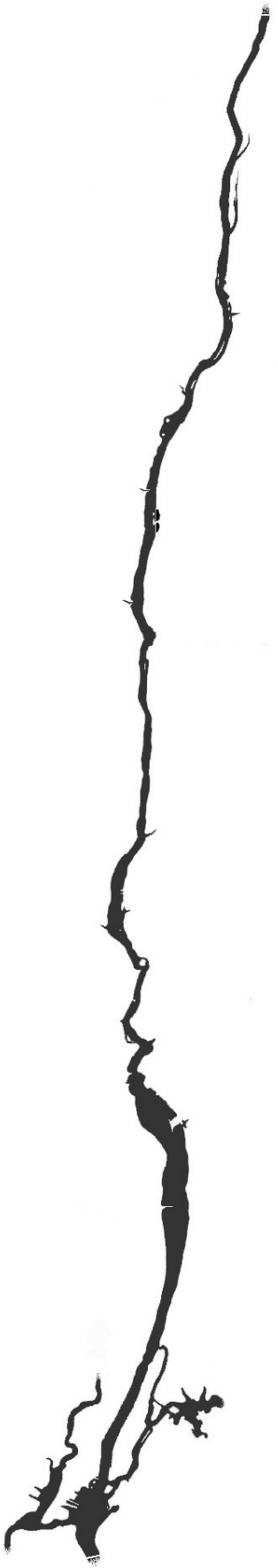

Hudson River Lessons for Kindergarten through Third Grade

Students will practice English language arts skills by listening to or reading short articles, then engage in activities to reinforce content and practice other skills.

Objectives: Students will respond to articles in ways that require:

- reading or listening for information and understanding;
- understanding scientific concepts pertaining to the living environment.

Grade level: Elementary (Grades K-3)

Subject Areas: English Language Arts, Science, Mathematics, Social Studies

New York State Learning Standards:

English Language Arts Standard 1
Mathematics, Science, & Technology Standards 4, 6
Social Studies Standard 3

Skills:

- Read and listen to acquire facts and ideas from texts.
- Gather and organize information about organisms and environmental phenomena.
- Interpret data presented in tables and maps.
- Describe major stages in the life cycles of selected plants and animals.
- Describe how plants and animals depend on each other and their physical environment.

Duration:

Preparation time: 5 minutes for each lesson
Activity time: 20-45 minutes for each lesson

Materials: Depending on the activity, each student may need:

- ☐ A copy of the selected article and worksheet
- ☐ Pencil, pen, crayons, or markers
- ☐ Scissors
- ☐ Tape or glue
- ☐ Measuring tape or ruler

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Background:
This collection allows young children to engage in standards-based study of the Hudson River. While the topics vary, the strategy is to have students read - or listen to the teacher read – each article and then engage in an activity that reviews content and uses other skills to process related information. English language arts skills are reinforced in all lessons. Other skills/understandings specific to each activity are listed below, as is a recommended grade level along with names and URLs of related lessons for older or more advanced students.

Meet the Hudson River/Mapping the Hudson River

- Draw maps and diagrams that represent places, physical features, and objects;
- Locate places within the local community and state;
- Designed for grade 2; for grades 3-7, see "From the Mountains to the Sea" link at www.dec.ny.gov/education/25398.html .

Growing Up as a Dragonfly

- Order and sequence objects and/or events;
- Describe the major stages in the life cycles of selected plants and animals;
- Designed for grades K-2.

Growing Up as an American Eel

- Order and sequence objects and/or events;
- Describe the major stages in the life cycles of selected plants and animals;
- Designed for grades 1-3; for grades 3-7, see "The Eel's Incredible Journey" link at www.dec.ny.gov/education/25398.html .

Growing Up as a Striped Bass/How Big? How Old?

- Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships;
- Measuring - making quantitative observations by comparing to a conventional or nonconventional standard;
- Understanding that each kind of animal goes through its own stages of growth and development during its life span;
- Designed for grades 2-3.

Hogchoker/Camouflage Hunt

- Identify the behaviors and physical adaptations that allow organisms to survive in their environment;
- Understanding that an organism's external physical features enable it to carry out life functions in its particular environment;
- Designed for grades K-2.

What Do Animals Need To Stay Alive? HABITAT!

- Understanding that animals depend on each other and their physical environment;
- Understanding that animals live in habitats and communities;
- Designed for grades 1-3; for grades 3-5, see also "Fish Communities of the Hudson" http://www.dec.ny.gov/education/25394.html .

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What Do Animals Need To Stay Alive? FOOD!

- Understanding that animals depend on each other and their physical environment;
- Understanding that organisms maintain a dynamic equilibrium that sustains life – for example, taking in food supplies energy and materials necessary for growth and repair;
- Designed for grades 1-3; for grades 3-6, see also "Dining Out With Fishes and Birds of the Hudson" http://www.dec.ny.gov/education/60486.html .

Activity:

1. Introduce the topic covered in the article.
2. The teacher may read the articles aloud – or have students read them – to the class to reinforce listening skills. They may also be assigned as in-class student reading.
3. The activities associated with the articles are best done in class.

Assessment:

- Answer sheets are provided for "Growing Up as an American Eel," "What Do Animals Need To Stay Alive? HABITAT!" and "What Do Animals Need To Stay Alive? FOOD!" For the other lessons, "correct" responses will vary with the individual or encompass a range of possibilities.
- Assess comprehension by having students share answers to questions about the articles, or collect and review worksheets.
- Make up additional questions about the content of the articles.

Resources:

To expand learning about topics covered in these lessons, more pictures of Hudson River organisms are available at http://www.dec.gov.ny/education/88154.html . Information about classification, size, habitat, place in food chains, and life cycle is included for each. The card-sized images are arranged on sheets to be printed back to back with this information. Each image can then be cut out with the appropriate text on the reverse side.

These children's books cover the Hudson and topics related to the content of these lessons.

- Lauber, Patricia. *Who Eats What? Food Chains and Food Webs*. HarperCollins Publishers, New York: 1996. Appropriate for ages 5-9.
- Locker, Thomas. *Where the River Begins*. Puffin Books, New York: 1993. Appropriate for ages 4-8.
- McKinney, Barbara. *A Drop Around the World*. Dawn Publications, Nevada City, California: 1998. Appropriate for ages 4-8.
- Pfeffer, Wendy. *What's It Like to Be a Fish?* HarperCollins Publishers, New York: 1996. Appropriate for ages 4-8.
- Prosek, James. *Bird, Butterfly, Eel*. Simon & Schuster Children's Publishing, New York: 2009. Appropriate for ages 6-10.
- Sill, Cathryn P. *About Fish: A Guide for Children*. Peachtree Publishers, Atlanta: 2002. Appropriate for ages 4-8.
- Talbott, Hudson. *River of Dreams: The Story of the Hudson*. G.P. Putnam's Sons, New York: 2009. Appropriate for ages 6-8.
- Wallace, Karen. *Think of an Eel*. Candlewick Press, Cambridge, Massachusetts: 2004. Appropriate for ages 4-8.

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Vocabulary List:

Adirondack Mountains: a group of mountains in northern New York State

angler: a person who fishes with hook and line

camouflage: colors and patterns that let animals blend in with their surroundings

carnivore: an animal that eats meat

community: a group of living things that interact and are located in one place

eel: a snake-like fish with smooth skin and a single fin running from its back around its tail to its belly

elver: a young eel

energy: the ability to do work, to power activity; the sun (solar) and food are sources

estuary: a body of water in which fresh and salt water meet

food chain: the path by which energy in food moves from one organism to another

fresh water: water that is not salty (rainwater is fresh water)

gill: in fish and other animals living in water, an organ used to draw oxygen from water

glass eel: a very young eel that is colorless; one can see through it

habitat: the particular sort of place where a given plant or animal lives

herbivore: an animal that eats plants

high tide: highest water levels in the tidal cycle

insect: an animal with the body clearly divided into a head, thorax, and abdomen, with six legs, and often with one or two pairs of wings

journey: travel from one place to another

lake: large inland body of standing water

life cycle: the sequence of forms and activities by which a living thing develops into an adult able to reproduce and restart the cycle

low tide: lowest water levels in the tidal cycle

metamorphosis: a change of form as a living thing transforms from one life stage to another – a tadpole to a frog, for example

migrate: to move from one place to another

nymph: immature insect

ocean: the entire body of salt water that covers 70 percent of the earth's surface

omnivore: an animal that eats both plants and other animals

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predator: an animal that eats other animals

river: a natural stream of water larger than a brook or creek

seawater: salty ocean water

spawn: to lay eggs; usually refers to animals that live in water

stage (of life): one of the distinct forms in the development of a plant or animal

surroundings: the setting around an animal or object of interest; its neighborhood

tides: the alternate rising and falling of the surface of the ocean

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Name: _____

Growing Up as an American Eel
ANSWER SHEET

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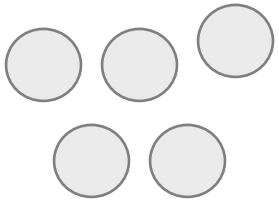
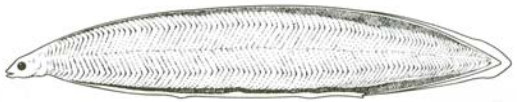


eggs

2



baby eel

3

glass eel

4

elver

5

adult eel

American Eel Life Cycle

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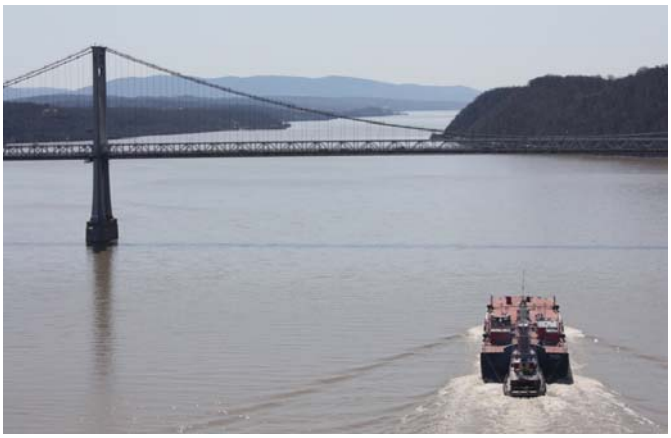
What Do Animals Need To Stay Alive? HABITAT! *ANSWER SHEETS*

Below are pictures of three Hudson River creatures and three Hudson River habitats. Draw a line joining each creature to its habitat.

A. The spotted sandpiper prefers sandy or muddy shorelines.



Hudson River at Poughkeepsie

B. The Atlantic sturgeon prefers deep water in large rivers and the ocean.

Tivoli North Bay

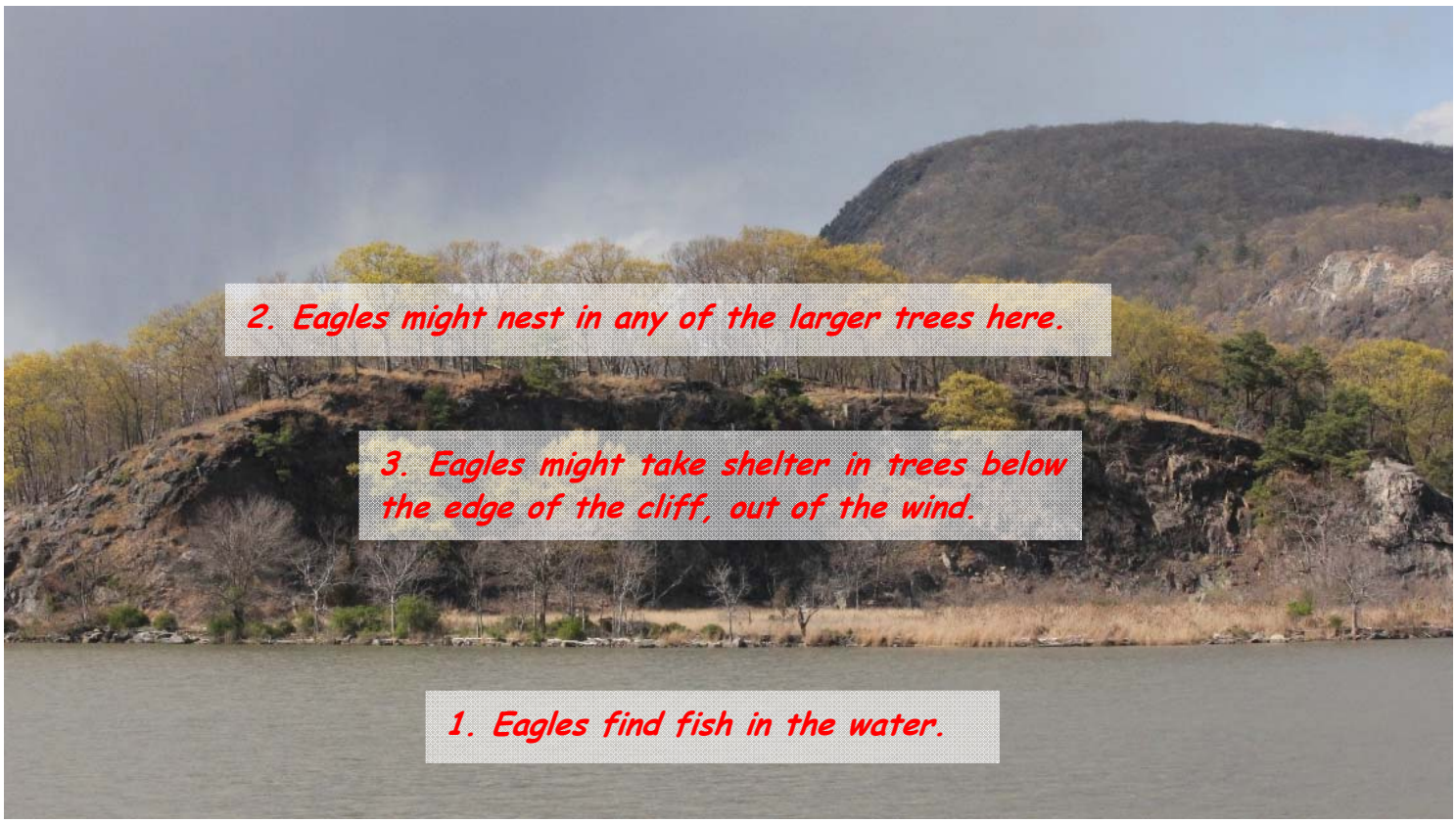
C. The marsh wren prefers marshes.

Hudson River beach in Port Ewen

Photo by Mike Pogue

In their habitats, animals find food, water, shelter, and a place to raise their young. Bald eagles need water to find the fish they eat. They need large trees for their big nests. In winter, they need shelter from cold winds at night.

Here is a picture of eagle habitat on the Hudson. Put the number **1** where an eagle would find food, **2** where it might build a nest, and **3** where it might find shelter from winds.



Round Island

What Do Animals Need To Stay Alive? FOOD! *ANSWER SHEET*

Different animals eat different kinds of food.

The muskrat eats plants. Animals that eat only plants are called **herbivores**.

The northern water snake is a **carnivore**. Carnivores eat other animals.

Some animals are not picky eaters. They eat plants and animals. They are called **omnivores**. The common carp is an omnivore.

Food chains show where living things get their energy. All food chains start with the sun. Green plants make their own food using sunlight. Animals must eat plants or other animals to live and grow.

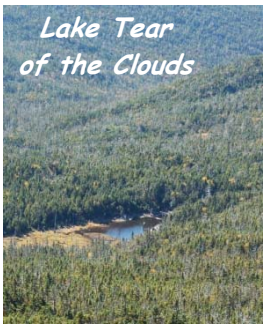
In this Hudson River food chain, arrows show where each living thing gets energy. The sun gives energy to the plant. The insect gets energy by eating the plant. The fish eats the insect to get energy. Last, the bird eats the fish to get its energy.

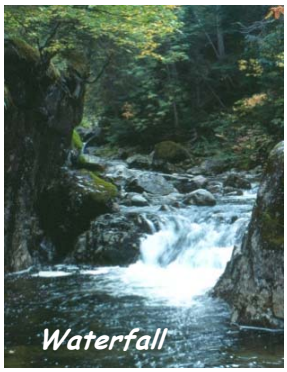
1. Are you an herbivore, carnivore, or omnivore? ***Except for vegetarians or very picky eaters, most people are omnivores.***
2. In this food chain, which animal is an herbivore? ***The insect.***
3. How many carnivores are in this food chain? ***Two, the fish and the bird.***
4. If insects disappeared, what would happen to fish and birds? ***The fish and birds would have a hard time finding food, and might not survive.***

Name _____Date_____

Meet the Hudson River

High in the **Adirondack Mountains** a **river** begins. It starts at **Lake** Tear of the Clouds. The river's **journey** is 315 miles long. It ends at New York City near the Atlantic **Ocean**. This river is called the Hudson.

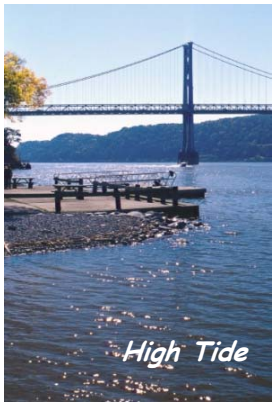




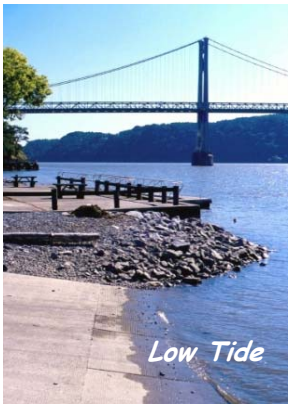
The Hudson River changes during this journey. It begins as **fresh water** flowing from the mountains. Here it rushes over rapids and waterfalls.

Later the Hudson passes small towns and big cities. It grows wider and deeper. Long bridges cross the river.

Near the ocean, salty **seawater** enters the Hudson River. It mixes with fresh water from the mountains. A place where this happens is called an **estuary**. Here you find crabs and other animals that like salty water.



At the seashore, **tides** make the water slowly rise and fall. At **high tide** the water's edge is far up the beach. At **low tide** it is low down on the beach. You can also see tides in the Hudson estuary. The tides and salty water show that this end of the river is an arm of the sea.



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Name_____Date_____

Mapping the Hudson River

Maps can show us land, rivers, lakes, mountains, roads, and cities.
Maps show us where things are.

Directions: Read the article ***Meet the Hudson River***. Then make a map of the Hudson River. Look at the article and its map if you need help.

- ☐ 1. On a clean sheet of paper draw the Hudson River.
- ☐ 2. Draw a compass rose to show directions.
- ☐ 3. Write the name of your town in the blank label below.
- ☐ 4. Cut out the labels. Paste each label in the correct place on your map. Again, if you need help look at a map of New York State or the map in the article **Meet the Hudson River**.
- ☐ 5. Draw in mountains, the Atlantic Ocean, and your town. Add bridges, the seashore, or any other places you might find on your map.
- ☐ 6. Using crayons, color in your map. Color the **Hudson River** and the **Atlantic Ocean** ***blue***. Color the **land** ***green***. Color the **mountains** ***brown***. Use any color for other places on your map.

Your town	Hudson River
Atlantic Ocean	New York City
Lake Tear of the Clouds	Adirondack Mountains

- ☐ 7. Sunfish live in fresh water. Sea robins live in salt water. Cut out the pictures below. Place the sunfish on your map where there is fresh water in the Hudson. Place the sea robin where there is salt water in the Hudson.


sunfish


sea robin

Name_____Date_____

Growing Up as a Dragonfly

I am a little animal, but I go through big changes. My **life cycle** takes place in **stages**. I look very different at each stage. There is a big word for these changes – **metamorphosis**.

My life cycle has three stages.

The first stage is an egg. My mother lays the egg in water.

The second stage starts when I hatch from the egg. Now I am called a **nymph**. You can see my six legs. That makes me an **insect**. I live underwater and breathe with **gills**.

Nymph

For the third stage I climb out of the water. My skin dries out and cracks open. Now you can see my new body. It is long, thin, and colorful. My gills are gone. Now I breathe air. My wings stretch out. I start to fly and catch tiny insects to eat.

Do you know what I am? I am an adult dragonfly.

Adult dragonfly

1. Color the pictures of each stage of the dragonfly's life cycle.

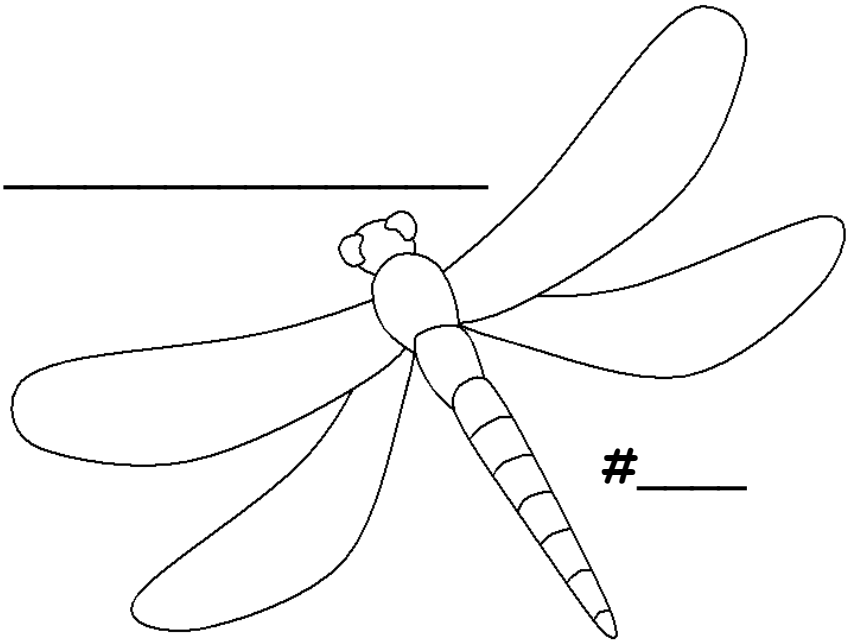
2. Write the name of the stage on the line next to each drawing, or cut out the names below and glue or tape them next to the correct drawing.

eggs	*nymph*	*adult dragonfly*

3. Cut out each drawing.

4. Label the drawings #1, #2, and #3 to put the stages of the dragonfly's life cycle in the right order.

_____



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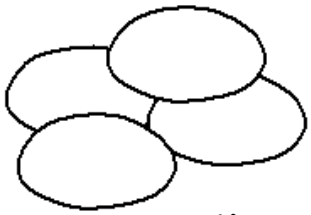

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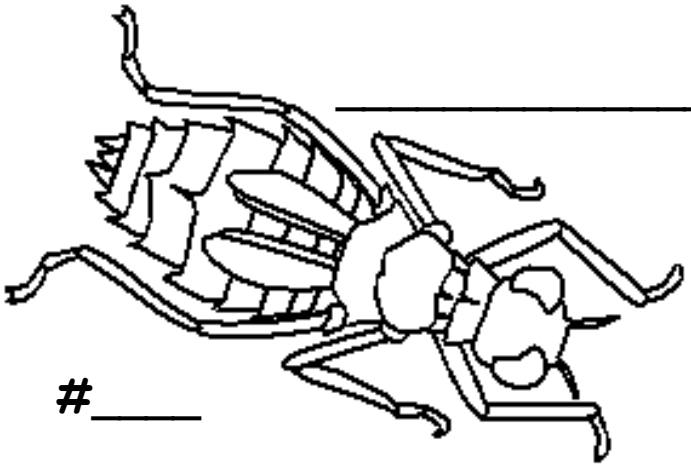

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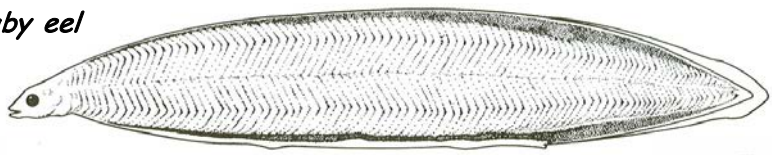
Name_____Date_____

Growing Up as an American Eel

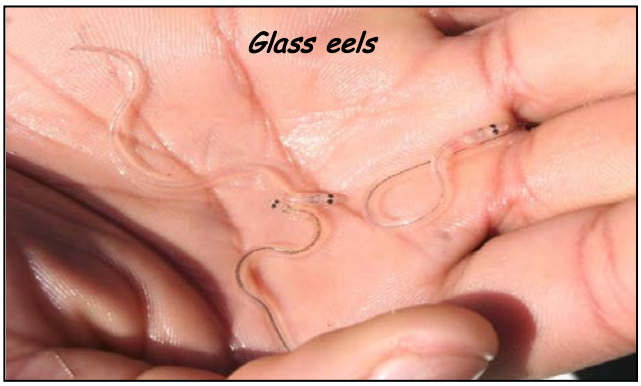
Could you find your way to a place you have not seen in twenty years? Without a map? The American eel can.

In the Sargasso Sea, a tiny **eel** is born. Just hatched from an egg, it looks like a piece of tape. Clear as glass. Only a few inches long.

Baby eel



Drifting across the sea, the eel begins its **journey**. It makes its way towards the Hudson River, changing along the way. The baby eel now looks like a tiny piece of spaghetti. At this stage of its **life cycle,** this fish is called a **glass eel**. You can actually see right through it!


Glass eels


Elvers

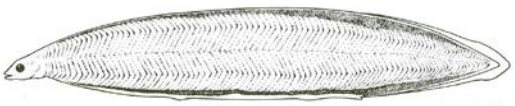
After about one year, the eel reaches the Hudson. It will change again. Its body becomes green, brown, or yellow. At this stage of the eel's life cycle, it is called an **elver**.

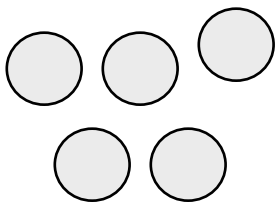
Elvers live in the river for 10 years or more. There they grow into adult eels. When eels are big and strong, they swim back to the Sargasso Sea where they were born. Here eels finish their life cycle. They will lay eggs and then die.


Adult eel

Follow the directions to make an American eel life cycle.

- ☐ 1. Cut out the pictures of the eel's life cycle.
- ☐ 2. Arrange the pictures **in the correct order** on the paper provided.
- ☐ 3. Paste pictures.
- ☐ 4. Fill in the blank lines with the names of the stages of the eel's life cycle: eggs, baby eel, glass eel, elver, adult

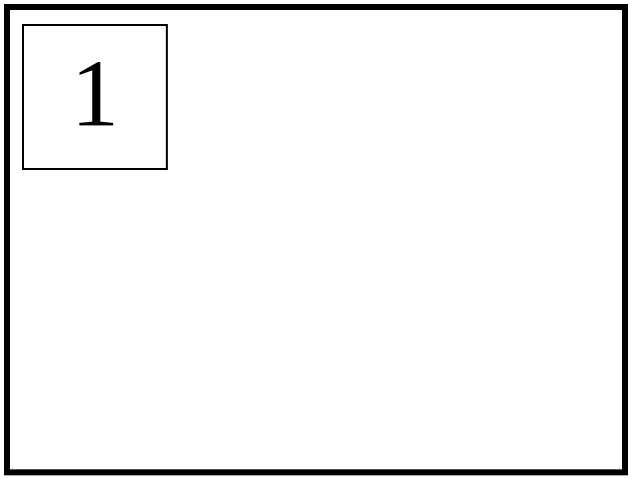




Name: _____

American Eel Life Cycle

1



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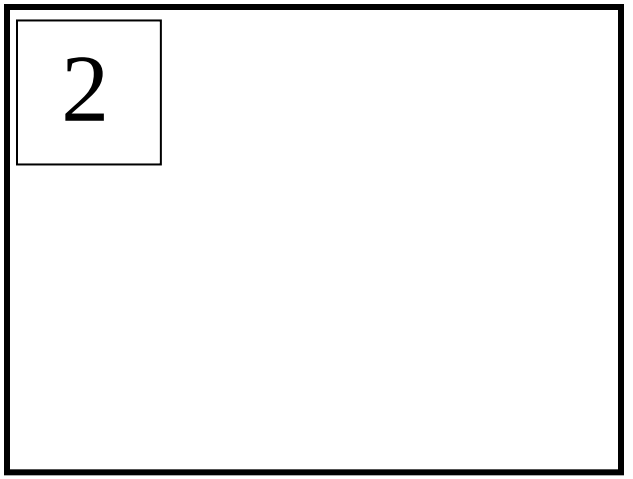

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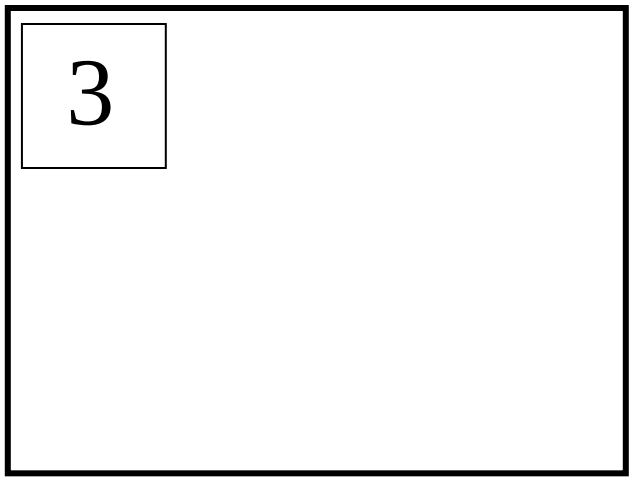

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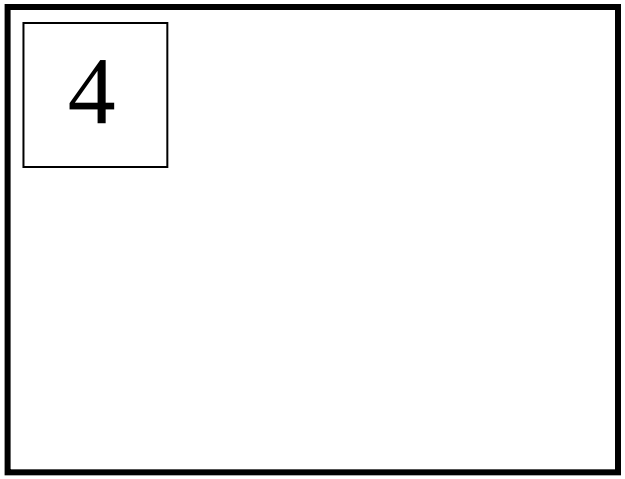

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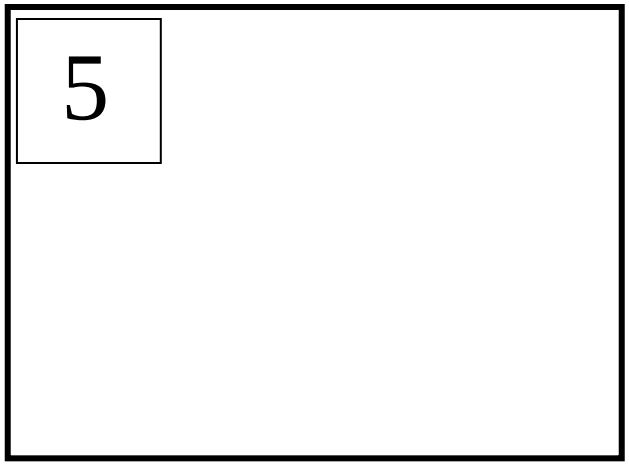

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Name_____Date_____

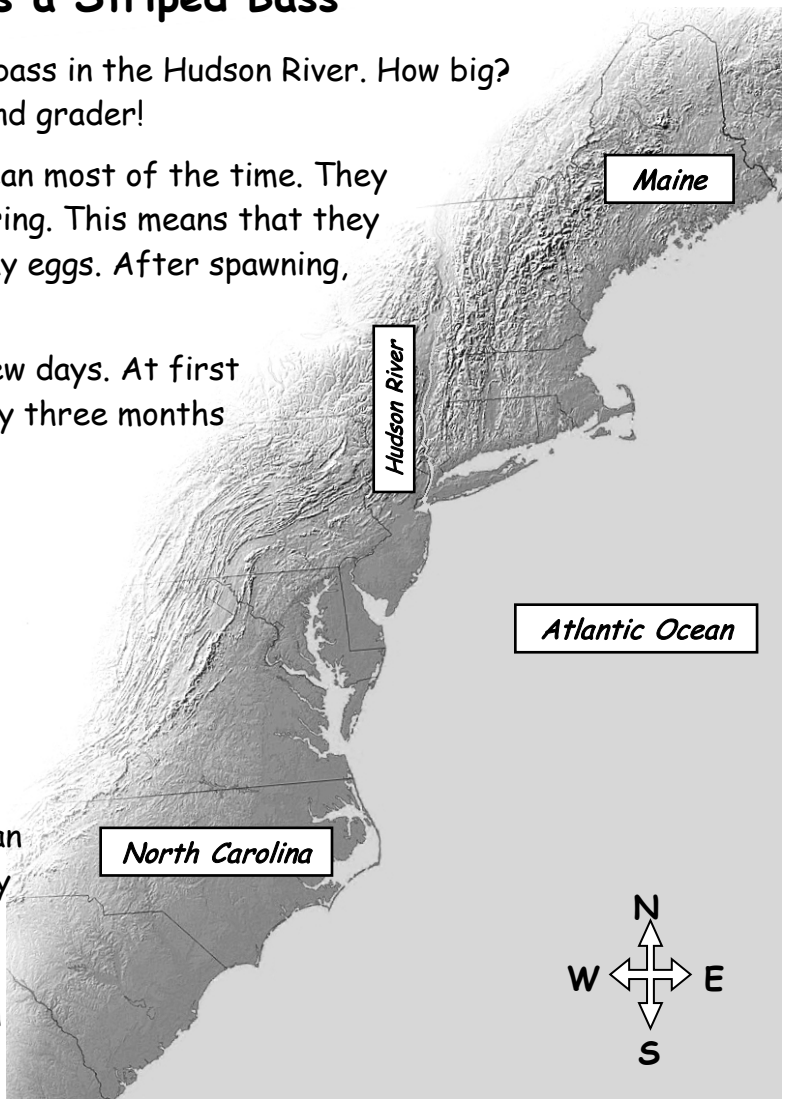
Growing Up as a Striped Bass

In spring, **anglers** catch big striped bass in the Hudson River. How big? Some of these fish are as big as a second grader!

Striped bass live in the Atlantic Ocean most of the time. They **migrate** into the Hudson to **spawn** in spring. This means that they swim from the ocean into the river to lay eggs. After spawning, these bass go back to the ocean.

Striped bass hatch from eggs in a few days. At first they don't look like their parents. Nearly three months go by before they get their stripes.

Most young bass go out into the ocean when they are two years old. There they may swim north to Maine in summer. In winter they may swim south to North Carolina. They come back to the Hudson to spawn after they are four years old.



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Name _____ Date_____

How Big? How Old?

This table matches the length and weight of a striped bass to its age. For example, a bass 20 years old would be 55" long. It would weigh 70 pounds.

1. How old are you?

_____ years

2. A striped bass as old as you is

_____ inches long.

3. A striped bass your age weighs

_____ pounds.

4. How much do you weigh?

_____ pounds

5. How old is a striped bass that weighs the same as you?

_____ years

6. How tall are you? Have a partner measure your height. Use a ruler or tape measure.

_____ inches

7. If a striped bass is as long as you are tall, how old is it?

_____ years

Table showing length and weight of striped bass ages 6-22 years

Figures are approximate.

Age of bass (in years)	Length of bass (in inches)	Weight of bass (in pounds)
6 yr	27"	10 lb
7 yr	29"	11 lb
8 yr	31"	13 lb
9 yr	33"	16 lb
10 yr	35"	18 lb
11 yr	37"	21 lb
12 yr	39"	24 lb
13 yr	41"	27 lb
14 yr	43"	32 lb
15 yr	45"	36 lb
16 yr	47"	42 lb
17 yr	49"	47 lb
18 yr	51"	55 lb
19 yr	53"	60 lb
20 yr	55"	70 lb
21 yr	57"	83 lb
22 yr	59"	95 lb

A scientist weighs a striped bass.

Name_____Date_____

Hogchoker Hunt

Have you ever looked for an animal and not found it? Some animals are hard to see. They blend in with their **surroundings**. This is called **camouflage**. Their colors, patterns and shapes help them to hide.

The hogchoker lives in the Hudson **River**. This fish is brown with a pattern of dark stripes. It lies flat on the muddy bottom. Would a hogchoker be easy to see?

Since this fish lies on the bottom, its eyes point up. Hogchokers keep watch for **predators** swimming overhead. Catfish and sturgeon might eat hogchokers.

Hogchokers also look around the bottom for food. They eat tiny worms, insects and other small creatures.

Camouflage Hunt

Which color hogchoker is hardest to find?

Directions:

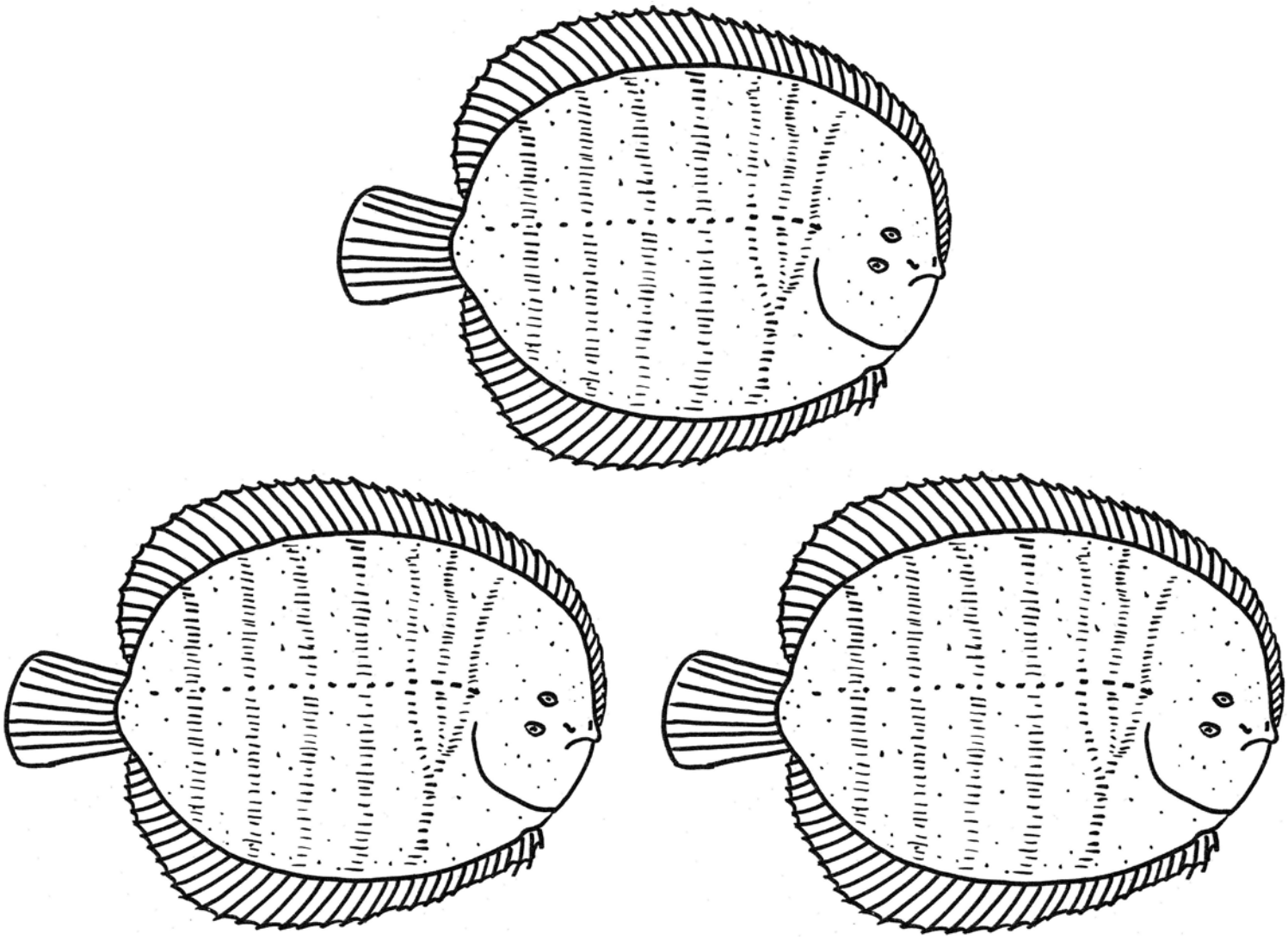
1. Color one hogchoker black, one brown, and one black and brown.

2. Cut out each hogchoker.

3. Go outside on to the playground. Place each fish where it will blend in with its surroundings. Do not hide them under or behind anything. They should be in view, but hard to see because of their camouflage.

4. Have a partner try to find each one. He or she will have only one minute to search.

5. Which color hogchoker was the easiest to find? Which one was the hardest?



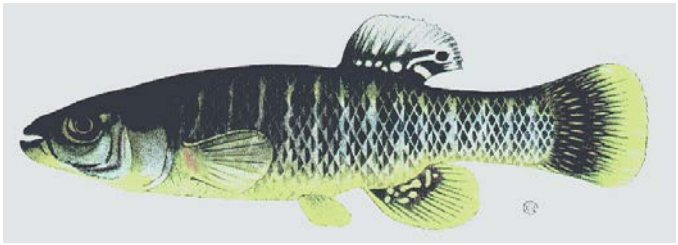
Name_____Date_____

What Do Animals Need To Stay Alive? HABITAT!

Where do you live? Is your home in a house? In an apartment building? Is it in the country? In a small town? In a city?

The people in your town or city belong to different families. They have different jobs. Yet they live together in a **community**. A community is a place where people live and work together. Here they have homes where they find food, water, and shelter.

This fish is a mummichog. It is found in the Hudson River. Do you think it lives in a house? In an apartment? In a town or a city?

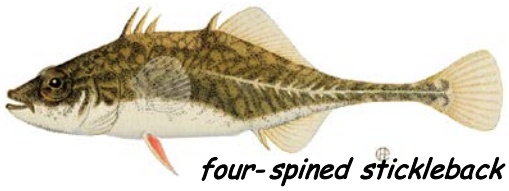


Fish do not build homes in towns, but each has a favorite place to live called a **habitat**. Habitats provide the food, water, and shelter fish need. Mummichogs prefer shallow water where plants grow. This picture shows mummichog habitat.

These fishes live in the same habitat as mummichogs. They belong to different families, but together they form a fish community.

banded killifish

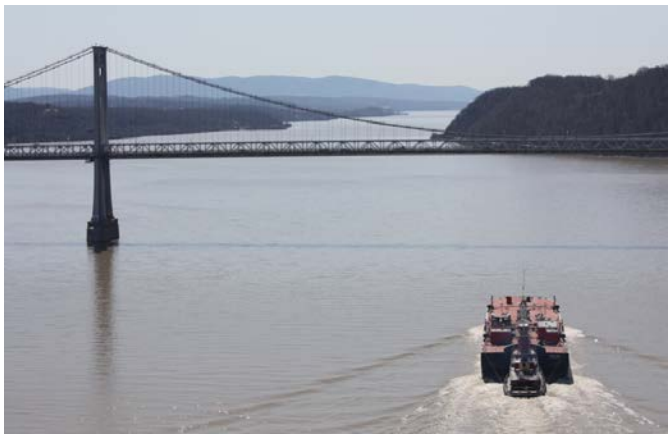
northern pipefish



four-spined stickleback

Below are pictures of three Hudson River creatures and three Hudson River habitats. Draw a line joining each creature to its habitat.

A. The spotted sandpiper prefers sandy or muddy shorelines.



Hudson River at Poughkeepsie

B. The Atlantic sturgeon prefers deep water in large rivers and the ocean.

Tivoli North Bay

C. The marsh wren prefers marshes.

Hudson River beach in Port Ewen

Photo by Mike Pogue

In their habitats, animals find food, water, shelter, and a place to raise their young. Bald eagles need water to find the fish they eat. They need large trees for their big nests. In winter, they need shelter from cold winds at night.

Here is a picture of eagle habitat on the Hudson. Put the number **1** where an eagle would find food, **2** where it might build a nest, and **3** where it might find shelter from winds.

Round Island

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Name_____Date_____

What Do Animals Need To Stay Alive? FOOD!

What would you do without food? Could you grow big? Would you be able to run and play?

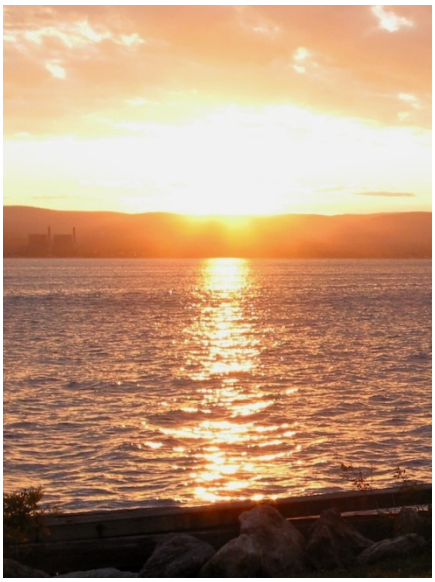
Eagle photos by Mike Pogue

All animals need food. This young bald eagle is eating a fish from the Hudson River. This food will become part of the bird's bones, muscles, and feathers.

Food also gives animals **energy**. They need energy to move, to make sounds, to see and to hear. The young eagle uses energy to keep watch. When it sees danger, it needs energy to fly away.

Plants need energy too, but they do not eat like animals. Plants get their energy from sunlight.

Green plants make their own food. They use sunlight and ingredients from soil, water, and air to grow.



Different animals eat different kinds of food.

The muskrat eats plants. Animals that eat only plants are called **herbivores**.

The northern water snake is a **carnivore**. Carnivores eat other animals.

Some animals are not picky eaters. They eat plants and animals. They are called **omnivores**. The common carp is an omnivore.

Food chains show where living things get their energy. All food chains start with the sun. Green plants make their own food using sunlight. Animals must eat plants or other animals to live and grow.

In this Hudson River food chain, arrows show where each living thing gets energy. The sun gives energy to the plant. The insect gets energy by eating the plant. The fish eats the insect to get energy. Last, the bird eats the fish to get its energy.

1. Are you an herbivore, carnivore, or omnivore?
2. In this food chain, which animal is an herbivore?
3. How many carnivores are in this food chain?
4. If insects disappeared, what would happen to fish and birds?

<u>Activity 1</u>. Draw a food chain that shows where <u>you</u> get your food and energy. Don't forget to start with the sun!

<u>Activity 2</u>. Create a food chain with real links.

1. Choose four strips from the food chain links sheets. One of the strips should be the sun. Another should be a plant. The strips will be the links in your chain.

2. Arrange your strips in correct food chain order.

3. Glue or tape the two ends of the **SUN** strip together to make a circle. This is your first link.

4. To make the second link, pass one end of the next strip through the **SUN** link. Then glue or tape the ends of the second strip together, connecting two circles.

5. Pass the third strip through the second link. Glue or tape its ends together to make the third link.

6. In the same way, make the fourth link of your chain.

7. Display your food chain by hanging it in your classroom.

Food Chain Links

INSECT

PLANT

SUN

BIRD

FISH

Food Chain Links

PLANT

INSECT

BIRD

SUN

FISH