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Tangled Web of Life

(adapted from *Web of Life* and *Tangled Web* in *Great Lakes in My World K-8*. Alliance for the Great Lakes. 2005. Chicago, IL.)

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Lesson Overview

Students make a yarn web of connections between Great Lakes species, discuss the complexity of the web and discover the impacts of changes to the web. Students will explore the feeding relationships in an ecosystem, as well as the different plants and animals that inhabit the Great Lakes. The focus is on native species, but the lesson also provides an opportunity to introduce invasive species to the yarn food web and highlight their impact.

Teacher Background

Food chains that show feeding relationships in an ecosystem are part of large and complex food webs. By exploring these relationships, students become familiar with the concept of food webs, as well as the different plants and animals that inhabit the Great Lakes. Non-native species are introduced, often accidentally, into new ecosystems. Hundreds of examples of non-native species (also known as exotic species) appearing outside of their native ecosystems are known from around the world. An “introduced species” is a non-native species that has been intentionally brought from its native ecosystem to a new one. Many times, non-native or introduced species cannot survive in the new ecosystem or, if they do survive, they don’t harm their new ecosystem. However, if the new species survives and spreads, it may cause harm to the native species populations, altering the ecosystem. Non-native species that cause harm to the ecosystem, to the environment, or to people are called “invasive species”. The Great Lakes have been altered and have adjusted to changes, including the introduction of non-native species, throughout history. In this lesson, students should think about how humans and other species have altered the Great Lakes.

Target Grade & Subject: Grades 5-8, Science

Duration: One 50-minute class period

Instructional Setting: Classroom

Advance Preparation:

Pull out all 35 Creature Cards with asterisks (*) from the set of Creature Cards. Then set the 9 invasive species cards to the side. Depending on how many students you have, you may want to make sure you have enough cards for everyone. If you have a smaller size class (<20) you want to make sure to have organisms from each trophic level (e.g. phytoplankton, zooplankton, crustaceans, fish, birds and humans) to make sure you’ll make enough connections to form a “tangled web”.

Learning Objectives

At the end of this lesson, students will be able to:

1. List 5 or more connections between Great Lakes organisms in a food chain.
2. Diagram a Great Lakes food web with a minimum of 5 organisms.
3. Give examples of changes and their potential impacts on a Great Lakes food web.

Michigan Science Performance Expectation Addressed <https://www.nextgenscience.org/search-standards>
MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics

Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*

SEP: Science & Engineering Practices <https://ngss.nsta.org/PracticesFull.aspx>

Engaging in Argument from Evidence

Engaging in argument from evidence in Gr. 6-8 builds on K-5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed worlds.

DCI: Disciplinary Core Ideas <https://www.nextgenscience.org/overview-dci>

LS2.A: Interdependent Relationships in Ecosystems

Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.

CCC: Cross-Cutting Concepts <https://ngss.nsta.org/CrosscuttingConceptsFull.aspx>

Stability and Change

Small changes in one part of a system might cause large changes in another part. (MS-LS2-5)

Materials & Quantities Needed per class and per student group

- Creature Cards with asterisks (*) from [Great Lakes in My World K-8](#). Alliance for the Great Lakes. 2005.
- Cards with possible situations (positive or negative) that affects a species or ecosystem: (-) invasive or non-native species competing with native species for food, (-) drought, (-) new construction, (+) wetland habitat restoration, (+) comeback of yellow perch population
- Ball of yarn
- Masking tape (optional)
- Web of Life student journal page
- Tangled Web student journal page (1 per student)

Guiding Question(s):

- Which native species live in the Great Lakes?
- How are these species connected to and dependent upon each other?
- In what ways might invasive species change the ways species in the Great Lakes interact with each other?

ENGAGE:

- 1) Discuss food chains by talking about the food eaten by humans. For example, if we eat a fish, that fish has possibly eaten a smaller fish, which ate microscopic zooplankton, which ate microscopic phytoplankton, which gained its energy from the sun. Have students trace back an element from their lunches to see how these connections apply.
- 2) Give each student one Creature Card. NOTE: Using those from the aquatic ecosystem will work best (with asterisks).

Ask students to silently read their creature name on the top left of the back side of the card, and then the “who eats me?” and “what I eat” sections on the right side of the card. You can then have 1 student stand up and read theirs aloud to the class. If another person’s creature is mentioned, they should stand up silently. Have these students then each say their creature names aloud. If other students hear a creature’s name that is in either the “who eats me?” or “what I eat” section of their card, they should silently stand up as well. Then, the new creatures that stood up should each say their creature names. Continue until all or most of the students are standing.

- 3) Show students examples of various Creature Cards that make up a food chain. Here is an example: sunlight (not a card), green algae, diporeia, yellow perch, lake trout, humans. Diagram this with students, using student page “Web of Life”.

Expected prior knowledge: *Students should be familiar with food chains and food webs.*

EXPLORE:

- 1) Have students sit in a circle and announce the names of their organisms. Make sure everyone understands what all the organisms are.
- 2) Holding the ball of yarn, tell students that you represent the sun. You will give your energy to one of the plants (e.g., algae) by holding onto the end of the yarn and passing the ball to a student with a plant card. When a student receives the ball of yarn, she/he should hold onto one end, and pass the ball to a student with the card of a species that her/his organism could eat OR be eaten by. It is VERY IMPORTANT that students realize that it can go to the species that eats their creature OR to a species their creature eats. Otherwise, a food web will not be successfully created. For example, the algae could pass the yarn to a zooplankton, who could pass it to a forage fish, and so on. Likewise, the fish could pass it back to something else it eats. Students look at the backs of their cards to determine what the species eats or is eaten by. Pass the yarn until it has reached everyone at least once. This may involve some problem-solving. A web will form between the students. Some species may be included more than once. Continue the game to find new connections.
- 3) At this point, give a hypothetical situation (positive or negative) that affects a species. For example, if the walleye have been over-fished, have the “walleye” give a light tug on his/her piece of the yarn. Have students “tug back” when they feel the tug, raising their hands as they tug for a visual of the web interconnections. Another example would be yellow perch population declining due to invasive alewives eating their larvae.
- 4) For each species, at least two others will feel a tug on the yarn and eventually everyone will. Other positive scenarios could include: a comeback in the yellow perch population or wetland habitat restoration.
- 5) Now, introduce an invasive species to the food web, such as: zebra mussels have entered the food web, reducing the amount of food available for native fish; or round gobies have competed with other fish and eaten their eggs, reducing their quantities. Select a native species to be impacted, such as lake trout. Have “lake trout” drop the yarn and have the rest of the class readjust the web to account for the change.

Supporting students during exploration: *Questions that the teacher could ask to guide the exploration.*

- What did the yarn look like after it had been passed to everyone? *A web.*
- Why did it look like this instead of a straight line or circle? *The food web connections are complex, like a web.*
- What happened when one organism dropped the yarn-- did the web stay the same, fall apart completely, or something else? *The rest of the web had to readjust. Other organisms were impacted, but the whole web did not collapse because it is complex enough that it can change and still survive.*
- What would happen if more and more scenarios were introduced, eliminating more parts of the food web? *The food web would ultimately look a lot different from the way it looked originally, and would be more simplified. Food webs that lack complexity are not as resilient to change as those with a diverse group of organisms.*

EXPLAIN:

Use the top half of the student page *Tangled Web* for each student to create a *Food Web Diagram*. Have each student create a food web diagram that includes 5-8 Great Lakes organisms. The food web should include several food chains. Use arrows to indicate who eats whom, and include all types (decomposers, producers, herbivores, omnivores, carnivores, scavengers). Students may need to ask questions of others who had different Creature Cards.

ELABORATE:

Have students share their food webs in small groups, looking for similarities and missing connections. Students can add to their food webs, based on the additional information they gather by seeing other students' food webs.

Supporting students during elaboration: *Questions that the teacher could ask to clarify student thinking.*

- What other organisms does each of these species impact?

EVALUATE:

Have each student write a brief explanation on the effects of changes in the food web when species' numbers are reduced or a species is eliminated.

Supporting students during evaluation:

- Which other organisms is your species connected to within the food web?
- How might they be affected by changes in the ecosystem?

New Vocabulary

Food chain - a series of organisms that eat each other: Humans – Lake Trout – Perch – Sculpin – Zooplankton - Phytoplankton

Food web - a group of interacting food chains in a living community

Safety Considerations: n/a

Sources

Alliance for the Great Lakes. 2005. "Web of Life", "Tangled Web" and Creature Cards. Great Lakes in My World K-8. Chicago, IL.

*Appendix***Supporting Materials:**

Teacher page to share with class "Web of Life"

Student journal pages "Tangled Web"

Creature Cards (PDF to print (<https://greatlakes.org/wp-content/uploads/2019/07/Printable-Creature-Cards-PDF-Version-2019.pdf>), or set ordered from Alliance for the Great Lakes (<https://greatlakes.org/>)

Creature Card Definitions

Carnivore: a flesh-eating animal

Colony: a population of plants or animals in a particular place that belong to one species

Consumer: a plant or animal that preys on other living things or eating particles of organic matter

Crustacean: any of a large class of mostly water-dwelling arthropods (as shrimps, wood lice, water fleas, and barnacles) having an exoskeleton of chitin

Decomposer: an organism that lives on and breaks down dead organisms

Detritus: particles of decaying organic material

Diurnal: active in the daytime

Endangered species: a species in immediate danger of extinction

Flock: a group of birds or mammals assembled together

Forage fish: fish that primarily eat phytoplankton and zooplankton (especially diporeia); they are prey for larger predators such as lake trout and whitefish; they include smaller fish such as herring, alewives, chubs, and smelt.

Herbivore: an animal that eats only plants

Introduced species: a plant or animal that is intentionally brought into an ecosystem by human beings either to diversify or to control a population within that ecosystem

Invasive species: a plant or animal that enters an ecosystem to which it is not native and competes with one or more species for food, shelter, and/or reproductive opportunities.

Larva: a young wingless, often wormlike, form (grub or caterpillar) that hatches from the egg of many insects

Migrate: to pass from one region or climate to another usually on a regular schedule for feeding or breeding

Creature Card Definitions

Mollusk: any of the category (phylum: mollusca) of invertebrate animals (as snails, clams, and mussels) with a soft body lacking segments and usually enclosed in a shell

Nocturnal: active in the night

Omnivore: feeds on both animal and plant matter

Phytoplankton: very small, freely floating plant that drifts with water currents

Plankton: small water organisms that exist in a drifting, floating state; is the base of freshwater ecosystems, provides food for larger animals and indirectly for humans, whose fisheries depend on phytoplankton and zooplankton

Predator: an animal that lives by killing and eating other animals

Prey: an animal hunted or killed by another animal for food

School: group of fish that swim together; generally of the same species for protection, feeding and other reasons

Sepals: petal-like leaves of flowering plants that lie under and protect the petals, often green in color or share the same coloring as the petals

Solitary: growing or living alone; not forming part of a group or cluster

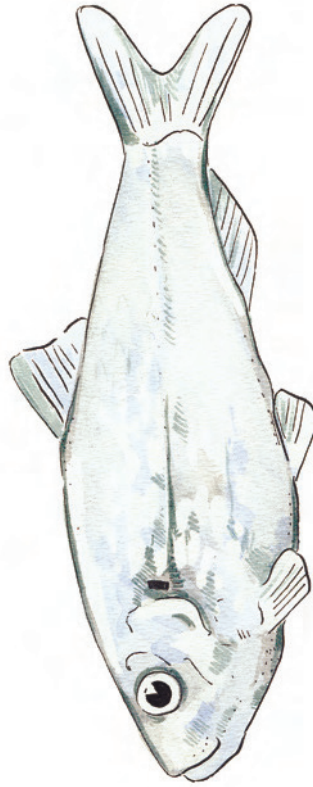
Spawn: to produce or deposit eggs

Species of concern: a plant or animal that may become threatened

Threatened species: a plant or animal needing special action to protect it from becoming endangered

Toxin: a substance produced by a living organism that is very poisonous

Zooplankton: very small floating or swimming animals that drift with water currents



Alewife*

Scientific Name:
Alosa pseudoharengus

who? description

Type: fish

Length: 15 cm / 6 in

Weight: 113 g / .25 lbs

Coloring: silver with blue or blue green luster on back

⌘ **Invasive Species**

where? environment

Habitat: lakes and oceans

Origin: Atlantic Ocean

what? characteristics

Feeding:

↳ **Who eats me?**
lake trout, salmon

↳ **What do I eat?**

phytoplankton,
zooplankton and small
crustaceans

Role: consumer, omnivore

Reproduction: lay eggs in
summer in water, near the
shore

Grouping: swim in schools
Activity: year-round



Interesting Fact *

Alewives are usually a salt-water fish, but they spawn in freshwater. After laying their eggs, many die and wash up along the lake shoreline in the spring and summer.

Size:



Bald Eagle*

Scientific Name:
Haliaeetus leucocephalus

who? description

Type: bird

Length: 76-94 cm / 30-37 in

Weight: 7 kg / 15 lbs

Coloring: dark brown body,
white head and tail

Body Features: yellow eyes,
beak, and feet

Size:



where? environment

Habitat: forested backdune,
lakeshore and seacoast, nests
in trees (especially conifers) or
on cliffs near water, nests are
182 cm / 6 ft wide and 91 cm /
3 ft high



Interesting Fact *

Bald eagles can see 3 or 4
times as far as humans and
eat one pound of fish in four
minutes. They have a 182 cm
/ 6 ft wingspan!

what? characteristics

Feeding:

↳ **Who eats me?**

scavengers eat dead eagles

↳ **What do I eat?**

dead or wounded fish,
aquatic birds, and mammals

Role: consumer, carnivore

Reproduction: 2 eggs in spring

Grouping: solitary or in pairs,
live in groups in winter

Activity: diurnal



Bloodworm*

Scientific Name:
Family: Chronomidae

who? description

Type: insect (in larval stage)

Length: 2.5-3.8 cm / 1-1.5 in

Coloring: red

Body Features: distinct head, segmented abdomen, prolegs (leg-like projections), and gills

where? environment

Habitat: muddy, bottom areas of ponds, lakes and rivers; the worms build tubes of mud around themselves that are attached to objects in the water



Interesting Fact *

A bloodworm is in the larval stage of its lifecycle. When it becomes an adult, it turns into a midge, an insect that looks like a mosquito. Freshwater bloodworms and humans both have hemoglobin which allows red blood cells to carry oxygen.

what? characteristics

Feeding:

↳ **Who eats me?**
fish, aquatic insects

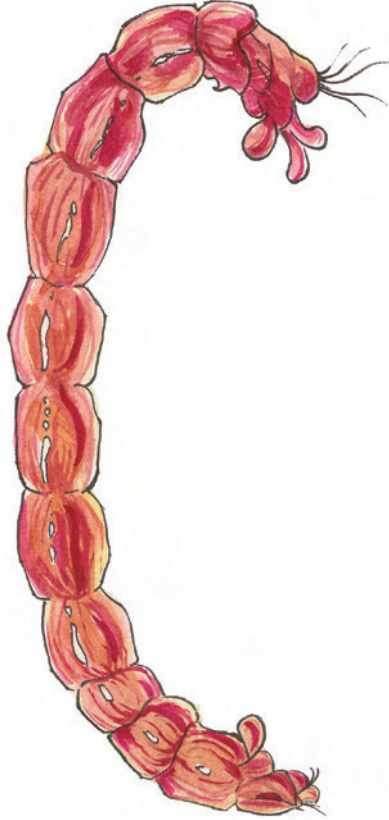
↳ **What do I eat?**
phytoplankton, detritus

Role: consumer, omnivore
Reproduction: lay eggs as adults

Grouping: often found in groups

Activity: mainly nocturnal

Size:



Blue-Green Algae (cyanobacteria)*

Scientific Name:
Anabaena, Microcystis

who? description

- Type:** bacteria
- Size:** microscopic
- Color:** some, but not all are blue-green; can be yellow-green, green, grey-green, grey-black, and even red
- Other:** microcystis colonies look like tiny grey-green clumps

ANABAENA



MICROCYSTIS

Size:



where? environment

- Sunlight:** varies - direct and dim sunlight
- Habitat:** water; attach to surface of rocks, stones and plants in water, or on the bottom sediment of lakes

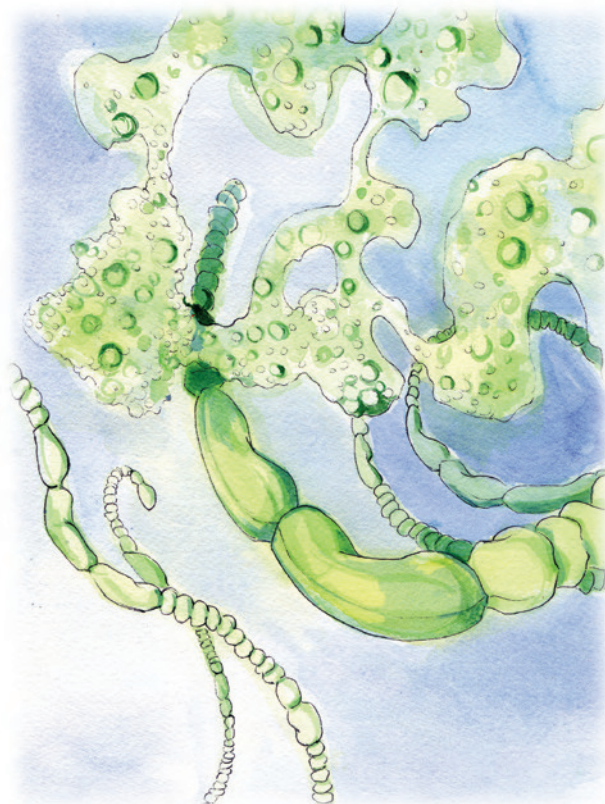


Interesting Fact ★

Blue-green algae movements can be seen under a microscope as they glide, rotate and jerk. Their fossils have been identified as over three billion years old!

what? characteristics

- Feeding:**
 - ↳ **Who eats me?** daphnia, copepod
 - ↳ **What do I use to make food?** sunlight
- Role:** producer
- Reproduction:** can grow individually as single cells or in colonies; when algae reproduces quickly it is called a "bloom"





Canada Goose*

Scientific Name:
Branta canadensis

who? description

Type: bird
Length: 63.5-114 cm / 25-45 in
Weight: 1-8 kg / 2-17 lbs
Coloring: black head and neck, white cheek patches, mottled grey-brown body
Body Features: brown webbed feet

Size:



where? environment

Habitat: interlunal pond, freshwater lakes, wetlands, ponds; builds a nest on the ground, near water



Interesting Fact *

Canada geese fly in a "V" formation during migration. They use their large, strong wings as weapons when protecting their young.

what? characteristics

Feeding:

↳ Who eats me?

coyotes eat geese; eggs are eaten by fox, raccoons and coyotes

↳ What do I eat?

Plants and insects

Role: consumer, omnivore

Reproduction: lays 5-7 eggs

Grouping: pairs and flocks

Activity: diurnal, migrate south in the winter

Common Loon *

Scientific Name:
Gavia immer

who? description

Type: bird

Length: 91 cm / 3 ft

Weight: 3-6 kg / 6-13 lbs

Coloring: black and white checkered body, black head, white belly and underwing, white collar

Body Features: large webbed feet



WINTER
SUMMER

Size:



where? environment

Habitat: freshwater lakes, sleep on deep water areas away from land; nest on small islands

what? characteristics

Feeding:

↳ **Who eats me?**

large fish, snapping turtles, gulls, eagles, crows

↳ **What do I eat?**

fish, crayfish, frogs, snails, salamanders, leeches

Role: consumer, carnivore

Reproduction: 2 eggs in summer

Grouping: pairs

Activity: diurnal



Interesting Fact *

Many bones of the loon's body are solid, rather than hollow like those of other birds. These heavy bones help loons dive for food.



Copepod (cyclops)*

Scientific Name:
Cyclops strenuus

who? description

Type: zooplankton, crustacean
Length: 2-3 mm / .08-.1 in
Coloring: clear, tan
Body Features: single eyespot and curved body

where? environment

Habitat: quiet waters of ponds, lakes, and rivers

what? characteristics

Feeding:

- ↳ **Who eats me?** insects and small fish
- ↳ **What do I eat?** algae, bacteria, dead plant and animal matter

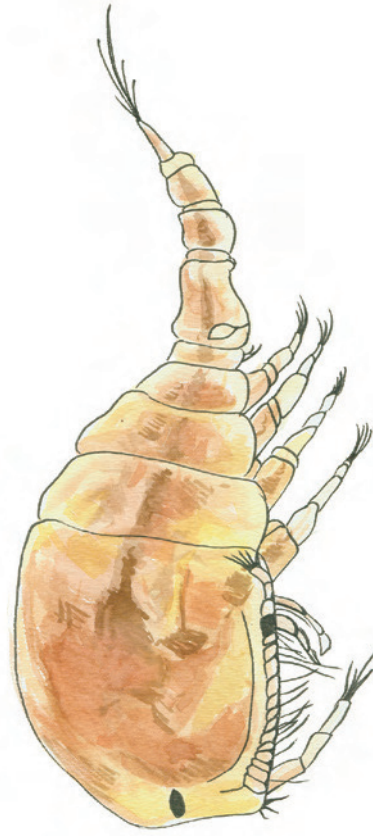
Role: consumer, omnivore
Reproduction: females carry twin egg sacs



Interesting Fact *

Copepods are difficult for scientists to catch to study because they dart so quickly! It is sometimes called a cyclops because the single eyespot reminds people of the one-eyed monster in Greek mythology.

Size:



Daphnia*

Scientific Name:
Daphnia pulex



who? description

Type: zooplankton, crustacean

Length: less than 3 mm / .1 in

Coloring: clear body tissue shows organs inside

Body Features: 5 pairs of legs used to capture food, large antennae are pushed downward for swimming

where? environment

Habitat: near the surface of lakes, ponds, and quiet streams



Interesting Fact ★

Dozens of daphnia can fit on a single fingernail.

what? characteristics

Feeding:

↳ **Who eats me?**
fish

↳ **What do I eat?**
phytoplankton

Role: consumer, herbivore

Reproduction: lays eggs in lake bottom sand, young hatch in spring

Size:

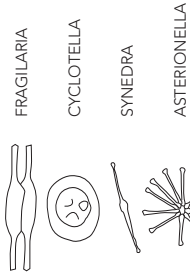


Diatoms*

Scientific Name: Asterionella, Cyclotella, Fragilaria, Synedra

who?
description

Type: phytoplankton
Height: microscopic – less than 1 mm / .04 in
Color: golden brown
Other: no leaves or flowers; single-celled organism



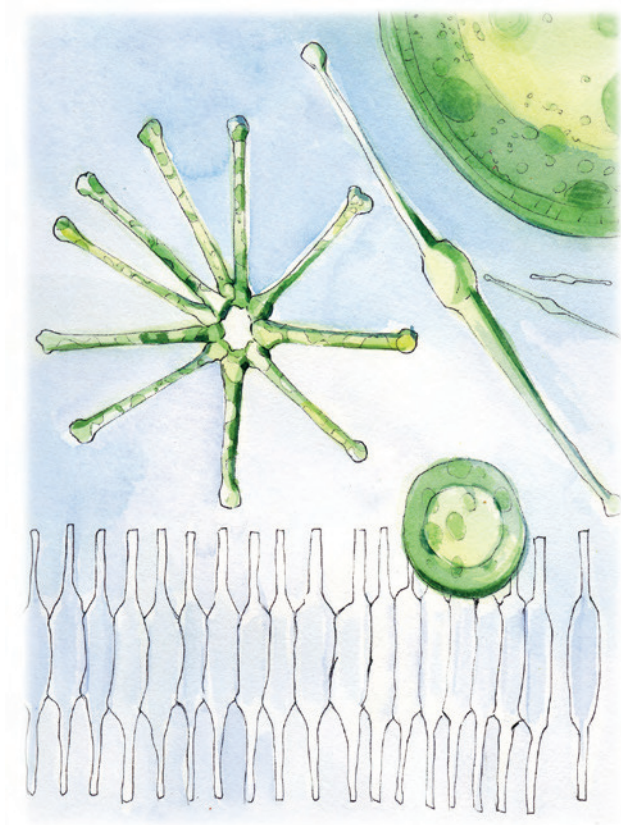
where?
environment

Sunlight: direct sunlight
Habitat: freshwater lakes and pond, and on the surface of oceans

Interesting Fact *
 More than 8000 kinds of diatoms exist. They are a major food source for fish. Diatoms have a shell or cell wall that has a pattern that lets scientists know what type of diatom it is.

what?
characteristics

Feeding:
 ↳ **Who eats me?** zooplankton, water fleas, copepods, snails, mollusks, fish
 ↳ **What do I use to make food?** sunlight
Role: producer
Reproduction: divide in half (cell division)



Diporeia*

Scientific Name:
Diporeia hoyi

who? description

Type: crustacean

Length: 1.27 cm / .5 in

Weight: .1 oz / 2.8 g

Coloring: clear, yellow

Body Features: 5 pairs of legs

where? environment

Habitat: freshwater lakes, spends time in the water column, lives in mud on lake bottom

what? characteristics

Feeding:

↳ **Who eats me?**
whitefish, chub, sculpin

↳ **What do I eat?**

algae and bacteria

Role: consumer, herbivore

Reproduction: lay eggs

Grouping: colonies

Activity: nocturnal



Interesting Fact *

Diporeia is a very important food source for forage fish. Even though they are small, they are high in fat and calories when eaten by fish.

Size:



Dragonfly (blue damer)*

Scientific Name:
Aeschna constricta

who? description

Type: insect

Length: 5-8 cm / 2-3 in wing-span

Coloring: primarily blue and green

Body Features: four wings operate independently

where? environment

Habitat: interdunal pond, in and around wetlands; under-water for first stage of life

what? characteristics

Feeding:

↳ **Who eats me?**
fish

↳ **What do I eat?**

mosquitoes, midges and other small, flying insects

Role: consumer, carnivore

Reproduction: lay eggs in water; first stage of life under-water; adult stage on land and in flight

Grouping: solitary

Activity: diurnal



Interesting Fact ★

Dragonflies are a living fossil; they have not changed for over 300 million years. They can hover, fly backwards, loop, and speed up to 56 km / 35 mi per hour.

Size:



Eurasian Milfoil*

Scientific Name:
Myriophyllum spicatum

who? description

Type: plant
Height: up to 91 cm / 3 ft
Leaves: 1.5-4 cm / .6-1.5 in long, have a feather-like outline, in groups of 4; stem is leafless towards the base, but branches out, the top often turns red

Flowers: lower ones are female, upper ones are male
 ⚠ **Invasive Species**



where? environment

Sunlight: moderate
Habitat: lives in water from 1-3 m / 3-9 ft deep

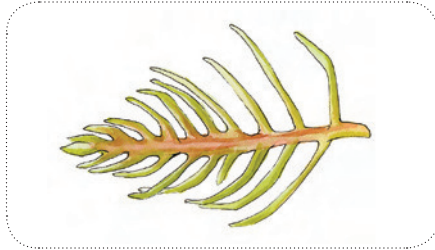
! Interesting Fact *

Eurasian milfoil is an invasive species brought to North America from Europe in the 1940's. It competes with native plants and can impair water quality.

what? habits

Feeding:
 ↳ **Who eats me?** water birds
 ↳ **What do I use to make food?** sunlight

Role: producer
Reproduction: stems release fragments that develop roots, new stems and leaves, then sink and grow from the bottom; can also be pollinated



Fingernail Clam*

Scientific Name:
Sphaeriidae



who? description

Type: mollusk
Length: 1.3 cm / .5 in
Coloring: cream, orange, white
Body Features: fine rows of concentric, raised lines

Size:



where? environment

Habitat: sandy bottom of freshwater lakes and streams



Interesting Fact *

Fingernail clams do not have eyes, a nose, or antennae, but they do have a foot they push out of the shell to help them to move.

what? characteristics

Feeding:

↳ **Who eats me?**
bottom feeding fish

↳ What do I eat?

plankton, bacteria

Role: consumer, omnivore

Reproduction: young emerge from parents in adult form

Activity: year-round

Green Algae*

Scientific Name: Closterium, Pediastrum, Scenedesmus, Tetraspora, Ulothrix

who? description

Type: phytoplankton
Size: microscopic - 1000 could fit on the head of a pin



SCENEDESMS



PEDIASTRUM



ULOTHRIX



CLOSTERIUM

TETRASPORA

Size:



where? environment

Sunlight: direct sunlight
Habitat: mostly freshwater, found in all 5 Great Lakes



Interesting Fact *

Algae is the base of the lake food web. It produces more oxygen than all of the plants on Earth combined. Of the more than 7,000 types of green algae in the world, cladophora is one type found in clumps along Great Lakes beaches.

what? characteristics

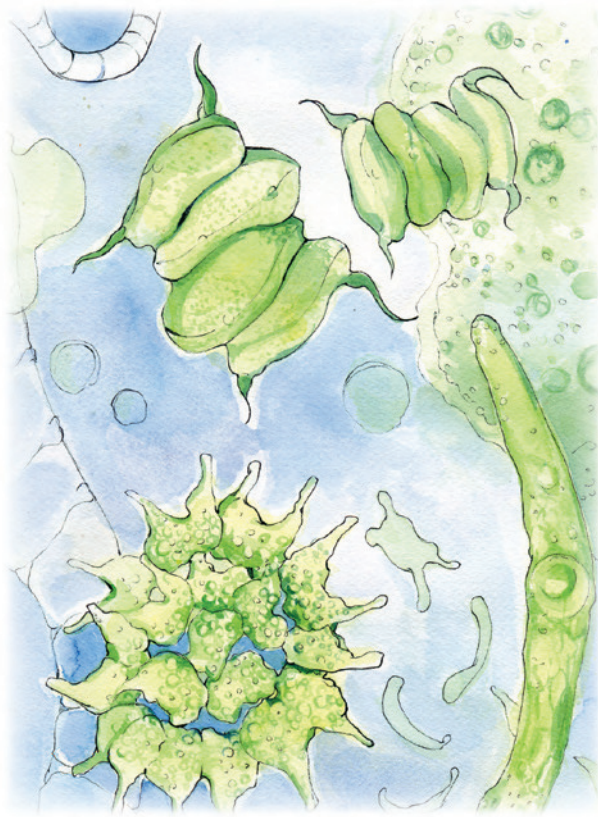
Feeding:

↳ **Who eats me?**
 water fleas, copepods, snails, mollusks, fish

↳ **What do I use to make food?**
 sunlight

Role: producer

Reproduction: can grow individually as single cells or in colonies; some have spores; when algae reproduce quickly, this is called a "bloom"



Herring Gull*

Scientific Name:
Larus argentatus

who? description

Type: bird

Length: up to 61 cm / 24 in

Weight: 1.1 kg / 2.5 lb average

Coloring: white, grey wing backs, yellow bill with red spot

Body Features: pink legs

Note: The ring-billed gull is also commonly found in the Great Lakes region. It has a black line around its beak and has similar characteristics to the herring gull.

Size:



where? environment

Habitat: beach, lakeshore and seacoast, grass nests on flat ground



Interesting Fact *

Herring gulls will travel up to 40 miles from home for food.

what? characteristics

Feeding:

↳ **Who eats me?**
other gulls, eagles eat young

↳ **What do I eat?**

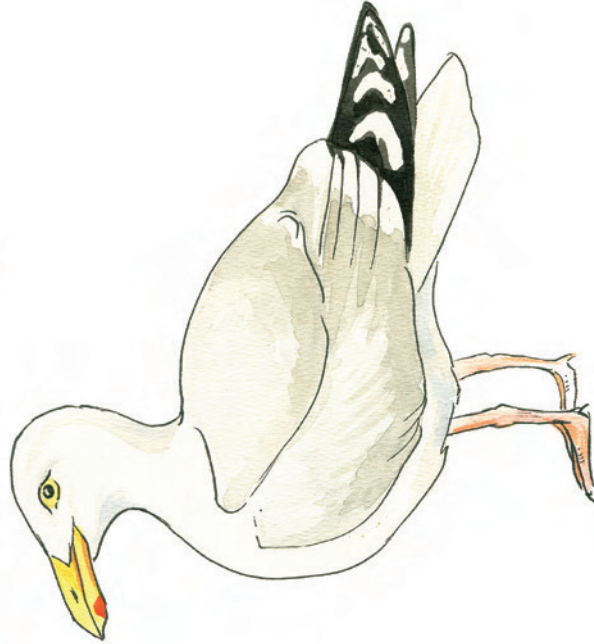
clams, small fish, small mammals, garbage, birds, dead animals

Role: consumer, omnivore, scavenger

Reproduction: 3 eggs in spring

Grouping: colonies

Activity: diurnal





Human*

Scientific Name:
Homo sapien

who? description

- Type:** mammal
- Length:** adults average 152-182 cm / 5-6 ft
- Weight:** adults average 50-91 kg / 110-200 lbs
- Coloring:** skin shades range including, white, pink, beige, tan, light-dark brown
- Body Features:** 2 arms, 2 legs, 10 digits on hands and feet
- Note:** rely on sense organs (eyes, ears, mouth, nose) and opposable thumb
- Size:**



where? environment

Habitat: homes in a variety of ecosystems, rural-urban; homes vary in shape, size, and material depending on culture and location



Interesting Fact *

Humans do not have natural predators and are able to live in many different types of environments.

what? characteristics

Feeding:

↳ Who eats me?

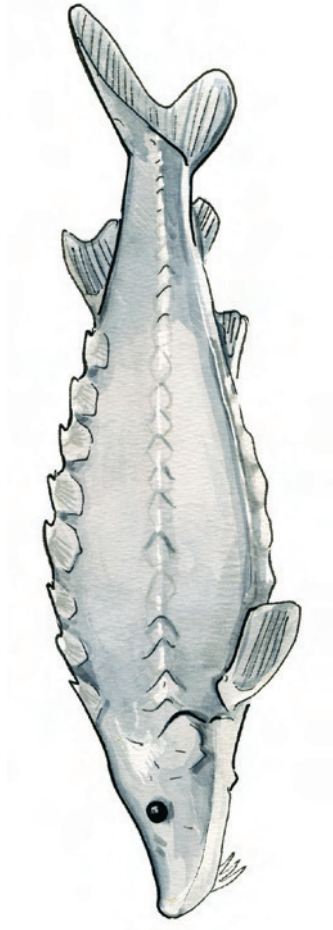
not a primary food source for animals, but may be eaten by large carnivores

↳ What do I eat?

depends on culture - various vegetables, fruits, nuts, fish (including lake trout and yellow perch), cows, pigs, chickens

Role: consumer, omnivore

Reproduction: live young which is generally raised by both parents



Lake Sturgeon*

Scientific Name:
Acipenser fulvescens

who? description

Type: fish

Length: 91-183 cm / 3-6 ft

Weight: 4-91 kg / 10-200 lbs

Coloring: olive brown to grey, white belly

Body Features: long, pointed snout with four barbels, or feelers, under the front of the snout

⚠ **Endangered in Illinois, Indiana, and Michigan**

Size:



where? environment

Habitat: freshwater lakes, lives on lake bottom

! Interesting Fact ★

The female sturgeon takes 20 years to mature and can live for 100 years. The sturgeon uses its barbels to find food on the lake bottom.

what? characteristics

Feeding:

↳ **Who eats me?**
humans and other fish eat eggs

↳ **What do I eat?**

crustaceans, mollusks, insects

Role: consumer, omnivore

Reproduction: eggs; spawns every 4-6 years in swift water

Grouping: solitary

Activity: diurnal

Lake Trout*

Scientific Name:
Salvelinus namaycush

who? description

Type: fish
Length: 43-69 cm / 17-27 in
Weight: 1344-4032 g / 3-9 lbs
Coloring: light spots on dark background, color can vary greatly from fish to fish

where? environment

Habitat: freshwater lakes, in cold, clear, deep water



Interesting Fact *

Lake trout are a popular food for humans and the invasive sea lamprey. This has caused overfishing and reduced fish population. The United States and Canada worked together to reduce lamprey numbers. Namaycush is a Native American word that means "dweller of the deep."

what? characteristics

Feeding:

↳ **Who eats me?**
sea lamprey, humans

↳ What do I eat?

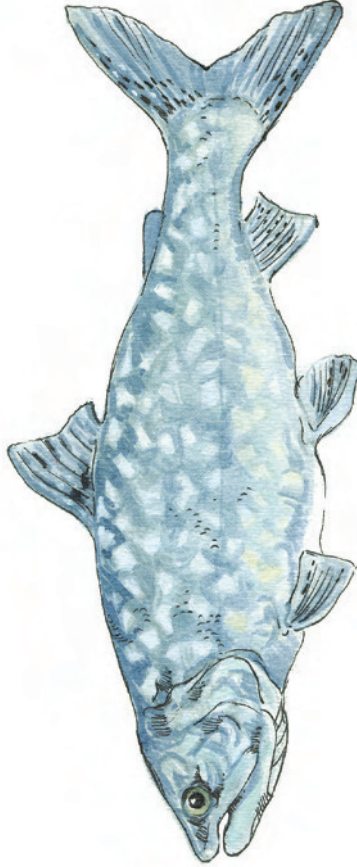
chub, sculpin, smelt, alewives

Role: consumer, carnivore

Reproduction: female lays up to 15,000 eggs; spawns in shallow areas

Activity: year-round

Size:



Lake Whitefish*

Scientific Name:
Coregonus clupeaformis

who?
description

Type: fish
Length: 43-56 cm / 17-22 in
Coloring: silver sides, greenish brown back
Body Features: two clear fins on the back and a blunt nose



where?
environment

Habitat: found in all five Great Lakes; prefer deep waters of up to 61 m / 200 ft, deeper in hot weather

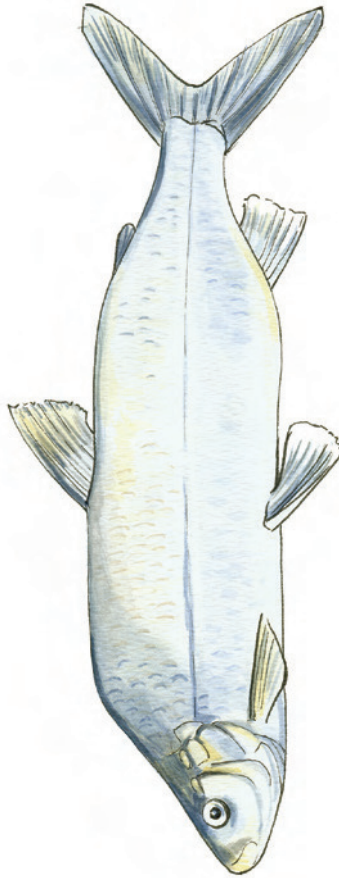
Interesting Fact *

The whitefish population seems to be making a comeback after years of over-fishing and bad environmental conditions had reduced their population.

what?
characteristics

Feeding:
↳ **Who eats me?** lake trout, walleye, pike, humans; eggs eaten by other fish
↳ **What do I eat?** diptera, insects, freshwater shrimp, small fish, fish eggs

Role: consumer, carnivore
Reproduction: eggs laid in early winter in shallow sandy or rocky water 7 m / 25 ft deep; young hatch in spring
Grouping: swims in schools



Mallard Duck*

Scientific Name:
Anas platyrhynchos

who? description

Type: bird
Length: 50-60 cm / 19-23 in
Weight: 1.24 kg / 3 lbs
Coloring: male-green head, white neck ring, brown breast, yellow bill; female-all brown/white mottled, greenish bill, white patch around wing
Body Features: orange webbed feet



where? environment

Habitat: interlunal pond, freshwater lakes, ponds, swamps, grass nest on the ground

Interesting Fact *
The mallard is the most commonly recognized wild duck in the world.

what? characteristics

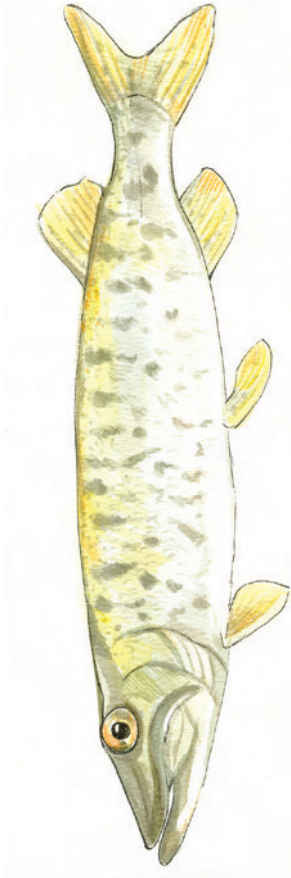
Feeding:
↳ **Who eats me?** muskellunge, humans, coyotes, snapping turtle
↳ **What do I eat?** emergent weeds, small invertebrates, larval insects, grains
Role: consumer, omnivore
Reproduction: 8-12 eggs in spring
Grouping: pairs or flocks
Activity: diurnal

Muskellunge*

Scientific Name:
Esox masquinongy

who? description

Type: fish
Length: up to 152 cm / 5 ft
Weight: 18-31 kg / 40-70 lbs
Coloring: silver green to light brown with dark bars, cream belly with small brown spots
Body Features: long head and snout, and a large mouth



Size:



where? environment

Habitat: freshwater lakes, near weed beds and shore

Interesting Fact ★

Muskies were often caught by fishermen as prize fish, but now fishing of muskies is regulated to protect the population.

what? characteristics

Feeding:

↳ **Who eats me?**
humans

↳ **What do I eat?**

other fish, ducklings, frogs, rodents

Role: consumer, carnivore

Reproduction: lay eggs in shallow water

Grouping: solitary

Activity: most active in warm weather

Opossum Shrimp*

Scientific Name:
Mysis relicta

who? description

Type: crustacean
Length: 2-3 cm / .8-1 in
Coloring: clear, beige
Body Features: 10 pairs of jointed legs

where? environment

Habitat: freshwater lakes, deep cold water

what? characteristics

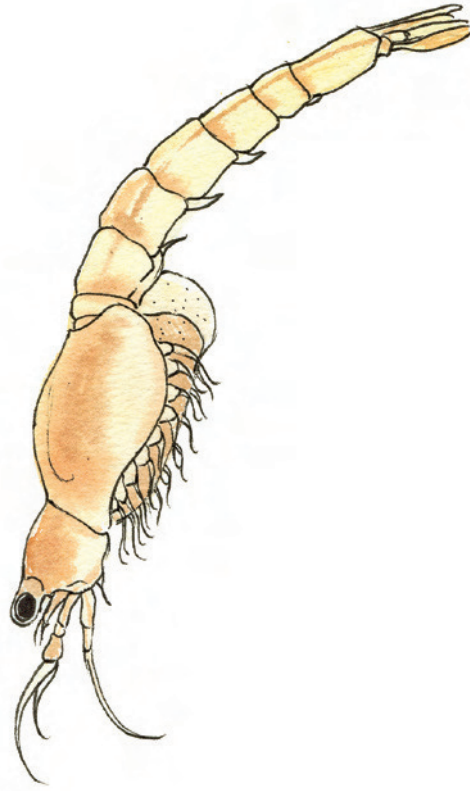
Feeding:
↳ **Who eats me?** lake trout, alewife
↳ **What do I eat?** Phytoplankton, zooplankton, copepods, detritus
Role: consumer, omnivore
Reproduction: female carries eggs in a pouch
Activity: diurnal movement and nocturnal feeding

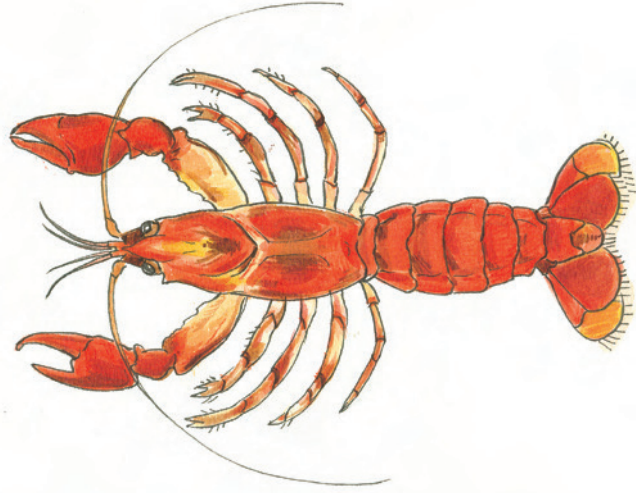


Interesting Fact *

Opossum shrimp look like a miniature crayfish. They are not actually shrimp.

Size:





Rusty Crayfish*

Scientific Name:
Orconectes rusticus

who? description

Type: crustacean
Height: 8-10 cm / 3-4 in
Coloring: red / brown color
Body Features: large claws and rusty colored spots on each side of the main body section

⌘ **Invasive Species**

Size:



where? environment

Habitat: lakes, ponds, and streams in areas where there is debris on the bottom
Origin: Ohio River basin

! Interesting Fact *

Rusty crayfish are an invasive species that have been spread when used for bait by fishermen. They have also been spread by science classes who have released them after being classroom pets.

what? characteristics

Feeding:

↳ **Who eats me?**
predator fish, birds, raccoons

↳ **What do I eat?**
aquatic plants and insects, fish eggs and small fish

Role: consumer, omnivore and scavenger

Reproduction: eggs are usually laid in the spring by the female

Grouping: young crayfish stay with their mother for several weeks. After, they tend to live independently

Activity: nocturnal

Scud*

Scientific Name:
Gammarus

who? description

Type: crustacean

Length: 2.54 cm / 1 in

Coloring: most are gray and tan; some are shades of green, blue, orange, and purple

Body Features: shrimp-like with an arched, flat body; two pair of antennae and nineteen paired legs

Size:



where? environment

Habitat: shallow water in lakes, ponds, and slow moving rivers with abundant vegetation and debris on the bottom



Interesting Fact *

Scud populations may be declining because of competition with the zebra mussel for phytoplankton.

what? characteristics

Feeding:

↳ Who eats me?

insects, amphibians, shore birds and fish like sculpin, smelt and chub

↳ What do I eat?

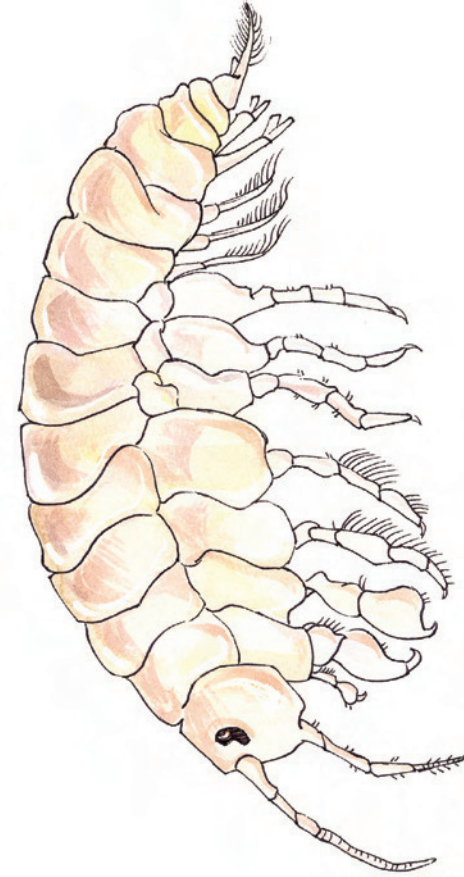
algae, dead plants and animals

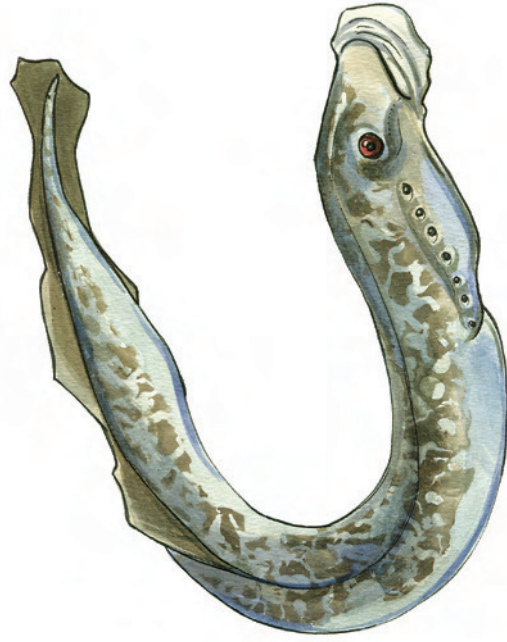
Role: consumer, omnivore

Reproduction: reproduces after 5-8 years

Grouping: colonies

Activity: mainly nocturnal





Sea Lamprey*

Scientific Name:
Petromyzon marinus

who? description

Type: fish
Length: 30-50 cm / 12-20 in
Weight: 226-363 g / .5-.8 lbs
Coloring: grey-blue, metallic purple, and silver
Body Features: long, slender body, mouth with sharp teeth enables it to suck out the fluid and tissue of fish, especially the lake trout

⌘ **Invasive Species**

Size:



where? environment

Habitat: freshwater lakes and oceans
Origin: Atlantic Ocean - Europe and North America



Interesting Fact *

Sea lampreys naturally live in saltwater, but came into the Great Lakes through canals. There are efforts to control the lamprey population because they do not have natural predators in the Great Lakes.

what? characteristics

Feeding:
 ↳ **Who eats me?** none in Great Lakes
 ↳ **What do I eat?** fish, including lake trout
Role: consumer, carnivore
Reproduction: lay eggs
Grouping: solitary
Activity: year-round

Spiny Water Flea*

Scientific Name:
Bythotrephes cederstroemi

who? description

Type: zooplankton, crustacean

Length: less than 1.3 cm / .5 in

Coloring: clear

Body Features: crustacean with long, sharp, barbed tail spine

⚡ **Invasive Species**

where? environment

Habitat: throughout the Great Lakes and some inland lakes

Origin: Eurasia

what? characteristics

Feeding:

↳ **Who eats me?**
some large fish

↳ **What do I eat?**
plankton

Role: consumer, omnivore

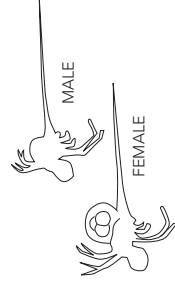
Reproduction: reproduce rapidly; during warm summer temperatures each female produces 10 offspring every 2 wks

Grouping: form clusters with each other

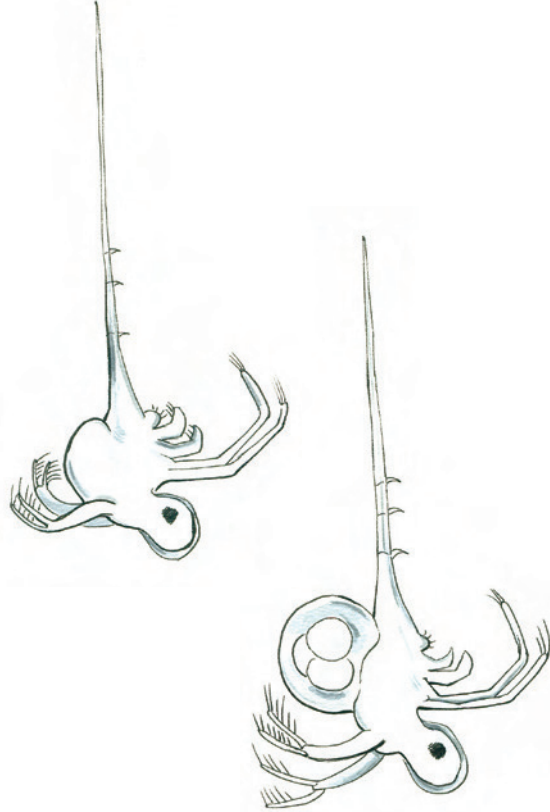


Interesting Fact *

This creature is not a flea, but a crustacean. Only some larger fish can eat it because the sharp tail spine is hard for smaller fish to swallow. It competes with fish for plankton.



Size:



Walleye*

Scientific Name:
Stizostedion vitreum

who? description

Type: fish

Length: 33-63 cm / 13-25 in

Weight: 4-2 kg / 1-5 lbs

Coloring: brown to yellow

Body Features: The young usually have dark blotches across their backs and down their sides

where? environment

Habitat: freshwater lakes, lives in deep water, near the bottom of the lake in weeds or rocks



Interesting Fact *

Walleyes have large, marble-like eyes that help them see well in dim light.

what? characteristics

Feeding:

↳ Who eats me?

humans, muskellunge, largemouth bass

↳ What do I eat?

yellow perch, aquatic insects, crayfish

Role: consumer, carnivore

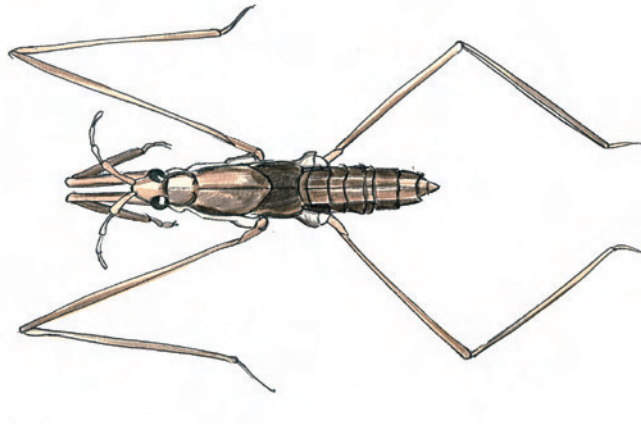
Reproduction: occurs in spring/early summer, females release up to 612,000 eggs

Grouping: loose but distinct schools

Activity: feeds at dusk

Size:





Water Strider*

Scientific Name:
Gerris remigis

who? description

Type: insect

Length: 1.2 cm / .5 in

Coloring: dark brown to black

Body Features: long legs, two legs can fold under front of body

where? environment

Habitat: intertidal pond, freshwater lakes and wetlands, live under leaves, spend time on surface of water

what? characteristics

Feeding:

↳ **Who eats me?**
birds, fish, dragonflies

↳ **What do I eat?**

Insects from water and land, plants

Role: consumer, omnivore

Reproduction: lay eggs at water's edge



Interesting Fact *

Water striders communicate with each other through ripples on the surface of the water.

Size:



Yellow Perch*

Scientific Name:
Perca flavescens

who? description

Type: fish
Length: 15-25 cm / 6-10 in
Weight: 168-448 g / 6-16 oz
Coloring: back is bright to olive green or golden brown, sides are yellow-green; grey to milk-white belly

Size:



where? environment

Habitat: lake bottom, less than 30 feet depth, feeds near the shore and rests on the bottom



Interesting Fact *

Yellow perch are a popular food for humans, but have been overfished and the population has decreased. They lay their eggs in long, jelly-like ribbons.

what? characteristics

Feeding:

↳ **Who eats me?**
alewife (feed on larva), humans

↳ **What do I eat?**
minnows, insect larvae, plankton, worms

Role: consumer, carnivore

Reproduction: lay eggs April-May

Grouping: swims in schools

Activity: diurnal, year-round

Zebra Mussel*

Scientific Name:
Dreissena polymorpha

who? description

Type: mollusk
Length: up to 5 cm / .75 in
Coloring: tan and blackish stripes (like a zebra)
Body Features: two connected shells hold a small mussel between them, they attach to hard surfaces with byssal threads

⚠ **Invasive Species**

Size:



where? environment

Habitat: freshwater; depths of 2-7 m / 6-23 ft
Origin: Eastern Europe and Western Russia; Caspian and Black Sea



Interesting Fact *

Zebra mussels in some parts of the Great Lake region have been outnumbered by the quagga mussel, a close relative of theirs. Zebra mussels are in all Great Lakes and some inland lakes.

what? characteristics

Feeding:

- ↳ **Who eats me?**
round goby
- ↳ **What do I eat?**
algae

Role: consumer, omnivore

Reproduction: eggs expelled by females and fertilized outside of the body by males in spring / summer

Grouping: singly or in colonies



Bighead Carp*

Scientific Name:
Hypophthalmichthys nobilis

who? description

Type: fish
Length: 76 – 102 cm / 30-40 in (as big as 4 ft)
Weight: up to 50 kg / 110 lbs
Coloring: silvery white abdomen, black dorsal and upper lateral sections, black spots on the side of their bodies, fins are a shade of grey

⚠ **Invasive Species**



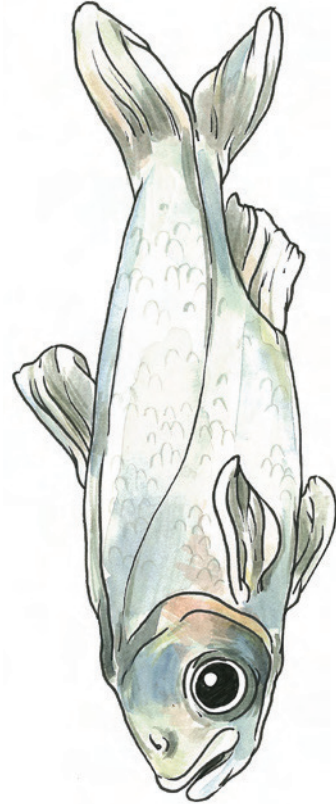
where? environment

Habitat: lakes, rivers and reservoirs
Origin: China

Interesting Fact *
Bighead carp eat up to 20% of their body weight per day. Carp are currently in waterways connected to the Great Lakes and humans are trying to ensure that the fish do not establish a permanent presence in this ecosystem.

what? characteristics

Feeding:
↳ **Who eats me?** humans
↳ **What do I eat?** zooplankton, algae
Role: consumer, omnivore
Reproduction: lay semi-buoyant eggs in warm, current-driven water during the summer
Grouping: travel alone or in small groups
Activity: more active in warmer waters



Hydrilla*

Scientific Name:
Hydrilla verticillata

who? description

Type: plant
Height: up to 8 m / 25 ft
Leaves: green with red ribbing, saw-toothed, four to eight around the stem
Flowers: transparent or white (female) or green (male), with three petals and three sepals

⚡ Invasive Species



MALE



FEMALE

Size:



where? environment

Sunlight: require less than 1% of full sunlight or less
Habitat: any partially submerged body of water with a salinity level of less than 7%
Origin: Africa



Interesting Fact *

Hydrilla, not yet in the Great Lakes, is anticipated to "invade" the system due to its presence in nearby aquatic ecosystems. It is made up of nearly 95% water, which allows for rapid growth.

what? characteristics

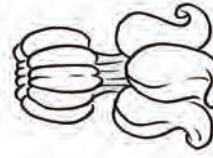
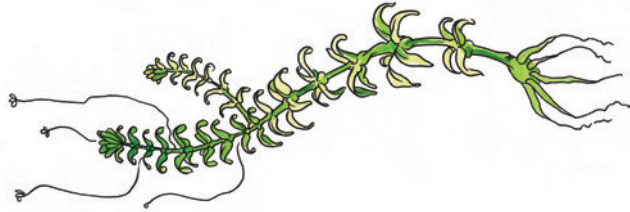
Feeding:

↳ **Who eats me?**
coots and other bird species
 ↳ **What do I use to make food?**
oxygen and sunlight

Role: producer

Reproduction: re-growth of stem fragments and by auxiliary buds (tubers) that can each produce up to 6,000 new plants in 4 years

Other: male and female flowers produced separately on a single plant



Quagga Mussel*

Scientific Name:
Dreissena rostriformis bugensis

who? description

Type: mollusk
Length: 28 mm / 1 + in
Coloring: tan and blackish pattern to all black depending on location
Body Features: a connecting tissue holds the two shell halves together, often with the animal inbetween, this tissue helps connect to hard surfaces and other mussels

⌘ Invasive Species

Size:



where? environment

Habitat: freshwater
Origin: Eastern Europe

! Interesting Fact *

The quagga mussel can live at any depth as long as oxygen is present, while the zebra mussel, a relative, can only survive at depths less than 12 meters.

what? characteristics

Feeding:

↳ **Who eats me?**
ducks, crayfish and lake whitefish, gobies, sculpins
↳ **What do I eat?**
phytoplankton, diatoms

Role:

consumer, omnivore

Reproduction: up to one million eggs per year expelled by females and fertilized outside of the body by males in spring / summer

Grouping:

singly or in colonies

Chinook Salmon*

Scientific Name:
Oncorhynchus tshawytscha

who? description

Type: fish
Length: 50 – 90 cm / 20-35 in
Weight: 6.8 – 13.6 kg / 15-30 lbs
Coloring: green/blue-green on back, silver sides and white/silver underneath; reddish color during spawning

♂ Introduced Species



Size:



where? environment

Habitat: lakes, rivers, oceans and estuaries
Origin: Pacific Ocean – from Asia to North America and the Arctic

! Interesting Fact *

Chinook Salmon were introduced into Lake Michigan on purpose, to control alewife populations and to be part of the sport fishing economy.

what? characteristics

Feeding:
↳ **Who eats me?** humans and sea lamprey
↳ **What do I eat?** alewives, smelt, bloaters
Role: consumer
Reproduction: spawn eggs once in a lifetime in freshwater during summer/fall in a nest called a redd, usually located on a rocky bottom
Grouping: solitary

