Did the trash float in?
- Did the trash get dumped in?



Brought to you by:

**PROJECT
Pollution
PREVENTION**

POLLUTION

- A** Clogged storm drain
- B** Aluminum cans and plastic bottles
- C** Releasing helium balloons
- D** Plastic six-pack rings
- E** Toxic chemicals
- F** Throwing trash on the ground
- G** Hosing off driveways and sidewalks
- H** Washing the car in the driveway
- I** Used Motor Oil
- J** Pet waste

SOLUTION

- ___ 1. Clean up after your pet.
- ___ 2. Use a broom to sweep trash, not a hose.
- ___ 3. Report full catch basins to an adult.
- ___ 4. Buy non-toxic alternatives instead.
- ___ 5. Recycle used motor oil at gas stations.
- ___ 6. Pop balloons and put them in the trash.
- ___ 7. Don't litter, put trash in a trash can.
- ___ 8. Recycle them so they can be used again.
- ___ 9. Cut them up before you throw them out.
- ___ 10. Wash it on your lawn.



Match the 10 pollution problems with the correct solution. Place the letter from the pollution on the line next to the solution. Then circle the pollution and solution in the picture.

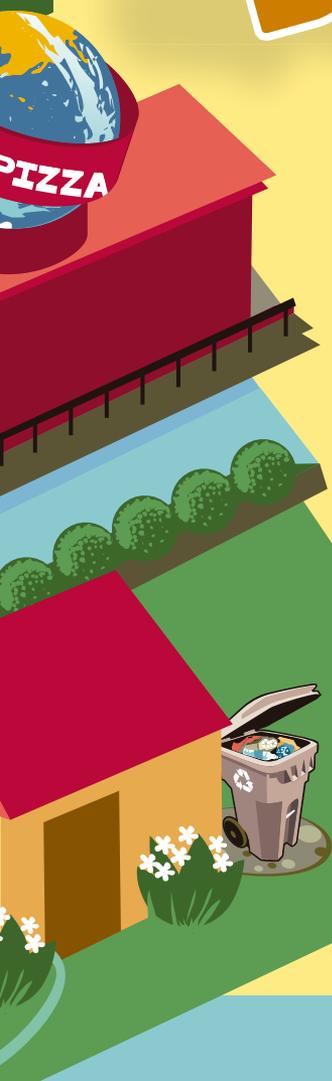
10 Ways to Heal the Bay



Heal the Bay Can Help You Keep Our Ocean Clean!

Have a free speaker come to your class to talk about ocean pollution
www.healthebay.org/education

Find out about fun family events like beach cleanups & aquarium festivals at
www.healthebay.org/calendar



California Coastal Cleanup Day is a program of the California Coastal Commission. For additional Coastal Commission programs visit their website at www.coast4u.org.

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 Produced by: Susan Bremer-Rossow

For a classroom set please call (800) Heal Bay ext. 146 or download the guide at www.healthebay.org/ccd.



THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Caution!

Don't be a Water Waster

Check all the ways you will help your family save water.



ESTIMATED GALLONS SAVED

1. Always turn off the water while brushing teeth.

8 gallons per day

2. Take 3 – 5 minute showers.

2.5 gallons per minute

3. Never flush tissues or other trash down the toilet. Use the wastebasket instead.

1.6 gallons per flush

4. Run the dishwasher only when it is full.

2 - 4.5 gallons per load

5. Turn off the faucet between rinsing dishes.

5 gallons per day

6. Water the yard only twice a week and never when it rains.

80 gallons per day

7. Use a broom instead of a hose to clean driveways and sidewalks.

Up to 20 gallons per minute

8. Keep water from running down the street when washing the car, and when watering the yard.

Up to 20 gallons per minute

9. Water the yard early in the morning when it is cooler and less windy.

20-25 gallons per day

10. Fix any leaking faucets or toilets.

15-20 gallons per faucet; 30-50 gallons per toilet



THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA



Heal the Bay

bewaterwise.com