



2026 Marsh-In Summer Camp Activity Packet



Marsh-In Summer Camp is a yearly tradition at the Don Edwards San Francisco Bay National Wildlife Refuge that began in 1980; this is our 47th year! This year's camp theme is Water!

We have put together this activity packet that anyone can participate in, even if you can't join us in person! You can use these exciting science experiments, crafts, and activities to explore and learn about how you are connected to your watershed and the nature around you.

We would love to see your completed projects! You are welcome to email any photos, stories, or comments about the activities to summercamp@sfbayws.org. You can also tag the San Francisco Bay Wildlife Society on [Facebook](#) and [Instagram](#), @sfbayws. We would love to share your creations!

Sincerely,
The Summer Camp Team



Don Edwards San Francisco Bay Wildlife Refuge



What is a Watershed?



Learn about and protect our watershed.

A watershed is an area that drains water into a creek, river, lake, wetland, bay, or groundwater aquifer. All the water from rain and irrigation that flows over land (called runoff) goes into storm drains, creeks and rivers that flow into San Francisco Bay. All the runoff from your home, yard, and neighborhood flows to a local creek and into the Bay, potentially passing through the Refuge on its way! You can make a model of a watershed and study how water flows!

Materials

- Parchment paper or wax paper
- Tape
- Washable markers
- Spray bottle or cup of water
- Paper and pencil for observations



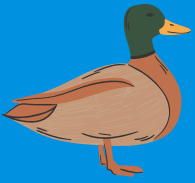
Steps

1. Gently crumple a piece of parchment paper or wax paper, then slightly unfold it so you can see wrinkles in it. This represents the land, covered in hills, mountains, valleys, and cities.
2. Tape the four corners of the paper to a flat surface. Warning! This might get messy, so tape it outside or on a tray if you can!
3. Using a blue washable marker, trace all of the high points, which is where water flow will begin. This represent our hills and mountains being rained on.
4. Use a spray bottle or flick water from your hand onto your paper. Watch carefully! The ink will start to travel like it's raining! Write some observations. Did the water end up where you expected? The big puddles now on your sheet represent lakes, ponds, bays, or the ocean!
5. Repeat steps 1-4 on a new piece of paper, but add in a source of pollution by drawing splotches in a different color. This might represent oil or trash that ends up in our waterways. How much was your watershed polluted? Where did the pollution end up? How can we protect our watersheds?



Let's find out the name of the watershed YOU live in!

With a parent/guardian's permission, visit mywaterway.epa.gov and enter your zip code. The name of your watershed will be on the right! You will use the name of your watershed on page 18 for your Watershed pledge!



What is a Habitat?

Watersheds support many habitats. Explore the habitats of the Refuge!



A **habitat** is another name for where an animal lives. For example, a creek can be a habitat or a tree can be a habitat. There are four characteristics that can be found in all habitats! Unscramble the words to reveal these four things that animals need to survive.

O F O D → _____
T A R E W → _____
H T E R L S E → _____
A C E P S → _____

Habitats

There are many different habitat types at the Refuge! Each supports different plants and animals. Here's four you are likely to see.

Mudflats



Mudflats may look empty, but the tides bring in nutrients that feed many insects and zooplankton! Shorebirds love to look for food here! This habitat is closest to the Bay.

Salt Marshes



These are coastal wetlands that are filled with seawater or drained depending on the tides. The endangered Ridgway's Rail and Salt Marsh Harvest Mouse live here.

Salt Ponds



Salt ponds are used to make salt that is used by humans. There are lots of brine shrimp in these pools, which are fed on by birds.

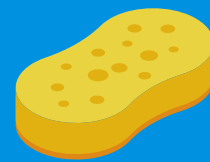
Slough



This habitat is where freshwater from creeks and rivers meet seawater from the tides. You may see harbor seals or bat rays swimming in the slough.



Tidal Marsh Filters



Understand how the tidal marsh habitat protects the Bay!

Working like a sponge, tidal marshes protect humans and nature by absorbing harmful stormwater pollution before it enters the Bay. The marshes also prevent flooding and provide habitat animals.

You can make a model tidal marsh using the steps below!

Materials

- Plastic bottle
- Scissors
- Nature items (leaves, soil, grass, rocks)
- A cup of dirty water
- Coffee filters, sponge, or cotton balls



Steps

1. Cut your plastic bottle so the top $\frac{1}{3}$ is removed. You may need an adult to help. This will act as a funnel. A soda or sports drink bottle are good options for this! Now, place your funnel (with cap removed) in the lower part of the cut bottle.
2. Go outside to collect your nature items. Think about what would make a good filter for water. Try not to disturb any living plants or animals. You'll also need to fill a different cup with some dirt and water to represent polluted water.
3. Make your tidal marsh! Add your coffee filter or sponge in first to block the hole. Layer your nature items atop the sponge or coffee filter.
4. Slowly pour some dirty water into your funnel. How clean or dirty is the water compared to what you started with?

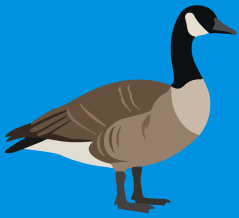
Common Tidal Marsh Plants:



Tule filters water, stabilizes the banks of the marsh, slows water down, and is habitat for many species!



Pickleweed is habitat and food for the endangered Salt Marsh Harvest Mouse and supports many birds.



Slough Animals

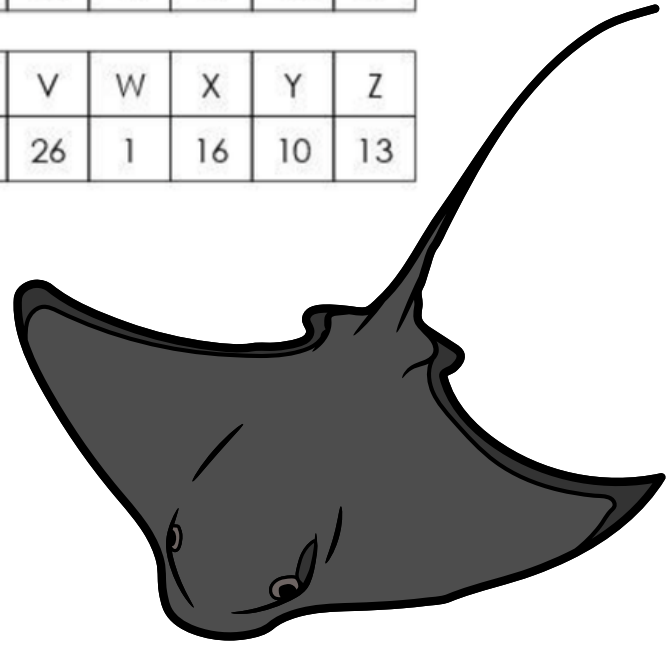


Fill in the blanks with the key to figure out what creatures can be found in the slough at our wildlife refuge!

A	B	C	D	E	F	G	H	I	J	K	L	M
8	22	25	9	14	15	4	23	18	17	3	24	7

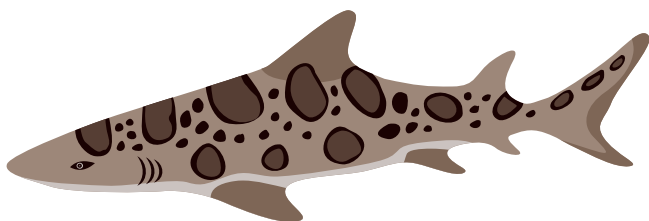
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
11	2	5	12	20	19	21	6	26	1	16	10	13

1.
 22 8 21 20 8 10

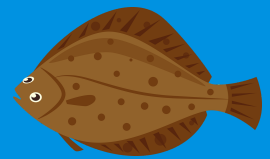


2.
 23 8 20 22 2 20 19 14 8 24

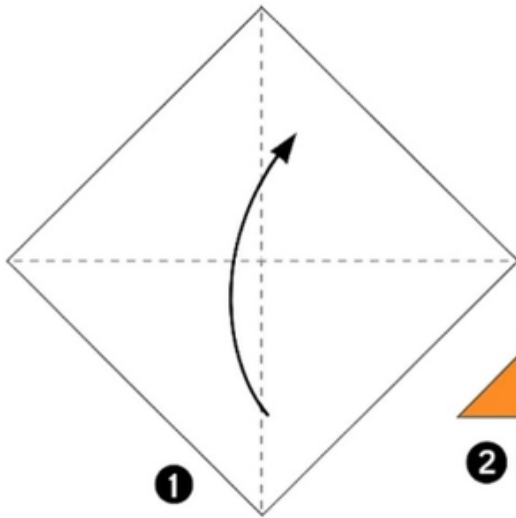
3.
 24 14 2 5 8 20 9 19 12 8 20 3



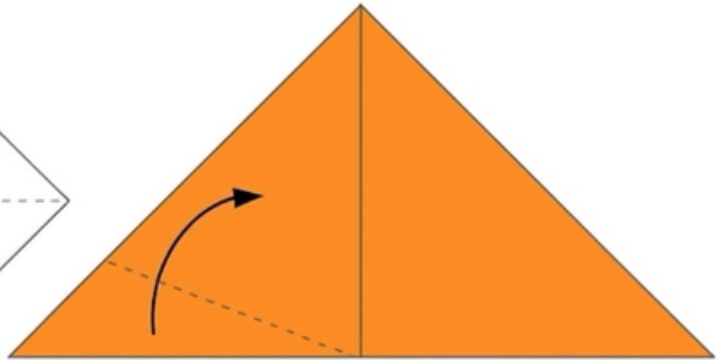
Origami Fish



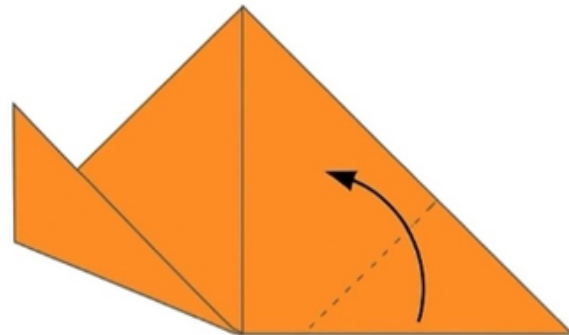
Fish are also found in the slough and the bay that is connected to Don Edwards SF Bay Wildlife Refuge. Ask a parent/guardian for help and follow the instructions to fold your own fish!



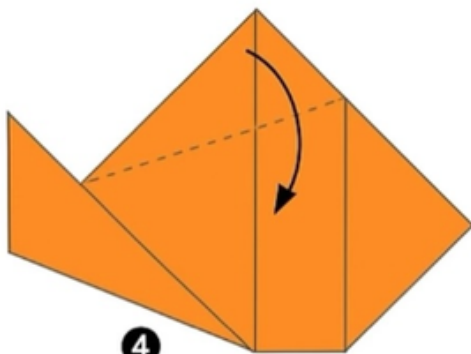
1
Fold in half



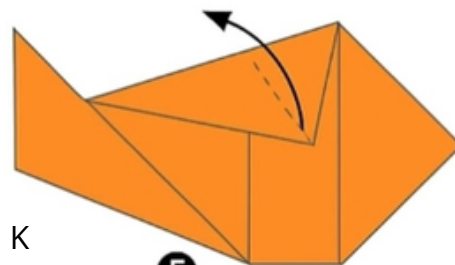
2 Fold in the dotted line



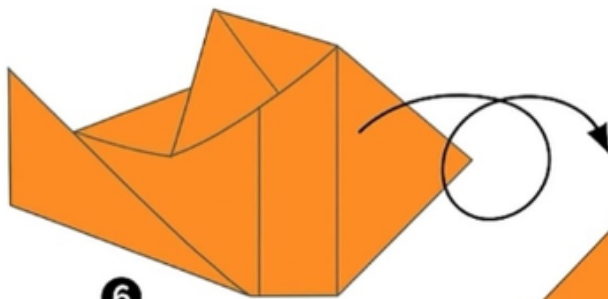
3 Fold in the dotted line



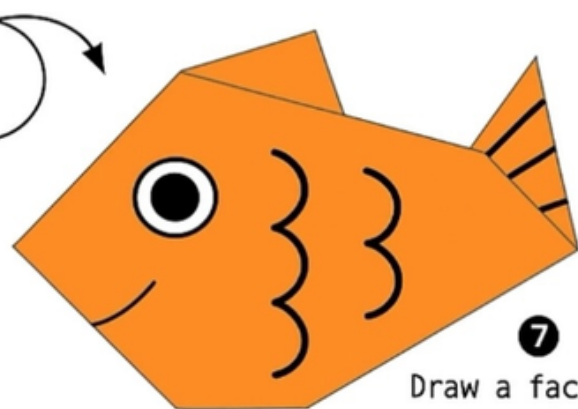
4
Both fold in the dotted line



5
Both fold in the dotted line



6
Turn over



7
Draw a face and spots and finished

Source: CraftyFafi

Wetland Plants and Animals: Fun Facts



Great Egret

Diet: Small vertebrates and aquatic invertebrates.

Size: 39" in length and 51" wingspan.

Description: Large white heron; heavy yellow bill; blackish legs and feet; breeding adults have long plumes which trail from back and extend beyond the tail.

Did you know? This bird stalks its prey slowly and methodically, and you can often see the great egret hunting in the uplands, salt marsh, mudflats, and sloughs.



Salt Marsh Harvest Mouse
(endangered)

Diet: Pickleweed.

Size: 2 1/2" - 3 1/2" long.

Description: Upper parts of mouse are a rich brown, which contrasts with the lighter-colored fur of its belly. Salt marsh mouse closely resembles the more common western harvest mouse (*R. megalotis*).

Did you know? It is an endangered species found only in the salt marshes of the San Francisco Bay.



California Ridgway's Rail
(endangered)

Diet: Crustaceans, insects, frogs, worms, small mammals, and cordgrass.

Size: 14" - 16 1/2" in length.

Description: Grayish edges on brown back feathers; olive wing tints; gray cheeks; cinnamon undersides.

Did you know? It has a very distinctive call that is a series of ten or more dry "kek kek kek kek" notes, which accelerate and then slow. They predominantly call at dusk and dawn.



Snail

Diet: Diatoms, algae, plant materials, and clams.

Size: Extremely variable in size, 0.1" - 1" in length.

Description: Has a single coiled shell and a distinct head and tentacles.

Did you know? Snails crawl slowly in the mud in shallow water, feeding on diatoms scraped off the mud with its tongue.



Fish (Topsmelt)

Diet: Zooplankton and phytoplankton.

Size: 14 1/2" in length.

Description: Green from above, silver from below, with a bright silver side stripe.

Did you know? These fish swim in large schools.



Peregrine Falcon
(delisted 8/26/1999)

Diet: Small to medium sized birds.

Size: 16" - 20" long.

Description: A powerful raptor with a black "helmet" head; long, pointed wings, mostly brown in color.

Did you know? It is the fastest bird in the world, and it can reach speeds of up to 2000 miles per hour, diving from above to kill its prey.

Wetland Plants and Animals: Fun Facts



Northern Harrier

Diet: Males prey more on birds, while females eat more mammals. It has been reported to drown waterfowl.

Size: 16 1/2" in length, 42" wingspan.

Description: Obvious white rump patch. Male has gray back, throat, and breast, white belly marked with brown, tail with black bars. Female is brown-streaked on breast; brown above.

Did you know? The Northern harrier flies close to the ground when searching for its prey in the upland, salt marsh, and salt pond habitats.



Phytoplankton
(tiny, drifting plants)

Diet: Sunlight (used for photosynthesis).

Size: 63 - 153 micrometers in length (very tiny!).

Description: Drifting plants, primarily single celled algae and diatoms

Did you know? Phytoplankton is at the base of the food chain for the ocean, bay, slough, and mudflat food webs.



Pickleweed

Plant size: Low growing plant that spreads out across the salt marsh, branches grow 8" - 25" tall.

Leaf description: The compressed leaves look like a series of pickles attached end to end.

Flower description: Tiny white flowers that bloom from April to September.

Did you know? This plant takes up salty water through its roots and stores excess salt in the top "pickles." In the fall, this part turns red and falls off, ridding the plant of the extra salt. This is the main food for the salt marsh harvest mouse.



Salt Grass

Plant size: 8" - 12" tall, low growing grass.

Leaf description: Stiff and wiry grass-like leaves.

Flower description: Clusters of flowers in bloom from April to July.

Did you know? The plant often has noticeable salt crystals that have been sweated out onto the leaves.



Crab

Diet: Detritus, phytoplankton, zooplankton, and dead fish.

Size: 1.2" - 1.4" in length.

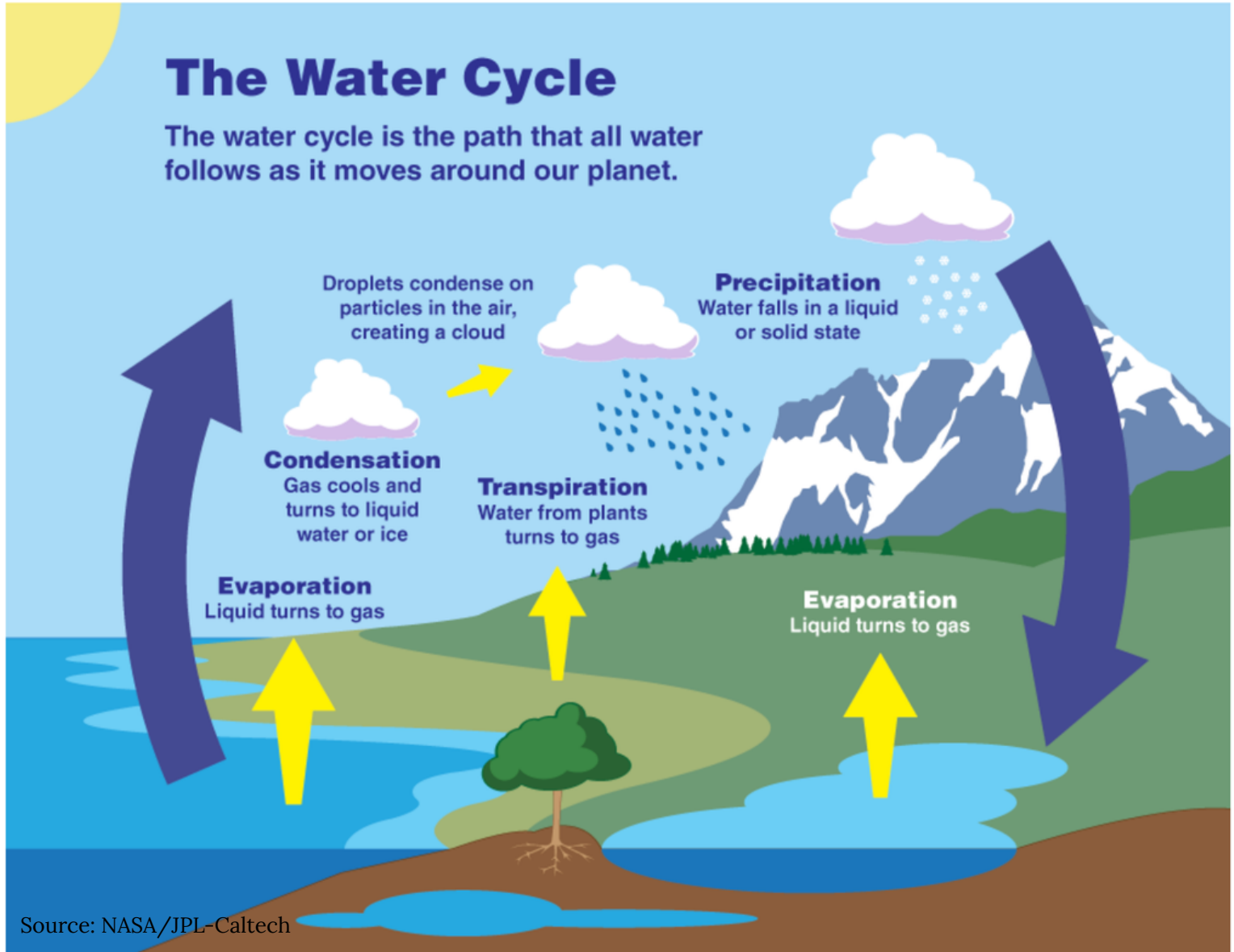
Description: Light gray, green, or yellow carapace (dorsal section of shell) with small blue/black spots and lighter colored legs with similar spots. Its legs are covered in many hairs known as setae.

Did you know? They burrow in the mudflats of the slough and are preyed on by egrets, California Ridgway's rail, and killdeer.



What is the Water Cycle?

The Water Cycle provides the water needed for the ecosystem, including habitats at our Wildlife Refuge.



Earth's water cycle is the path that water takes as it moves around Earth. This includes times when it flows, like when it rains, and places where it's stored, like in ice, groundwater, lakes, rivers, and the ocean.



Water Cycle Word Search

Practice Water Cycle vocabulary with this word search!

EVAPORATION
CONDENSATION
PRECIPITATION

TRANSPIRATION
RUNOFF
GROUNDWATER

AQUIFER
VAPOR
CLOUDS

RAIN
SNOW
HAIL

SLEET
CYCLE
DROPLETS

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

www.GrowingPlay.com



Water Cycle in a Bag

Experiment

Create your own mini water cycle!

Materials

- Ziplock bag
- Permanent marker
- Water
- Blue food coloring
- Clear tape

Steps

1. Use colored markers to draw a sky on the upper half of your ziplock bag. Include clouds and the sun.
2. Fill a cup with water and add a few drops of blue food coloring. Pour the blue-colored water into the bag and zip it tightly, so no water escapes.
3. Using clear tape, hang the bag outside or on a sunny window ledge.
4. Check the bag after a couple of hours. You can also check again the next day. You will eventually start to see drops of water sticking to the side of the bag. Some will be in the “clouds” and other drops will be coming down like rain.



The Science Behind the Experiment

After a couple of hours, you will be able to observe some water droplets rising and sticking to the sides of the bag. Eventually, these droplets will fall back down to the pool of water at the bottom of the bag, just like how the water cycle happens in nature.

The water cycle starts with Earth's water like those in lakes, seas, rivers, and underground. Because of the sun's heat, water is changed into vapor and rises into the atmosphere in a process called **evaporation**.

After the warm water vapor evaporates, it starts to cool down and change back to liquid. They begin to form clouds. This process is called **condensation**.

When the clouds get too heavy with water droplets, it begins to rain or snow. Water falls back down to Earth in a process called **precipitation**.



Water Cycle Salt Experiment



Materials

- Salt
- Water
- Bowl
- Food coloring



Using food coloring adds a more dramatic effect to the final part of this experiment but you can use just salt and water to get the same outcome.

Steps

1. Pour water into your bowl and add a few drops of food coloring to it. Stir it around.
2. Add your salt to the water. The more salt you add, the more dramatic the effect.
3. Set aside for a few days and watch to see what happens!

Project Extensions

Try these project variations to delve deeper into your scientific inquiries!

- Try filling two bowls with different amounts of water and salt to see which one evaporates sooner.
- Will the water evaporate if it's placed in the shade?
- Will it evaporate faster in the direct sun?
- What happens if the bowl of salt and ice is placed in the freezer?
- How long does the ice take to evaporate in the sun?
- There are so many observations you can make with this water cycle salt experiment!

Fog in a Bottle Experiment



Materials

- Hot water-safe glass jar or plastic bottle
- Water
- Ice cubes
- Plastic bag

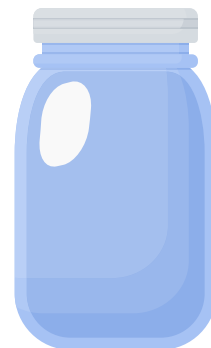
Steps

1. Fill a jar or bottle with HOT water for 60 seconds.
2. Pour out most of the water and then place a plastic bag with ice cubes over the top.
3. Fog will start to form inside the bottle.

Project Extensions

Try these project variations to delve deeper into your scientific inquiries!

- Try adding food coloring to the water. Is the fog also colored?
- Does the fog form more densely at the top of the bottle, or near the water? Why do you think that is?
- Before adding the bag of ice cubes, add a few drops of isopropyl alcohol (rubbing alcohol) to the water. How does this affect how quickly the fog forms?





Creek Pollution Poster

Understand how pollution gets into waterways.

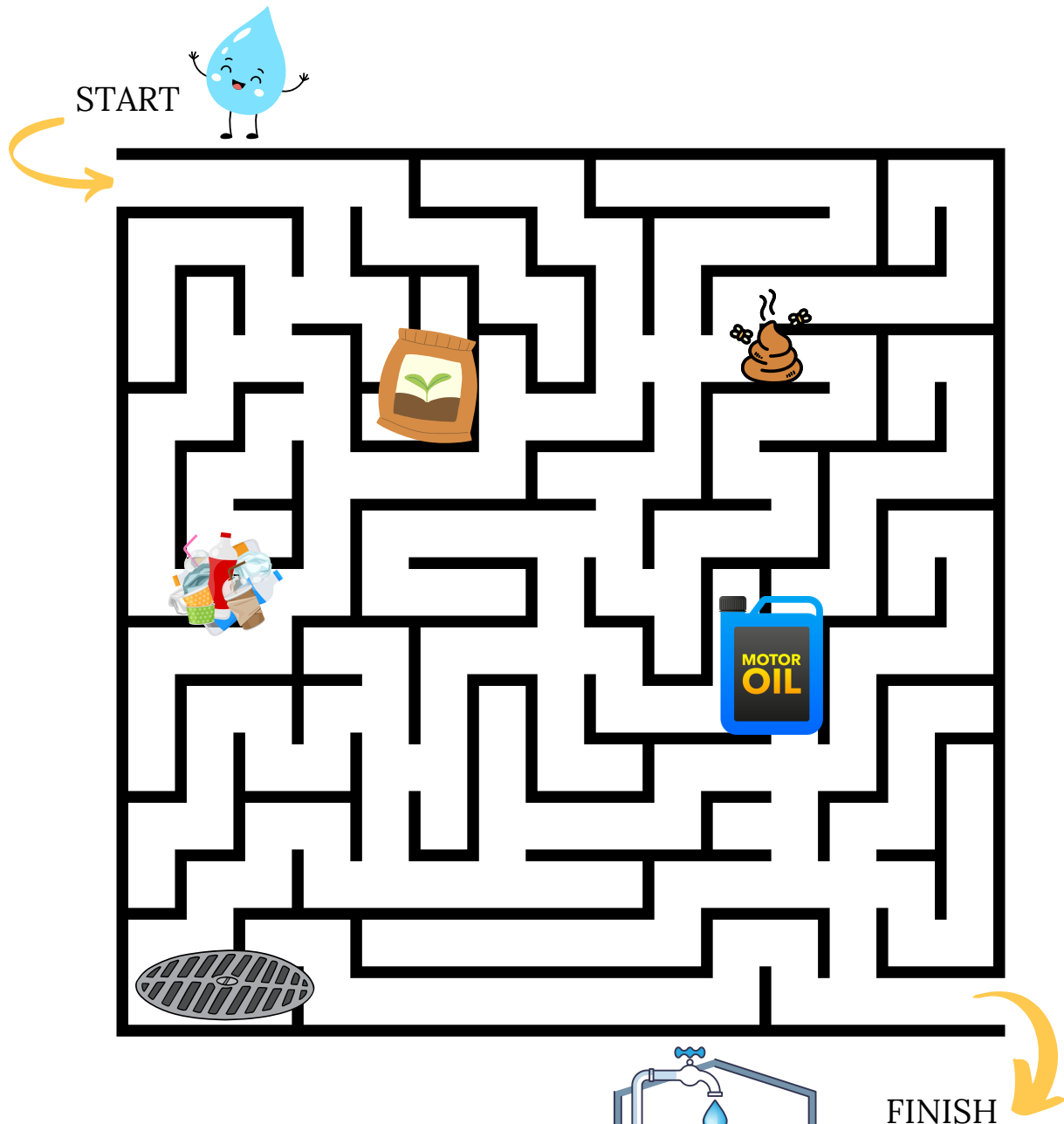




Drip's Obstacle Maze

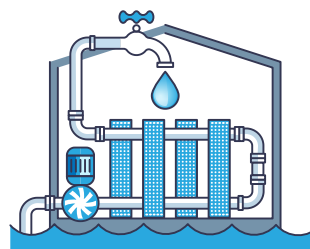


Help Drip the Water Droplet get to the water treatment plant safely. Avoid pollutants that can run into storm drains that lead to the bay. Take note of the obstacles Drip has to avoid to get treated.



What types of pollution created obstacles for Drip?

1. _____
2. _____



3. _____
4. _____

Watershed Cleanup



Be a Watershed Watcher and help clean up your community! Circle all the things you see that might end up polluting the local river and harming wildlife.



Source: Santa Clara County Watershed Protection
Division Watershed Activity Booklet

Pollutant Scavenger Hunt



Explore your neighborhood and identify pollutants that may enter the storm drains to the bay.

Are you able to spot real pollutants? Search your yard, neighborhood or schoolyard for the following pollutants. Each item has a point value. Once your search is completed, add up your points and find out how polluted your environment is.

0 POINTS: SPOTLESS

Congratulations, your family, friends and neighbors are doing a great job keeping your environment pollutant-free.

5-50 POINTS: SPRINKLING OF POLLUTANTS

Your neighbors/schoolmates are working hard to keep your environment pollutant-free. Keep up the good work.

55-100 POINTS: SEVERAL POLLUTANTS

Your environment has too many pollutants. Help keep your environment pollutant free by doing your part.

105-150 POINTS: SCORES OF POLLUTANTS

With so many pollutants in your environment, consider teaming up with a friend or family member to educate your community about the simple ways they can keep your environment pollutant free.

155+ POINTS: SUBMERGED IN POLLUTANTS

Your environment has a significant amount of pollutants that may enter the storm drain and flow directly to the ocean. Consider working with adults in your area to organize a school/neighborhood clean-up event.

Animal waste	20 points
Bag	10 points
Candy wrapper	10 points
Cardboard	15 points
Cigarette	5 points
Cut grass	10 points
Dirt on the street	15 points
Fallen leaves	5 points
Fast food wrapper	10 points
Glass	20 points
Metal	15 points
Newspaper	10 points
Oil	15 points
Paper	5 points
Plastic bottle	10 points
Soapsuds	20 points
Soda can	5 points
Water in the gutter	10 points

YOUR TOTAL _____



Watershed Pledge



Create your own pledge to protect our watersheds!

As the next generation of activists, leaders, and voters, you are empowered to take positive actions to protect the environment. In this activity, you will create a handprint pledge, where you choose your favorite local creeks and describe one way you pledge to protect our watersheds, such as picking up litter, reducing our waste, and recycling! Use what you learned from this activity packet to help you brainstorm. You will then put that pledge into action. This way we can all show our commitment to protecting the environment and representing the impact of our efforts. Let's take action!

Materials

- White copy paper
- Construction Paper
- Pencil or marker
- Scissors



Instructions

Step 1: Place your hand with your fingers slightly separated on your sheet of white copy paper. Trace your hand with your pencil or marker.

Step 2: Cut out your traced hand with a pair of scissors.

Step 3: Glue the traced hand onto your choice of color construction paper.

Step 4: Imagine that your traced fingers are your local creeks that flow into the San Francisco Bay. Pick five creeks from the watershed map on Page 2 and write the name of a creek on each finger.

Step 5: Now imagine that the palm of your traced hand is the San Francisco Bay. Add one or more actions on your traced palm about how YOU will take action in protecting the environment. You can use the colored markers and decorate the hand however you wish!

Need some ideas?



Feel free to watch the Pollution Prevention video for some inspiration for your pledge. Are you already noticing some ways that you could change your habits at home to help the environment?
Here is the link: tinyurl.com/preventingpollution



Wetland Diorama

Create a diorama of the habitats and animals you learn about!



Materials

- Pencils
- Colored markers
- Scissors
- Glue
- String
- Construction paper
- Box (any cardboard box that you can find)
- Wetland Habitat sheet (provided)
- Wetland Plants and Animals sheet (provided)



Instructions

STEP 1 - Find a box

Use any small box you can find. In this example, we used a shoebox.

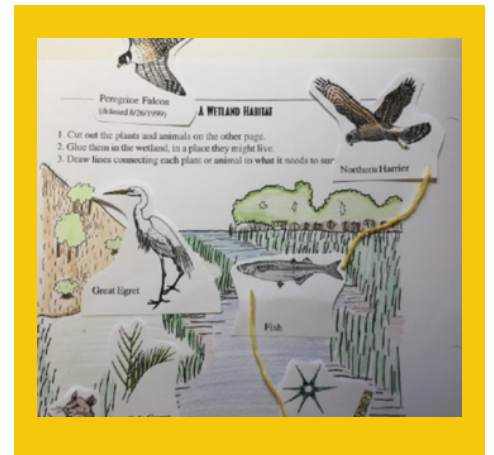
STEP 2 - Color in and cut out Wetland Plants and Animals (pg. 21 & 22)

STEP 3 - Make your wetland habitat diorama

You have the option of using the wetland habitat coloring page (pg. 20) for your diorama or making a wetland habitat using construction paper, markers, glue, or any other materials you have at home.

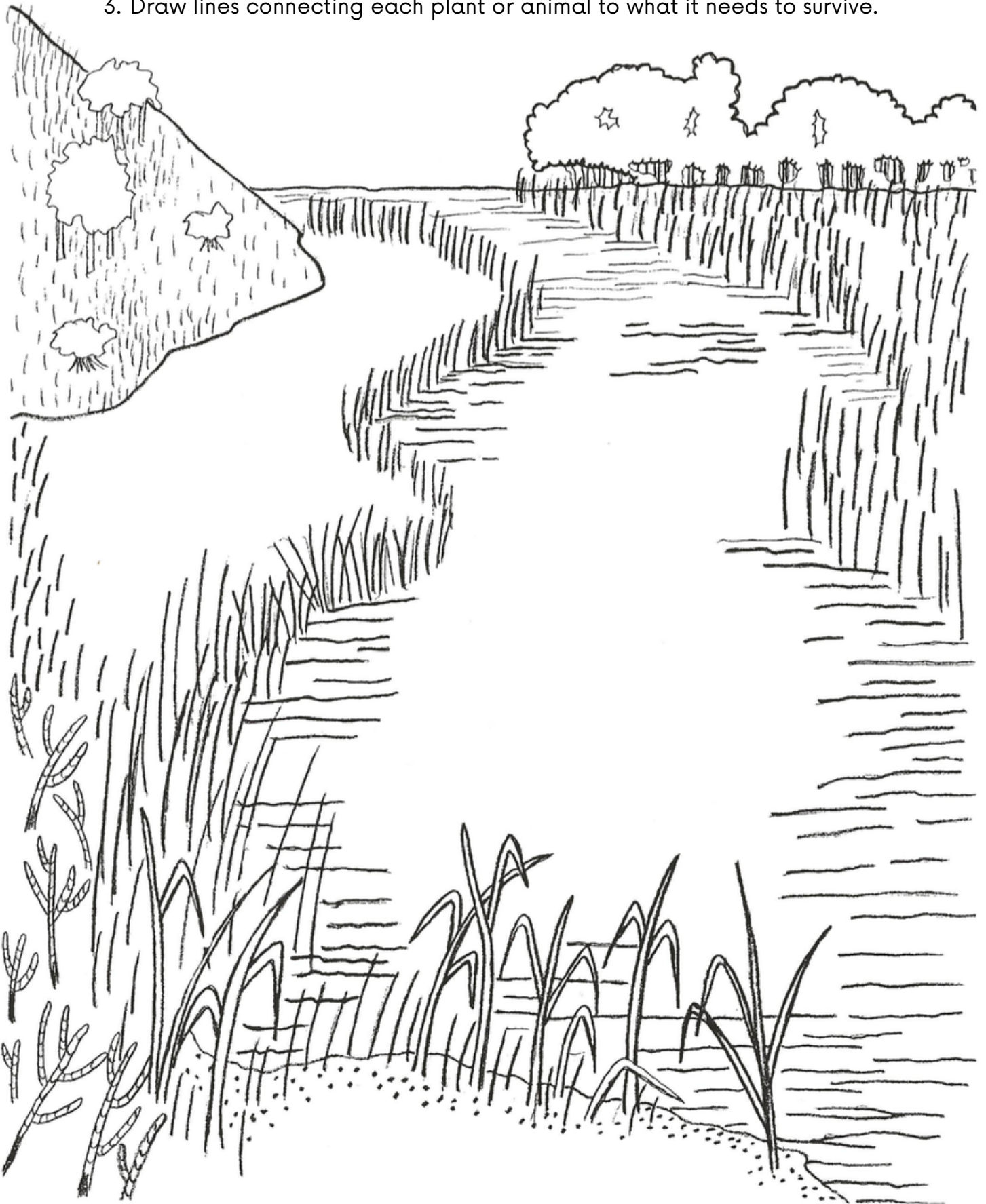
STEP 4 - Glue the Wetland Plants and Animals where you think they live or find food

STEP 5 - Use pieces of string to connect each plant or animal to what it needs to survive



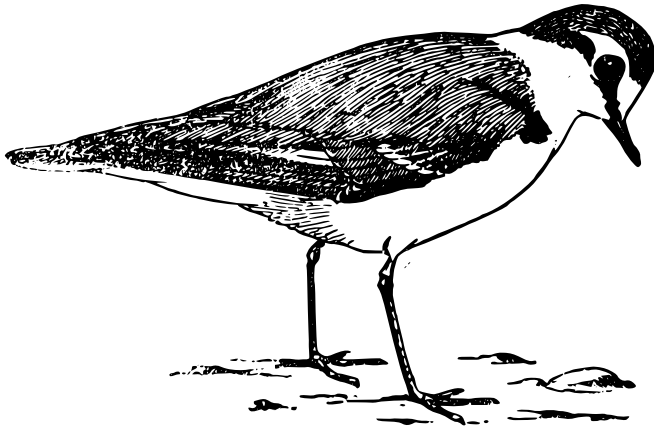
A Wetland Habitat

1. Cut out the plants and animals on the next page.
2. Glue them in the wetland, in a place where they might live.
3. Draw lines connecting each plant or animal to what it needs to survive.



Wetland Endangered Animals to Cut Out

Tip: to make your diorama 3-D like the example photo (pg. 19), leave a small tab of paper at the bottom of the species you cut out! You can glue or tape that tab down and the cut-out will stay standing!



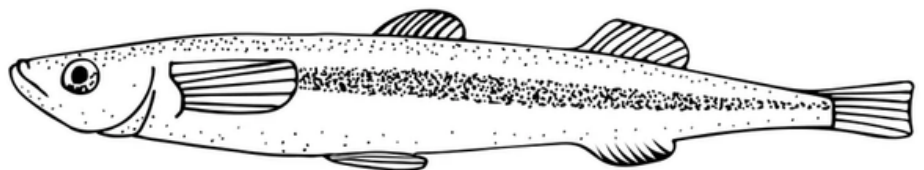
Western Snowy Plover
(threatened)



California Ridgway's Rail
(endangered)



Salt Marsh Harvest Mouse
(endangered)



Delta Smelt
(endangered)

shutterstock.com · 1613960902

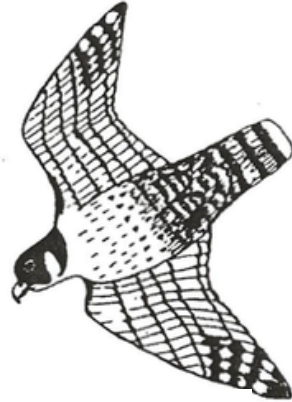
Wetland Plants and Animals



Pickleweed

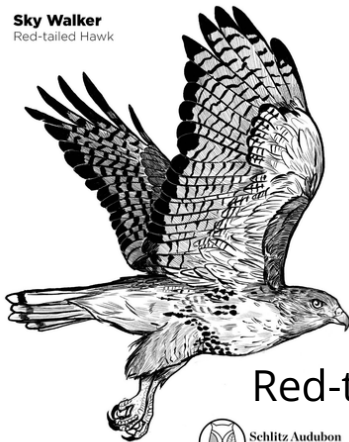


Salt Grass

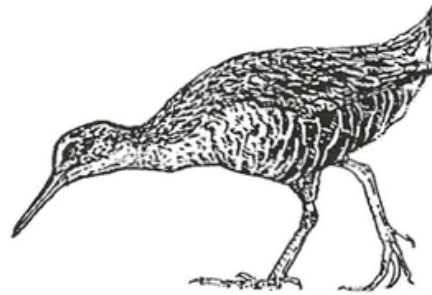


Peregrine Falcon
(delisted 8/26/1999)

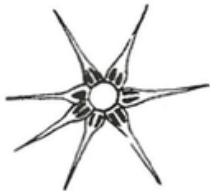
Sky Walker
Red-tailed Hawk



Red-tailed Hawk



Cordgrass



Phytoplankton
(tiny, drifting plants)



Great Egret



Snail



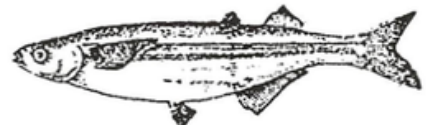
Snail



Northern Harrier



Crab



Fish