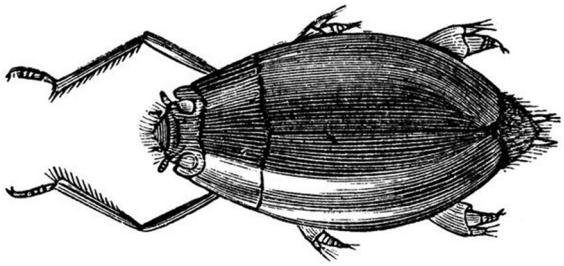
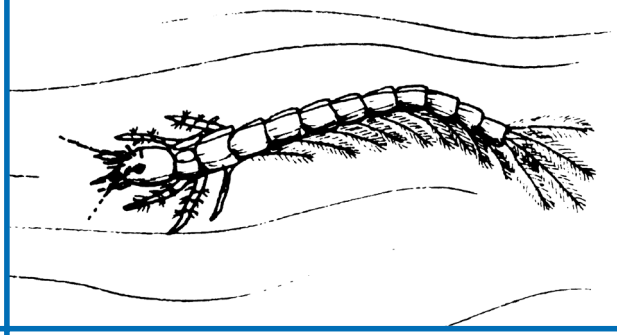
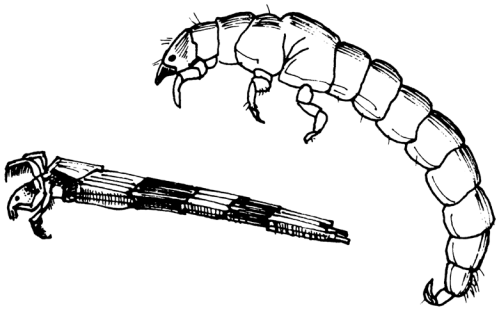
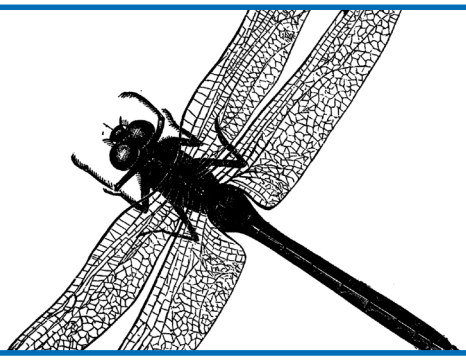
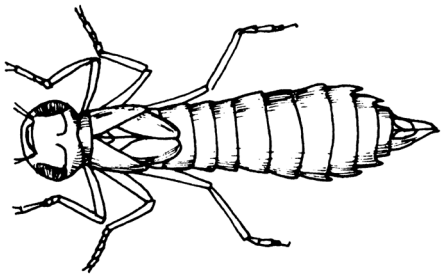
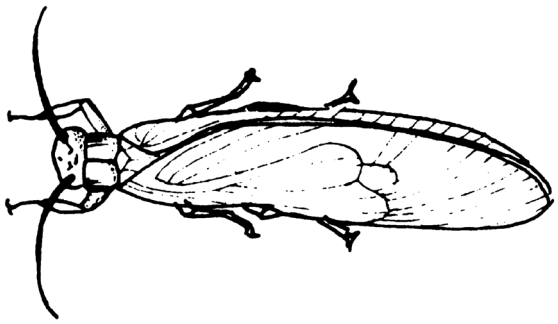
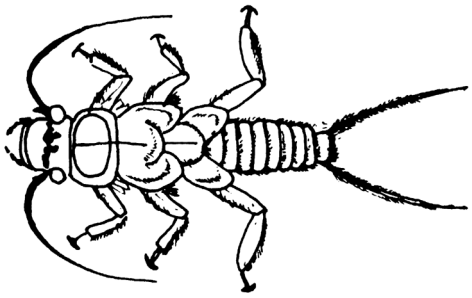
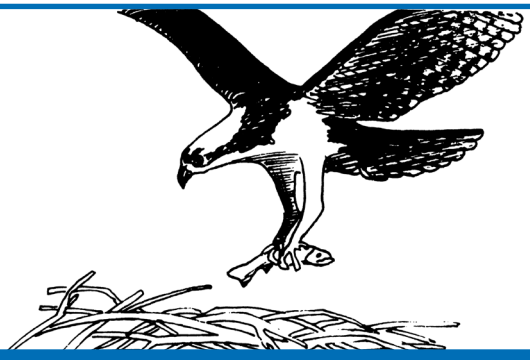
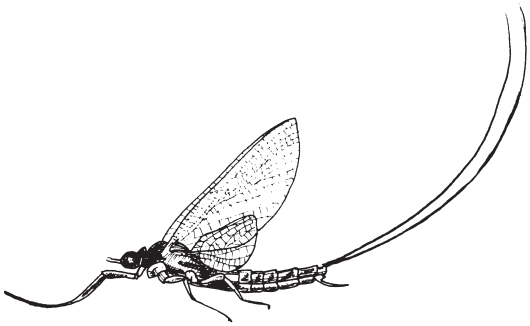
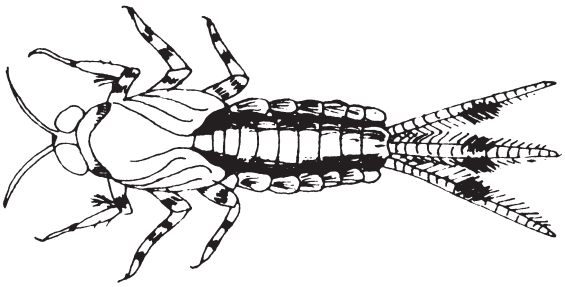
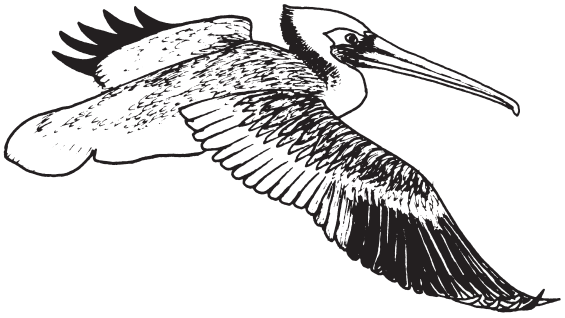
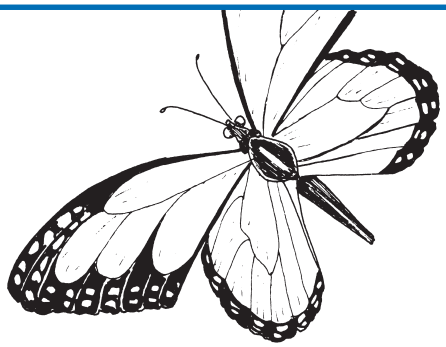
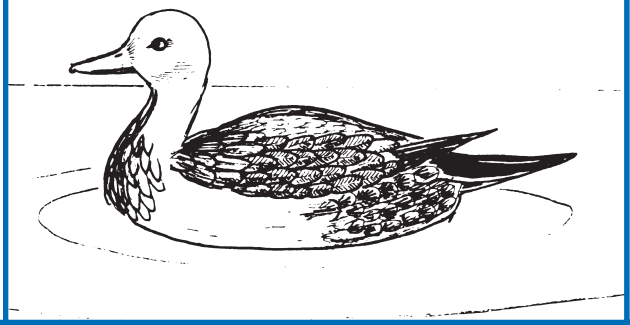
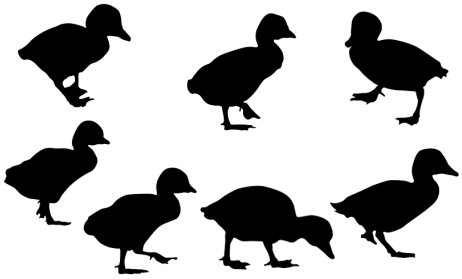
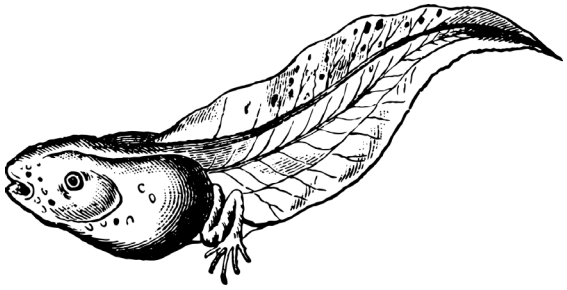
# Are You Me? Cards

FOR STUDENTS

| | | | |
|---|---|---|---|
| Whirligig Beetle |  |  | Whirligig Larva |
| Caddisfly |  |  | Caddisfly Larva |
| Dragonfly |  |  | Dragonfly Nymph |
| Stonefly |  |  | Stonefly Nymph |
| Osprey |  |  | Osprey Chicks |

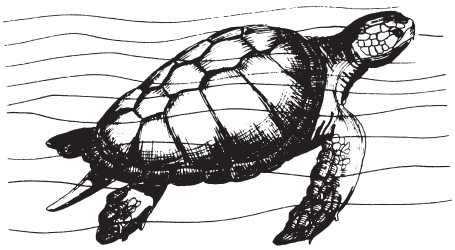
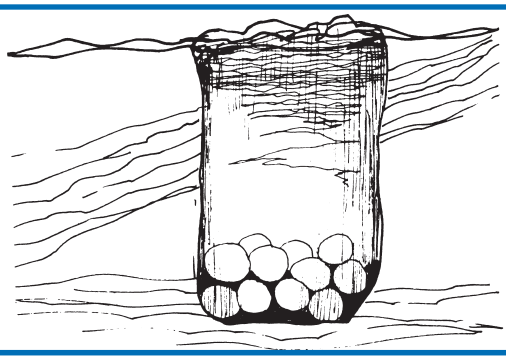
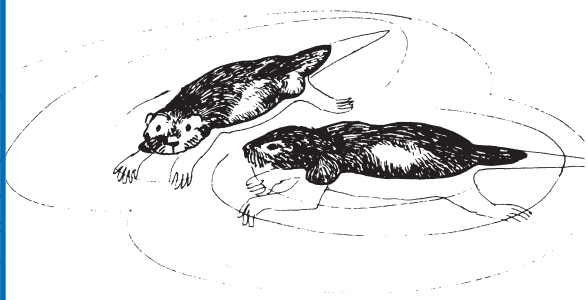
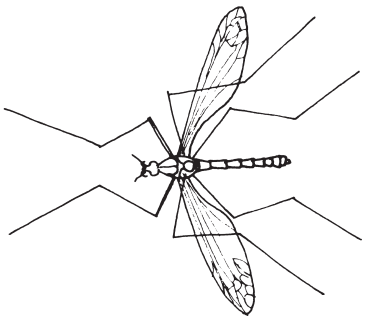
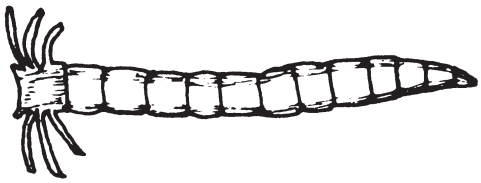
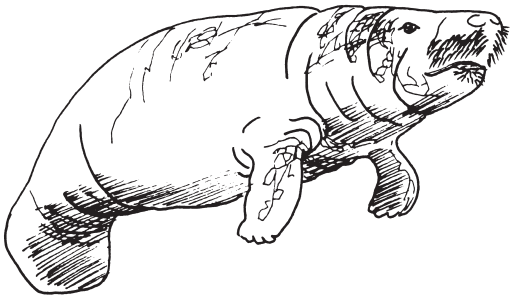
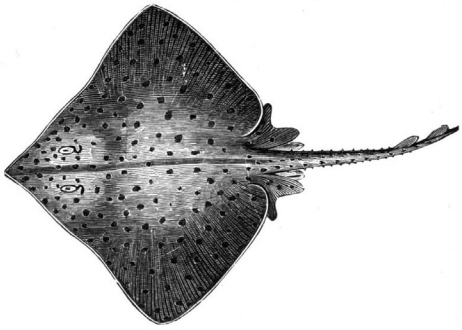
FOR STUDENTS

# Are You Me? Cards

| | | | |
|---|---|---|---|
| Mayfly |  |  | Mayfly Nymph |
| Pelican |  |  | Pelican Eggs |
| Butterfly |  |  | Butterfly Larva |
| Duck |  |  | Ducklings |
| Frog |  |  | Tadpole |

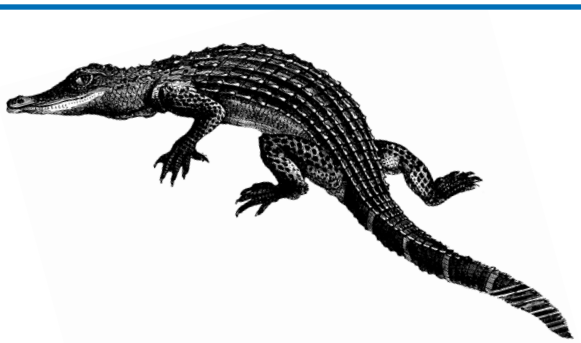
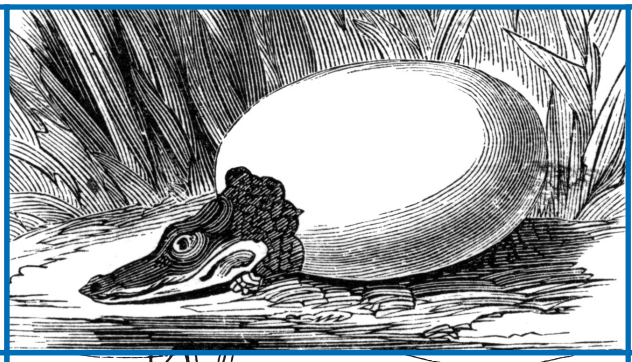
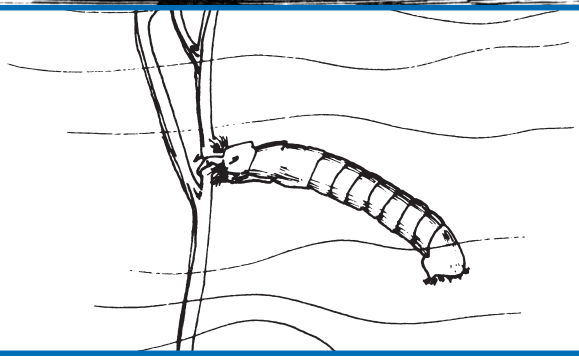
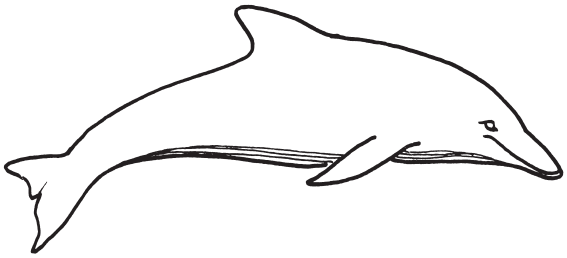
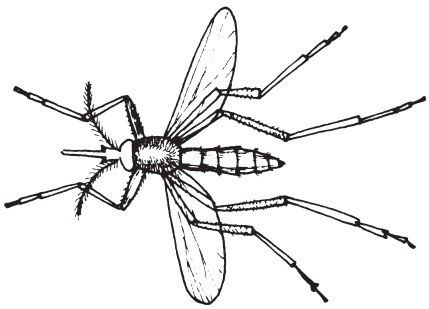
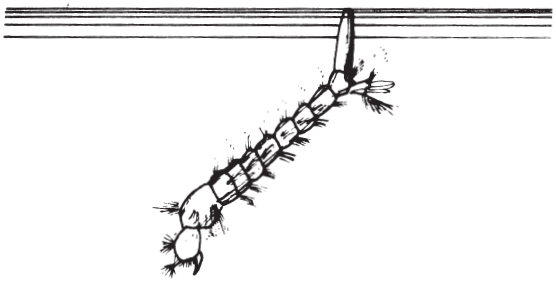
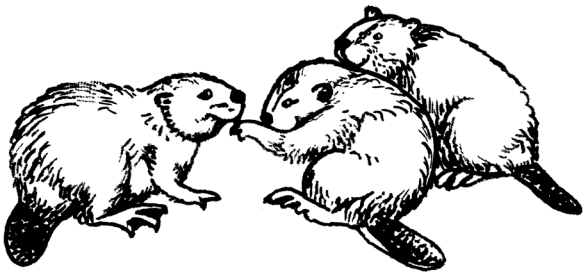
# Are You Me? Cards

FOR STUDENTS

| | | | |
|---|---|---|---|
| Sea Turtle |  |  | Sea Turtle Eggs |
| Sea Otter |  |  | Young Sea Otters |
| Cranefly |  |  | Cranefly Larva |
| Manatee |  |  | Young Manatee |
| Skate |  |  | Skate Egg Case |

FOR STUDENTS

# Are You Me? Cards

| | | | |
|---|---|---|---|
| Alligator |  |  | Alligator Hatchling |
| Black Fly |  |  | Black Fly Larva |
| Dolphin |  |  | Young Dolphin |
| Mosquito |  |  | Mosquito Larva |
| Beaver |  |  | Young Beavers |

FOR STUDENTS

# Pattern for Life-Size Whale

## List of Materials

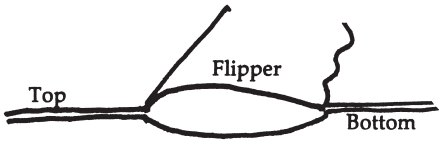
1. Black plastic, 4 mil, 24 feet (7.2 m) by 100 feet (30 m)
2. Clear/White plastic, 4 mil, 16 feet by 100 feet (4.8 m by 30 m)
3. Clear 2 inch (5 cm) wide plastic tape—20 rolls

## Tools Needed

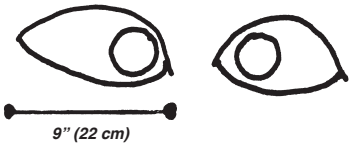
1. Tape measures, 100 feet (30 m) and 26 feet (8 m)
2. Scissors to cut the plastic and tape
3. High-speed fan

## Steps

1. Lay plastic on 10-foot (1 m) grid.
2. Cut out all parts; cut out some of the flippers or tail flukes from the cutout sections of the whale body.
3. Tape together the flippers and tail flukes (remember the right and left sides for both), and tape together the top dorsal fin. Do not tape the body (straight side) connection.
4. After taping the "fins," turn inside out, placing the tape seam inside.
5. Tape together the cutout sections of the whale's top section as indicated on the plan.
6. Tape together the cutout sections of the whale's bottom section as indicated on the plan.
7. Place the tail flukes and flippers on the bottom section of the whale at their locations.



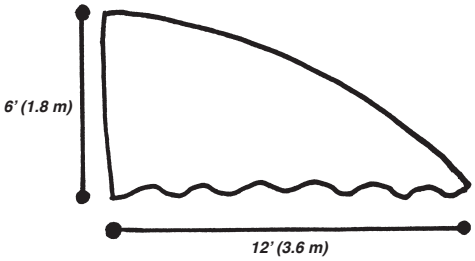

8. Start taping the top section to the bottom section, using the tail flukes as side walls where they connect to the body; start at the tail section on each side and work toward the mouth area.
9. Do not tape the end of the tail section together.
10. Mouth area—the clear/white plastic will have to be pleated to meet the side area taping; start in the center of the mouth and work out the sides—about 2 inches (5 m) for each pleat.
11. Once the whale is fully taped, place the fan in the tail opening and inflate the whale. One person will go into the whale to the nose section and pull the nose section out through the tail opening, inverting the seams and letting the flippers and tail flukes to the outside.
12. Mount the top dorsal fin on the black top section in the center of the tail section about 58 feet (17.4 m) from the front of the whale.
13. Place the-9 inch (22 cm) eye drawings on the top section, just in front of the flippers. 9" (22 cm)




14. Inflate the model with the high-speed fan; step back and give it room.

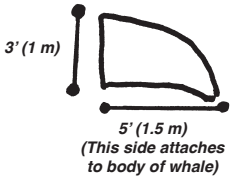
## Tail Flukes

2 black and 2 clear/white pieces
(Will create right and left tail sections)



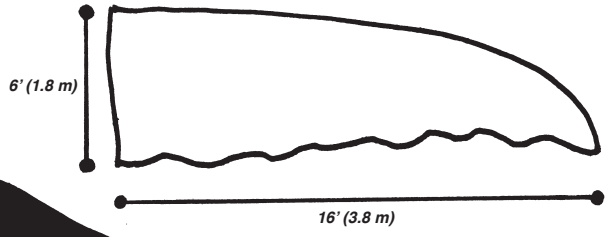

## Top Dorsal Fin

2 black pieces




## Flippers

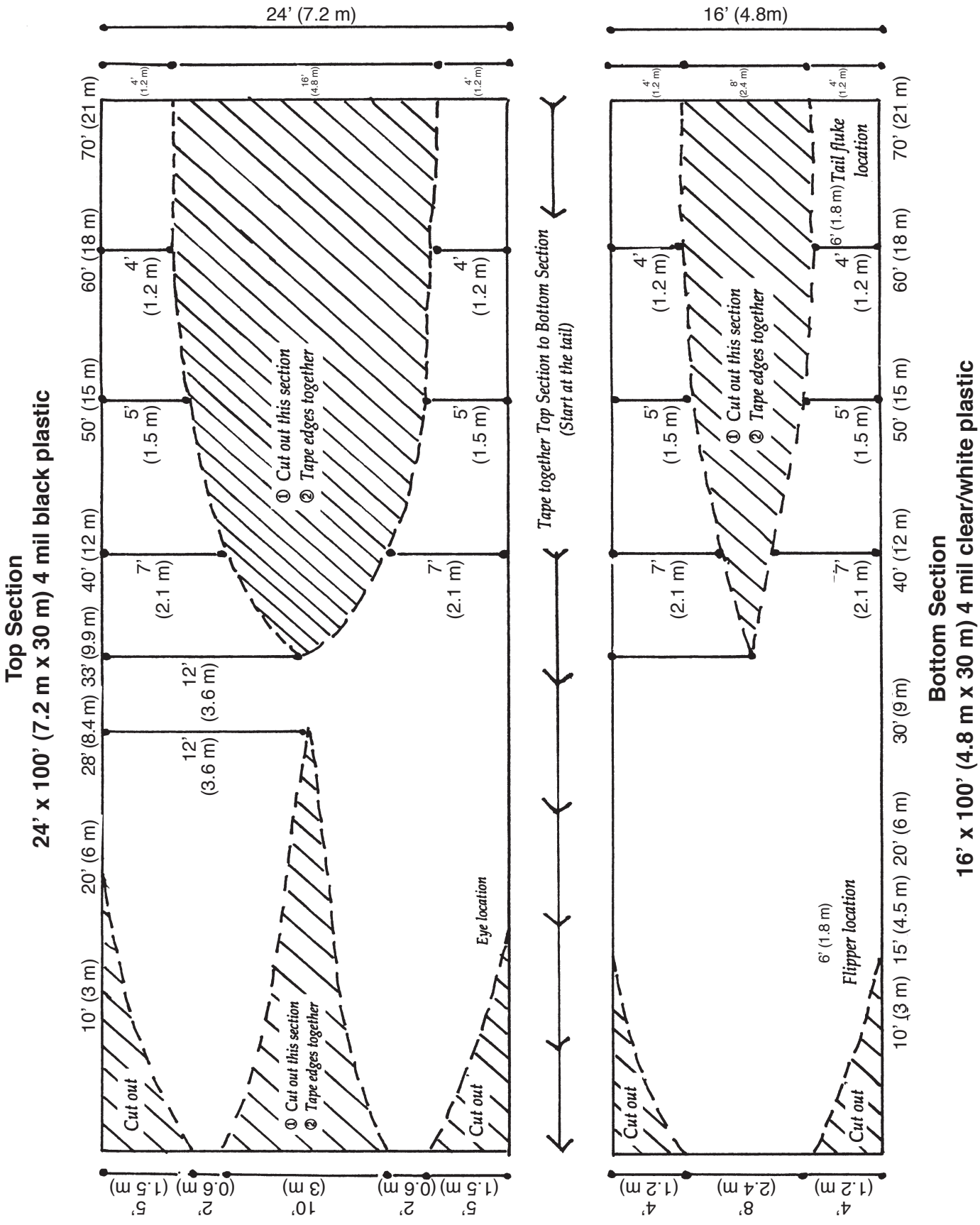
2 black and clear/white pieces
(Will create right and left flipper sections)




Activity courtesy of Needham Science Center, Needham, Mass.

# Pattern for Life-Size Whale

FOR STUDENTS



# Habitat Scenarios

A marsh has been dredged to allow a marina to be built.
**Remove one "habitat haven" from the *stopover* habitat.**

A landowner has agreed to re-flood fields after harvesting, increasing acreage for wintering birds. **Add one "habitat haven" to the *wintering* habitat.**

A joint federal and state wetland restoration project involved removing "drain tiles" (perforated pipes), allowing a former wetland to flood and return to its natural state.
**Add one "habitat haven" to the *stopover* habitat.**

A large increase in the number of mink and raccoons has reduced the value of a marsh nesting area. **Remove one "habitat haven" from the *nesting* habitat.**

Wintering habitat is reduced by the conversion of bottomland hardwood forests to cropland.
**Remove one "habitat haven" from the *wintering* habitat.**

New legislation restricts motorboat traffic on a number of lakes and large marshes, reducing the human disturbance to wildlife. **Add one "habitat haven" to *stopover* habitat.**

Several years of sufficient rain and snow has replenished the water supply, thus increasing the food supply. **Add one "habitat haven" to the *nesting* habitat.**

A timber company has agreed to preserve a forested wetland in exchange for tax credits.
**Add one "habitat haven" to the *stopover* habitat.**

Filling and diking reduces the amount of tidal wetlands available to waterfowl.
**Remove one "habitat haven" from the *wintering* habitat.**

A large condominium development has been built on a drained marsh that was prime duck wintering habitat. **Remove one "habitat haven" from the *wintering* habitat.**

A large oil spill from a supertanker has severely damaged a number of salt marshes that were prime wintering areas. **Remove three "habitat havens" from the *wintering* habitat.**

A canal was constructed to remove boat traffic from a river that was used by a large number of waterfowl years ago. It is returning to its natural state.
**Add one "habitat haven" to the *stopover* habitat.**

A number of consecutive dry years have occurred, resulting in numerous small wetlands drying up. **Remove one "habitat haven" from the *nesting* habitat.**

A prime wetland area has just been included in a new National Park. Because human disturbance is reduced in the area, **add one "habitat haven" to the *wintering* habitat.**

A coastal resort town has annexed a nearby area containing a wetland, which it has drained to allow tourist hotel development. **Remove one "habitat haven" from the *wintering* habitat.**

# Habitat Scenarios

A "cookie cutter" (machinery that removes some vegetation and exposes a small area of water) has been brought to a marsh to improve waterfowl habitat.
**Add one "habitat haven" to the *nesting* habitat.**

Acid rain has reduced the number of invertebrates needed by hens during nesting.
**Remove two "habitat havens" from the *nesting* habitat.**

A marsh has been dredged to allow a marina to be built.
**Remove one "habitat haven" from the *wintering* habitat.**

Prime waterfowl habitat has been severely damaged by the use of a marsh as an irrigation pond. **Remove one "habitat haven" from the *stopover* habitat.**

Water in a human-made marsh has been drawn down to speed decomposition and consolidate the bottom. **Remove one "habitat haven" for a season and then add two "habitat havens" the next season because of the improvement in *nesting* habitat.**

A large increase in the number of mink and racoons has reduced the value of a marsh as a nesting habitat for waterfowl. **Remove one "habitat haven" from the *nesting* habitat.**

The muskrat population explodes, "eating out" cattails in a dense marsh. This makes the marsh more suitable for waterfowl. **Add one "habitat haven" to the *nesting* habitat.**

The owners of fragile wetland areas agree to place their lands in a wetland conservation program. **Add one "habitat haven" to the *wintering* habitat.**

A new dam is built on a river, creating a lake that covers the wetlands above it. **Remove two "habitat havens" from the *wintering* area.** However, the following year the area below the dam is declared a wildlife sanctuary. **Add one "habitat haven" to the *wintering* habitat.**

Pesticides infiltrate marsh water, altering the food web and affecting resistance to disease.
**Remove one "habitat haven" from the *nesting* habitat.**

Rough fish, such as carp, that stir up bottom sediments are prevented from entering a wetland by a fish trap. This improves the water quality and habitat for waterfowl.
**Add one "habitat haven" to the *stopover* habitat.**

Filling and diking reduces the amount of tidal wetlands available to waterfowl.
**Remove one "habitat haven" from the *wintering* habitat.**

New federal laws ban the use of lead shot nationwide. This reduces waterfowl deaths due to lead poisoning. **Add one "habitat haven" to the *stopover* habitat.**

Heavy spring rains in the nesting habitat stimulate aquatic plant and invertebrate growth, creating more food sources for waterfowl. **Add one "habitat haven" to the *nesting* habitat.**

A new water treatment plant reduces the amount of pollutants released into a wetland.
**Add one "habitat haven" to the *nesting* habitat.**

# Habitat Evaluation Data Form

FOR STUDENTS

| **Date:**<br><br>_____<br>**Study Site Location:**<br><br>_____ | **Species #1:**<br><br>_____<br>**Distance of Home Range**<br>*(if traveling in a straight line):*<br><br>_____ | **Species #2:**<br><br>_____<br>**Distance of Home Range**<br>*(if traveling in a straight line):*<br><br>_____ |
|---|---|---|
| **Part 1: Food Source**<br>(examples: acorns, nectar) | | |
| **Part 2: Location of Food**<br>(examples: oak tree by slide, flowers by front door) | | |
| **Part 1: Water Source**<br>(examples: dew, pond) | | |
| **Part 2: Location of Water**<br>(examples: dew on grass, small pond near the trees) | | |
| **Part 1: Shelter**<br>(examples: nest, burrow, rock) | | |
| **Part 2: Location of Shelter**<br>(examples: nest in pine tree, hole in the hill along fence) | | |
| **Distance between Food and Water** | | |
| **Distance between Water and Shelter** | | |
| **Distance between Food and Shelter** | | |

FOR STUDENTS

# Field Investigation Analysis

1. How far must the animal travel if it goes from its shelter to a food source, then to a water source, and then back to its shelter?

2. Based on your earlier research, how does the distance the animal must travel compare with the animal's home range?

3. If the animal's food, water, and shelter are too far for the animal to travel, what do you think the animal would need to do in order to survive?

4. Do you think this site is a good habitat for your animal? Why or why not?

5. Can you answer your original field investigation question based on the information you gathered? If yes, answer the question in one or more complete sentences. If no, explain what additional information you might need to answer the question.

6. What things have people done to change habitat in this area?

7. What things could people do to make this site a more suitable habitat for your species? Would these actions affect other species?

# Home Range and Habitat

FOR STUDENTS

Home range can be defined as the area within which an animal normally lives and finds what it needs for survival. Basically, the home range is the area that an animal travels for its normal daily activities. Many factors influence the size of a home range, including: species, number of animals (density) in an area, the time of year, the sex of the animal, and the type and quality of the habitat. Typically home range sizes fall within a range, for example, the home range of a gray squirrel varies from 1.2 acres to 8 acres. This is very dependent on the number of squirrels in the area and the quality of the habitat. The table below provides a comparison of home ranges and habitat components for four common animals.

| **Animal** | Gray Squirrel | Eastern Bluebird | Night Crawler | Ant |
|---|---|---|---|---|
| **Possible sizes of home range** (as area or volume) | 0.5–3.2 hectares | 0.8–2.2 hectares during spring, summer.<br>Often larger in fall, winter up to 240 acres. | 1500 cubic centimeters–1 cubic meter | 5,000 square meters |
| **Typical size of home range** (as area or volume) | 0.5 hectares | 0.8 hectares during spring, summer, early fall | 1 cubic meter | 1,000 square meters |
| **Size of home range if traveling in a straight line** (as distance) | 137 meters | 122 meters in spring, summer, early fall | 100 centimeters | Up to 100 meters |
| **Water** | Stream, pond, creek, dew, and some from succulent plant material | Ponds, creeks, bird baths.<br>Prefer running water. | Rain, dew.<br>Skin must stay moist. | Dew, moisture, or liquids from foods they eat, anywhere they can find water. |
| **Food** | Variety of nuts (acorns, walnuts), buds, flowers fungi | Mostly insects.<br>Some berries, such as dogwood | Dead leaves, soil, microorganisms, and animal remains | Fruits, plant materials, insects. A variety of foods depending on the species. |
| **Shelter** | Trees, tree cavities, leaf nests | Prefer running water. | Underground tunnels in soil | Most in soil underground. Some build ant hills. Others live in logs or other rotting plant material. |
| **Habitat Type** | Forest, woodlots, parks, backyards.<br>Must have trees. | Fields, shrubby fields, parks, backyards with scattered trees | Most not native to U.S. Live in soil in forests, fields, gardens. | Found in a variety of habitats from deserts to forests. Not found in Antarctica or the Arctic. |

# Wildlife and Water Source Note Cards

FOR STUDENTS

## Wildlife Signs

## Wildlife Signs

## Water Sources

## Water Sources

# Pervious vs. Impervious Investigation

FOR STUDENTS

**Date:** _____ **Time:** _____ **Study Site:** _____

**Names of field investigators:** _____

**Questions:**

**A.** Is the study site covered more with pervious or impervious surfaces?

**Prediction:** _____

**B.** What is the volume ($m^3$) of potential runoff of water from the study site?

**Prediction:** _____ **$m^3$**

**1. Take measurements of your study site. Map the site on graph paper.**

**2. Calculate the area of the study site:** (The example below assumes a rectangular-shaped study site)

Length of study site: _____ Width of study site: _____ Study site area (length x width): _____

**3. Calculate the total area of impervious surface on the study site:**
Measure the dimensions of each impervious surface in order to calculate the area. Impervious surfaces include buildings, paved areas, sidewalks, etc.

| Description of Impervious Surfaces | Length | Width | Area |
|---|---|---|---|
| #1: | | | |
| #2: | | | |
| #3: | | | |
| #4: | | | |
| **Total area of all impervious surfaces =** | | | |

**4. Calculate the % of impervious surface on the study site:** _____

$$\% \text{ impervious surfaces} = \frac{\text{sum of the areas of all the impervious surface X 100}}{\text{total area of the site}}$$

Is the study site covered more with pervious or impervious surfaces? Provide percentages in your explanation:

_____

**5. Calculate the volume of rainfall on the study site.** Volume = Area of study site x depth of rain per day/month/or year. Be careful! Make sure you convert all of your measurements to either metric units or standard units before completing calculations! **Volume =** _____ **($ft^3$ or $m^3$)**

**6. Calculate the runoff potential of the study site.** Runoff potential = % impervious surfaces x the total rainfall depth. **Runoff Potential=** _____**($ft^3$ or $m^3$)**

**7. Record on your map your observations of the path water takes during a heavy rainstorm.**

**8. Record on your map or on the back of this sheet any other observations about water flow.**

FOR STUDENTS

# The Life and Times of Somewhere Creek

While Somewhere Creek is not a real creek, it represents a typical urban freshwater creek, stream, or river.

Cecelia and Tomás grew up together in Someplace City. They've been friends since they were very young. Back then, their favorite thing to do was to splash around in puddles at the park in their neighborhood. Over the years their shared love of water has helped hold their friendship together. Cecelia loves math and wants to study engineering and work for the city water department when she grows up. Tomás can't understand what Cecelia finds so interesting about math, but he loves the water too. Ever since his family went rafting on Big River a few years ago, he's wanted to learn to fish and kayak. He'd like to be a river guide when he grows up.

In school, Cecelia and Tomás are studying their local watershed. Their assignment is to research water quality conditions of a body of water—a lake, stream, river, or reservoir—in their watershed. They picked Somewhere Creek, a stream that flows through their city neighborhood. Here is what they have learned so far.

Somewhere Creek begins as a fast-moving stream high in the mountains, many miles from Someplace City. A variety of fish and aquatic insects live in and around the water, and deep pools provide them shelter. Trees and shrubs along the bank also provide shade and shelter, and their roots hold the soil to the creek's banks. Shallow rocky areas of the creek (called riffles) stir up the water, and there are many small waterfalls. When Cecelia's parents took them to visit the upper reaches of Somewhere Creek, they saw many families playing and picnicking near the stream. Cecelia noticed a couple of artists who had set up their easels and were painting the beautiful scene. Tomás persuaded one of the people fly fishing in the stream to give him a casting lesson.

As the creek descends into the foothills, it naturally slows and begins to meander. Shrubs and thick grasses line the stream banks, and the water flows across the rocky bottom and through deep pools where the water is calmer and slower.

Further downstream, Somewhere Creek flows past farms and golf courses, picking up runoff that often contains fertilizers and other nutrients. Tomás has a cousin, Merced, whose family owns a farm near Tiny Town, an aptly named community along the banks of Somewhere Creek. A few times when he's visited his cousin during the summer, Tomás has noticed that the water in the local fishing hole (which is actually a small reservoir, created by a dam, that holds water used for irrigation) has turned brownish-green and has mats of algae floating near the water's edge.

Below the dam, Somewhere Creek picks up speed again, passing through an area where new homes are being built. Some of Merced's neighbors have sold parcels of their farmland to people who want to live in the country. Merced took Tomás here on their bicycles one day after a heavy rain. Tomás noticed that the stream was brown with soil that had washed into the creek from the construction sites. Merced told him that rocks at the bottom of the stream were all covered by fine silt now.

# The Life and Times of Somewhere Creek

FOR STUDENTS

Fifty miles from its beginnings, Somewhere Creek flows into a suburban area. Tomás and Cecelia took the bus there one Saturday. They saw people walking in the park along the creek's banks with their dogs and children. Some of the children were playing in the water, turning over rocks to look for aquatic insects, but they didn't seem to be having much luck. Cecelia's grandfather told her that fishing in that part of the creek was once fantastic but that it had become mediocre at best after all the roads, parking lots, and lawns were put in. He told Cecelia that the water had always turned a little murky and green in the summer and fall when water levels dropped, but now he refused to fish there because he'd noticed an oily smell and sheen on the surface of the creek during low water.

Further downstream, where Somewhere Creek flows into the Someplace City limits, Tomás and Cecelia learned that the creek used to overflow into a flat area, especially during the spring. About thirty years ago, the county built a channel lined with concrete to contain the stream and prevent flooding. Because they were now protected against floods, people built houses in the flat area, and Somewhere Creek flows swiftly by during high water. Over the years, some silt has collected on the bottom of the channel, but most of it gets washed away during periods of high, fast water.

As the creek enters the neighborhood where Cecelia and Tomás live, its channel becomes a tunnel under the streets. Most people in this neighborhood of Someplace City don't even know the creek exists.

Once it emerges from the tunnel, Somewhere Creek flows through downtown Someplace City. About 20 years ago, the city parks department planted trees and native plants along the stream bank. Now, the trees provide plenty of shade for the slow-moving creek. When Cecelia and Tomás visited this section of the creek, they noticed that some of the trees had fallen into the water and were left there to provide shelter for fish. The water here seemed cleaner than it did in certain places upstream.


NORTH AMERICAN BEAVER

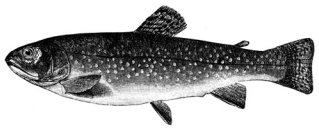
Downstream of the downtown park, Somewhere Creek flows past the city wastewater treatment plant, several manufacturing plants, and a fuel storage facility. Tomás and Cecelia talked with a local biologist who told them that the water in that part of the river was polluted with chemicals that made the water more acidic. No one knew exactly where the chemicals were coming from, but the city environmental protection department was conducting an investigation.

After flowing through Someplace City, Somewhere Creek continues its journey toward Big River, which eventually empties into the ocean.

FOR STUDENTS

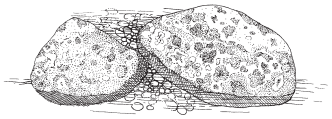
# Stream Inhabitants

### Cutthroat Trout, Brook Trout



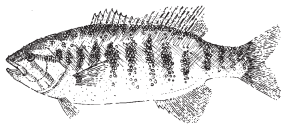
- Need very clean water with high levels of dissolved oxygen.
- Need colder water than many other fish.

### Spots of algae growing on rocks



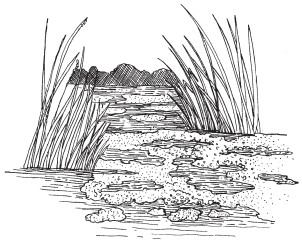
- Found in many water conditions from cold to warm, including fast-moving water.

### Rainbow Trout, Brown Trout, Smallmouth Bass, suckers, whitefish



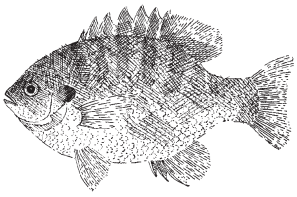
- Need relatively clean water.
- Can tolerate somewhat warmer water temperatures than cutthroat and Brook Trout.

### Large beds and floating mats of algae



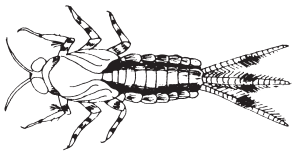
- Generally require slow-moving or stagnant water.
- Encouraged by high nutrient levels in the water.

### Carp, chub, shiners, sunfish



- Pollution tolerant.
- Prefer warmer, slower-moving water than other types of fish.

### Mayfly, caddisfly, and stonefly nymphs; gilled snails; adult riffle beetles; hellgramites (dobsonfly larvae)

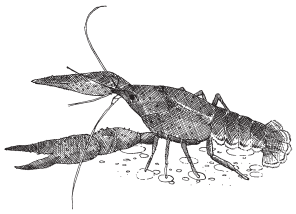


- Pollution sensitive.
- Need good to excellent water quality.

### Eelgrass, elodea, and other types of rooted aquatic plants

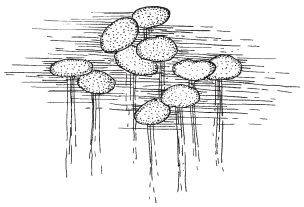
- Unlikely to grow in fast-moving water.

### Crayfish, riffle beetle and cranefly larvae, dragonfly and damselfly nymphs, clams and mussels



- Somewhat pollution tolerant.
- Need fair water quality to survive.

### Duckweed, water lily, and other types of floating aquatic vegetation



- Need slow-moving, sometimes even stagnant water

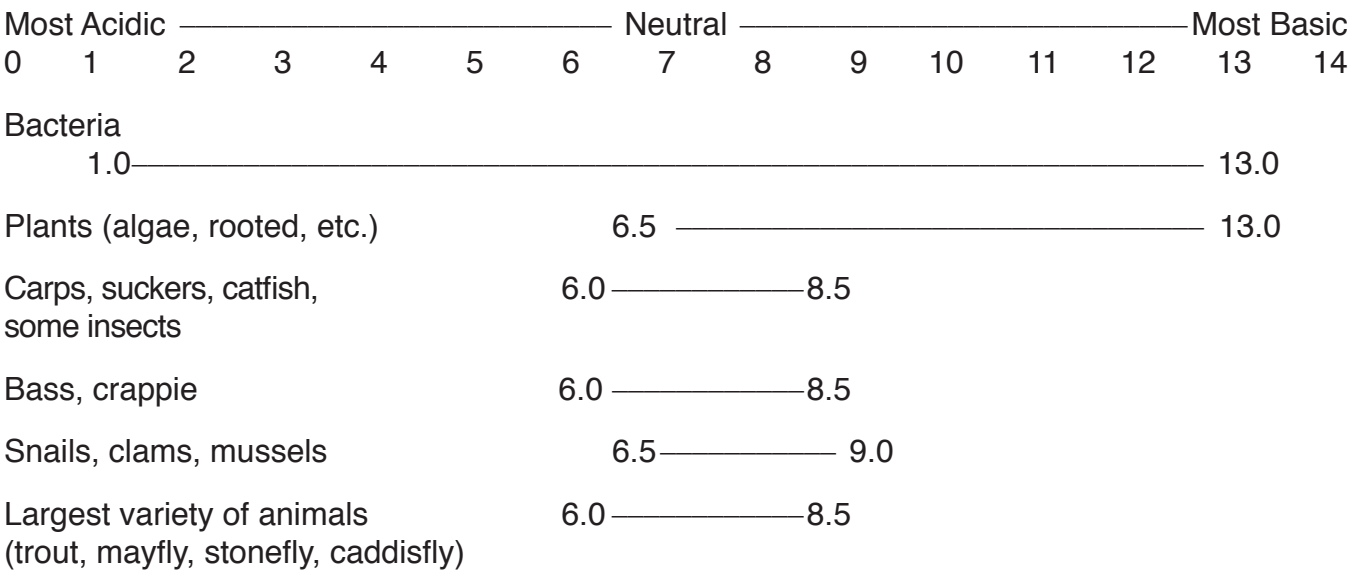
### Midge fly and blackfly larvae, leeches, aquatic worms, lunged snails

- Pollution tolerant.
- Can survive in water of poor quality.

# Aquatic Conditions Fact Sheet

FOR STUDENTS

## pH Ranges That Support Aquatic Life




## Temperature Ranges (Approximate) Required for Certain Organisms

| Temperature | |
|---|---|
| Greater than 68 F (20 C) = Warm water | Much plant life, many fish diseases<br>Most bass, crappie, Bluegill, carp, catfish, caddisfly, dragonfly, mayfly, mussels |
| 55 – 68 F (12.8 – 20 C) = Cool water | Plant life, some fish diseases<br>Salmon, trout, stonefly, mayfly, caddisfly, water beetles, smallmouth and rock bass, various minnows and darters, mussels |
| Less than 55 F (12.8 C) = Cold water | Trout, caddisfly, stonefly, mayfly, various minnows, darters, sculpins |

## Dissolved Oxygen (DO) Requirements for Native Fish and Other Aquatic Life (DO in parts per million [ppm])

| (Below 68 F)<br>Cold-water organisms including salmon and trout | (Above 68 F)<br>Warm-water organisms including fish such as bass, crappie, catfish, and carp |
|---|---|
| 6 ppm | 5 ppm |

FOR STUDENTS

# Student Worksheets I and II

## Student Worksheet I

| Where Organism Was Found | Sketch of Organism | Number Found |
|---|---|---|
| | | |

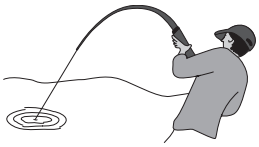
## Student Worksheet II

| Observations | Predictions |
|---|---|
| **Water Temperature** _____<br>**Air Temperature** _____<br>**pH** _____<br>**Dissolved $O_2$** _____ | |

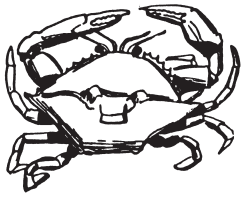
# Feeding Behavior Cards

FOR STUDENTS

## *Predators*

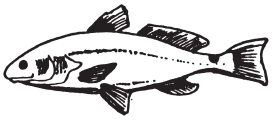


**Person Fishing:** Student walks forward casting line, and tags prey by grasping on the shoulder.

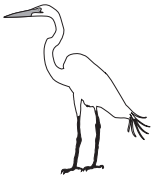


**Blue Crab:** Student walks sideways, waving arms like claws and grasps prey.

**Raccoon:** Student walks forward washing hands and grasps prey.



**Red Drum Fish:** Student walks with hands held forward like a mouth, and grasps prey.



**Egret:** Student struts with hands on hips, so elbows are like wings. Nearing prey, arms become a beak to grasp prey.

## *Detritus-Eaters*

**Juvenile Fish:** Gulps down detritus particles in the water or on the bottom. (Student puckers lips and makes sucking noises while feeding.)

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**Shrimp:** Stirs up mud and detritus with walking legs that lift particles to mouth. (Student makes stirring motions with both arms.)

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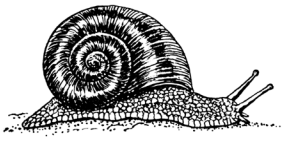
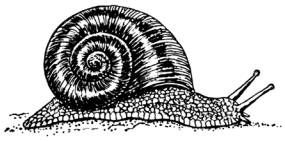


**Snail:** Licks up detritus with specialized tongue called radula. (Student displays licking motion, using one hand as the radula.)



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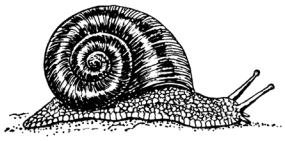

**Snail:** Licks up detritus with specialized tongue called radula. (Student displays licking motion, using one hand as the radula.)

**Oyster:** Filters detritus from water using gills. (Student waves arms back and forth in air.)

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**Fiddler Crab:** Picks detritus from sand with one or two claws. (Students pick objects from floor with thumbs and fingers acting as claws.)

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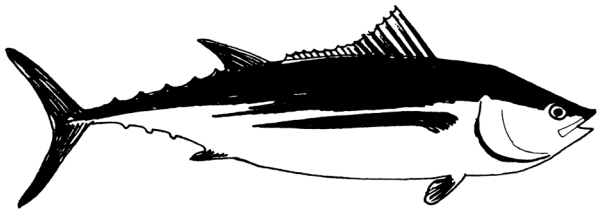
# Fish Adaptation Cards

FOR STUDENTS

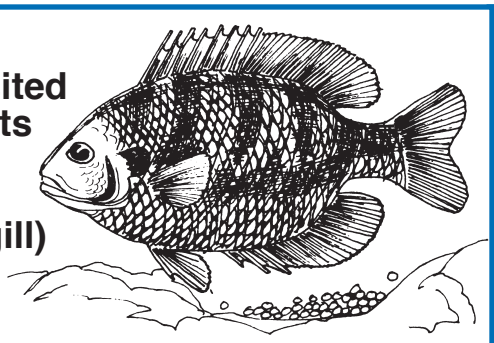


Light Colored Belly (Albacore)

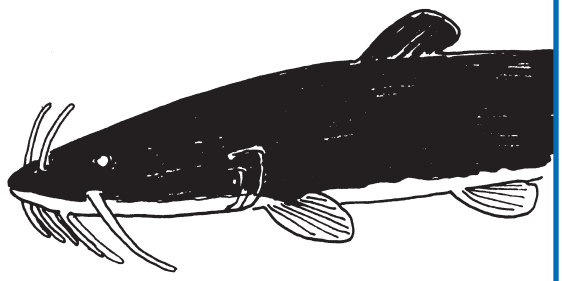
*Coloration*

Eggs Deposited in Nests

(Bluegill)



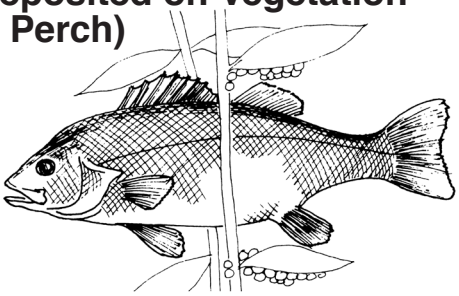
*Reproduction*



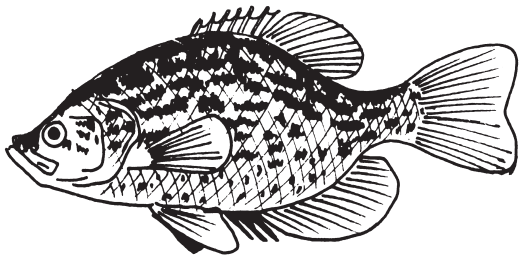
Dark Upper Side (Catfish)

*Coloration*

Eggs Deposited on Vegetation (Yellow Perch)

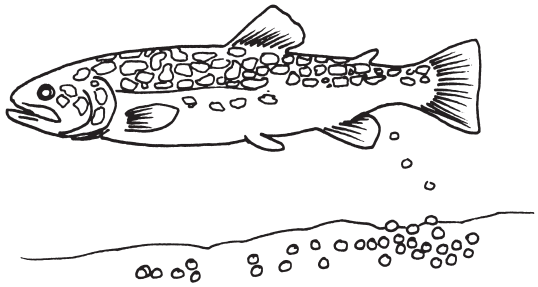


*Reproduction*



Mottled (Crappie)

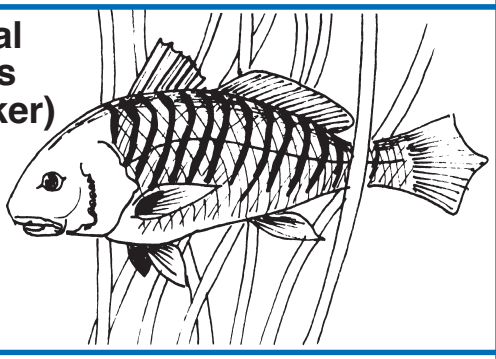
*Coloration*



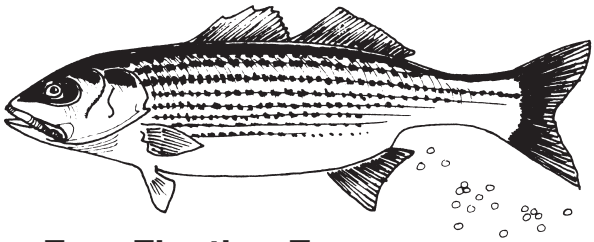
Eggs Deposited on Bottom (Trout)

*Reproduction*

Vertical Stripes (Croaker)

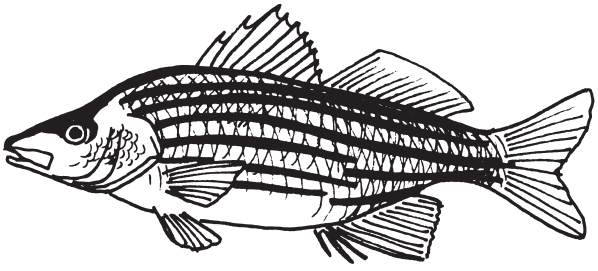


*Coloration*



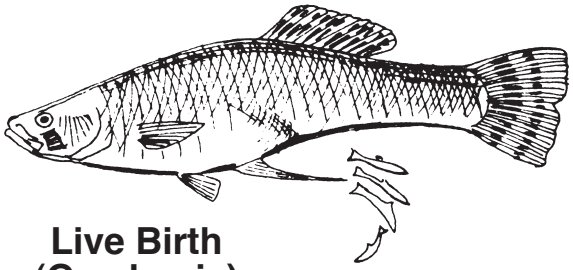
Free Floating Eggs (Striped Bass)

*Reproduction*



Horizontal Stripes (Yellow Bass)

*Coloration*

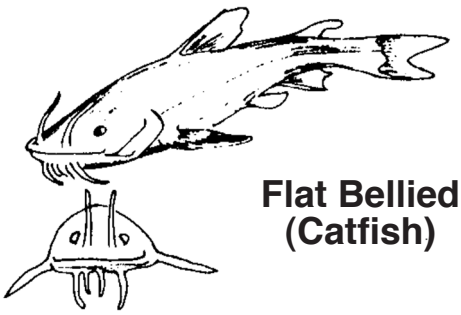
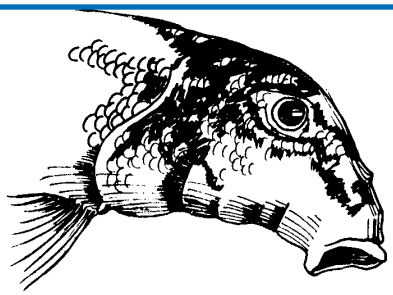
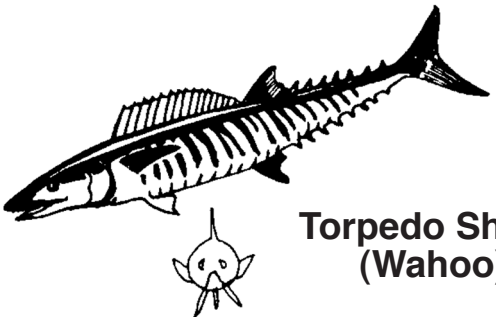
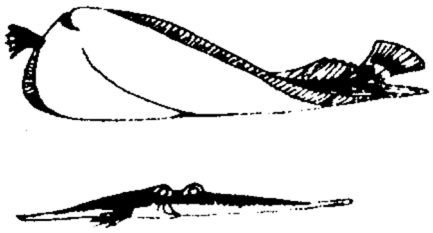
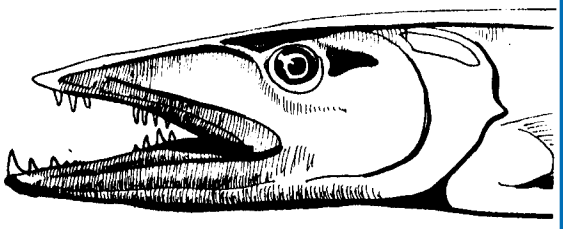
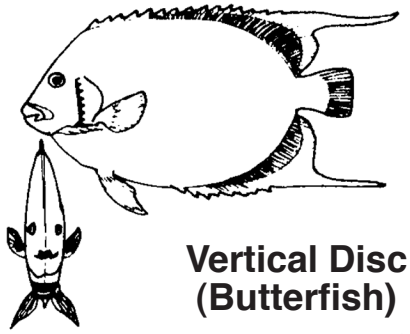
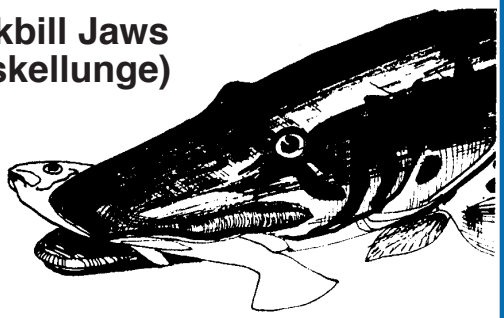
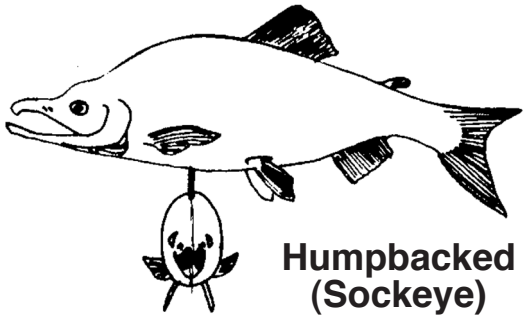
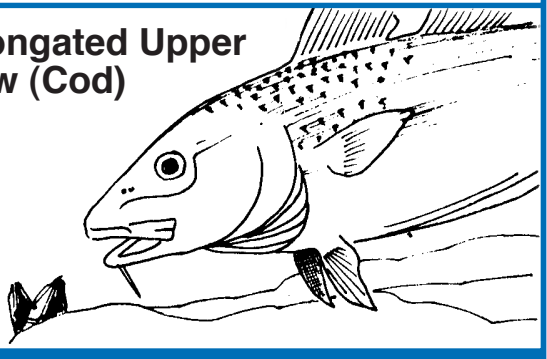


Live Birth (Gambusia)

*Reproduction*

FOR STUDENTS

# Fish Adaptation Cards

| | | | |
|---|---|---|---|
| *Shape* |  Flat Bellied (Catfish) | *Mouth/Feeding* |  Sucker Shaped Jaw (Sucker) |
| *Shape* |  Torpedo Shape (Wahoo) | *Mouth/Feeding* | Extremely Large Jaws (Grouper)  |
| *Shape* |  Horizontal Disc (Halibut) | *Mouth/Feeding* |  Elongated Lower Jaw (Barracuda) |
| *Shape* |  Vertical Disc (Butterfish) | *Mouth/Feeding* | Duckbill Jaws (Muskellunge)  |
| *Shape* |  Humpbacked (Sockeye) | *Mouth/Feeding* | Elongated Upper Jaw (Cod)  |

# Historic Salmon Range in the Columbia River Basin

FOR STUDENTS


*Adapted from WILD About Salmon, Idaho Department of Fish and Game, 1999.*

FOR STUDENTS

# Student Worksheet

| | Room Light | | UV Light | |
|---|---|---|---|---|
| | Moving | Not Moving | Glowing | Not Glowing (or glowing more faintly than controls) |
| Control Jar | | | | |
| Treatment 1 (mildest) | | | | |
| Treatment 2 | | | | |
| Treatment 3 | | | | |
| Treatment 4 | | | | |
| Treatment 5 (strongest) | | | | |