



# STUDENT WRITING PORTFOLIO

FILE BOX SOURCE TEXTS





# **File Box Source Texts**

## **Level B**

*Blackline Masters*

First Edition, February 2014  
Institute for Excellence in Writing, L.L.C.

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*File Box Source Texts*

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## Carnivorous Fungus

The carnivorous soil fungus, *Arthrobotrys*, captures worms! The fungus is made of very thin threads of cells called hyphae. When nematode worms are present, the hyphae grow into three-celled loops. If a worm enters a loop, the loop contracts in less than a tenth of a second. The worm is strangled, and the fungus absorbs it by sending hyphae into its body. There are also many other kinds of soil fungi that catch nematodes. They use sticky globs, entangling nets, and other kinds of traps.

## Desert Tarantula

Tarantulas are the largest spiders in the world. In spite of how they are portrayed in the movies, they are not really dangerous to humans. Tarantulas spend most of their lives underground in burrows. Sitting by the entrance at night, they wait for insects and other small animals to wander too close. Tarantulas are most often seen during mating season, when males leave their burrows and search for the burrows of adult females. Males live to be 10 or 11 years old, and they die after mating. Females can live 25 years or more. They can mate and lay eggs several times during their lives.



## Pillbug

Pillbugs are common backyard inhabitants around the world. They are called pillbugs because when they are disturbed they can roll into a ball like an old-fashioned pill. The sowbug is a close relative. It looks similar but is a little flatter and can't roll itself up. Pillbugs are actually crustaceans, like crabs or lobsters. Just like these underwater crustaceans, they breathe through gills instead of lungs. The gills, located on the underside of the pillbug, must be kept slightly moist—that's why you usually find these animals in damp places.

## Starfish

Starfish live in all the world's oceans. There are over 2,000 kinds of starfish. They eat oysters and clams. Most starfish have five arms, but some have ten, twenty, or even forty arms. If a starfish loses an arm, it can grow another one. Some starfish can even grow a body from just an arm. They can do this because they have their important organs in their arms instead of in their body. Starfish are not really fish, so scientists encourage people to call them sea stars.

## Oysters

Bivalves are marine animals. They have two shells, one on the top and one on the bottom. Oysters are the most valuable of all bivalves. They are common in the shallow and warmer waters of all oceans. A female oyster can produce five to fifty million eggs in a year, but few of them will mature. The shell begins to form within a day after an egg is fertilized. Oysters swim about a few days after hatching. They then attach themselves to a rock or submerged object, where they will spend the rest of their lives. Full-grown oysters are usually 2–10 inches long.

## Pearls

Oysters are useful for food and for the production of pearls. Pearls form when a small object such as a parasite or grain of sand finds its way into the mantle of an oyster. It causes an irritation. The oyster secretes its mother-of-pearl-forming substance around the object to stop the irritation. Over time many layers of this substance are made and a pearl is formed. The Japanese discovered a way to encourage the oysters to make pearls artificially. It takes three to four years for a pearl to form.

## The Donkey and His Driver

A Donkey was being driven along a road that led down a mountainside. Seeing his stall at the foot of the mountain, he decided to take a shortcut home. It seemed to him that the quickest way down was over the edge of the nearest cliff. Just as he was about to leap over, his master caught him by the tail and tried to pull him back. The stubborn donkey would not give up and continued to pull with all his might. “Very well,” said his Master, “go your own way, you silly beast, and see where it leads you.” With that he let go, and the foolish donkey fell head over heels down the mountainside.

## Peter the Great

In the eighteenth century, Russia was the largest nation on earth. It spread from Europe on the west to the Pacific Ocean on the east. Everywhere in Europe wonderful things were happening. Scientists, explorers, painters, musicians, and writers were changing the world. But the Russians did not want to change. Then came Peter Alexeevich, who was the tsar of Russia. He was born in 1672 and decided that Russia needed to change. After a trip to Europe, where he learned many things, Peter brought great change to his country. That is one reason he is called Peter the Great.

## The Mongols

The Mongols were a fierce, warlike people living in central Asia. In the twelfth century the Mongols spread into Muslim empires of Russia, China, and India. They conquered the local people as they went. They became the largest single empire in history. Mongols were the first to link Europe to China, opening trade routes between those nations.

## Genghis Kahn

Genghis Kahn developed a strong army. He united all the tribes and had everyone call them Mongols. Khan's army was harder and tougher than others. They were able to move quickly on horseback. The army organized into regiments, much like the armies of today. Officers were given golden "paitzes" to distinguish them from common soldiers.

## Camp Life

Mongol families lived in tents called a *yurt* or *ger*. They were set up in sheltered areas near streams. When the horses needed new grazing land or the weather turned cold, they moved their camps. Large yurts were not dismantled for the move but placed on wheels and pulled by oxen to the new camp. The yurts were made out of felt and greased to make them waterproof.

## Family Life

Mongol children did not go to school. Instead of learning to read and write, Mongol children learned to ride horses by the age of five. Boys learned to mend saddles, milk mares, and make and mend bows and arrows. The girls learned to cook, milk the cows and goats, ride horses, and make and mend tents. They loved to hear stories about adventures on the steppes.

## Our First President

George Washington became the first president of the United States of America in 1789. He did not want people to treat him like a king, so he had everyone call him “Mr. President.” Washington cared about his country. He visited each of the thirteen states during his presidency. During the French Revolution he helped keep peace between America and England. He believed Americans should live virtuous lives to keep our country strong. Many people call our first president “The Father of our Country.”



## Andrew Jackson

The first president who came from the plain, common people themselves was Andrew Jackson. He was the hero of the Battle of New Orleans in the War of 1812. Jackson had been born in the Carolinas back in 1767. He fought against the British during the American Revolution when he was only thirteen years old. In one battle he was captured and ordered by a British officer to shine his boots. When he refused, the officer slashed Jackson across the face with his sword. That scar and Jackson's hatred of the British lasted for the rest of his life.

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## The Sword in the Stone

It happened that Uther Pendragon, King of the Britons, died without leaving a male heir. This caused tremendous strife in the realm. Actually it was untrue, however, for Merlin the Magician had advised the king:

When Queen Igraine bears your son, I shall carry  
him to safety. His name shall be Arthur. In my  
cave is a magnificent table that would have helped  
you become a great king. Instead Arthur shall have it.  
And the whole world shall know of Arthur and the  
Knights of the Round Table.

Nevertheless, the barons in Briton battled among themselves, and foreign barbarians threatened to decimate the monarchy. Realizing that Arthur's time had come, Merlin called the barons to assemble on Christmas Day at the great Cathedral of London.

When they arrived, this was what they discovered: a gleaming sword thrust into an anvil that stood over an enormous stone. Onto the blade of the sword in letters of gold was engraved, "Whoso pulleth out this sword of this stone is rightwise King of Briton." Since none of the barons could move the sword even a hairsbreadth, jousting tournaments would be held. The winners would gain opportunities to draw the sword from the stone. The baron Sir Ector sent his son, the knight Sir Kay, to compete.

Naturally, Sir Kay brought his faithful squire along—his younger brother Wart. But on the day of the first tournament Sir Kay had forgotten—of all things—his sword. "Wart, go back to the inn and retrieve my sword," Sir Kay requested. Wart obeyed immediately. Unable to locate his brother's sword, however, he happily remembered the sword in the stone, about which he understood nothing. Lightly Wart grasped the hilt of the mighty sword. He withdrew it easily.

Now when Sir Kay recognized the sword, he took it to Sir Ector and declared, "Father, here is the sword from the stone! I must be king!" Nevertheless, the wise father interrogated Sir Kay, who confessed that Wart had pulled the sword from the stone.

Sir Ector knelt down before young Wart and swore his fealty. "King Arthur, I am at your service." Then he narrated the entire drama to Arthur regarding who his father had been and why in secret he had raised Arthur. The other barons had no intention of humbling themselves before a fifteen-year-old shaveling, however. Again and again Arthur had to plunge the sword into the stone and draw it out, until finally the jealous barons submitted. Eventually Merlin's prophecy was fulfilled. Arthur was knighted. He was crowned. He was king.

## Bears-2, Muskoxen-0

A huge grizzly bear stalked the herd of muskoxen on the frozen, white Alaskan tundra. Now this bear had recently awakened from a very long hibernation. He was famished. Many times he tried to attack the calves, but the wooly adults turned their tails to each other every time and formed a compact circle. Whenever the grizzly approached, the muskoxen met him with their horns, which were gigantic and sharp. Eventually one day, some silly members of the herd started quarreling. While they bickered among themselves, a couple of the calves wandered off, and they got lost. The bear patiently hunted them down, and that was the end of them.

Moral: United we survive. Divided we're dead meat.

## The Tortoise and the Eagle

by Aesop

Long ago, a certain tortoise grew weary of always having to slowly creep along the ground. He longed to fly high in the atmosphere. If any bird were willing to take him up, he promised that he would provide a generous remuneration. Buried in the field nearby, he said, there was a magnificent treasure that he would reveal after the flight. When an eagle heard this, he accepted the offer and carried the tortoise aloft. Gently he returned him to the ground, and then demanded his recompense. But the tortoise had to admit that he could not keep his promise. In his eagerness he had fabricated the whole story. Feeling cheated, the eagle again lifted the silly tortoise, climbed to a great elevation, and let him fall. He was dashed to pieces.

Moral: Make no promises you cannot keep.

## The Shepherd Boy

by Aesop

Many years ago, a young shepherd boy tended his flocks. Out by himself, he felt lonely in the wooded hills. Foolishly, he therefore concocted a plan by which to stir up not a little excitement. Rushing down toward the village, he shouted in an unnerving tone, “Wolf, Wolf!” Frightened immensely, the villagers came out to assist the child, and some of them remained to comfort him for a considerable length of the day. He enjoyed this. Pulling the same devious trick some days afterwards, again the compassionate villagers raced out to rescue the shepherd boy. Eventually a vicious wolf truly did emerge from the woods and began worrying the sheep. Then the terrified child of course cried, “Wolf, Wolf!” But this time the villagers, who had been deceived twice already, ignored the boy’s alarm. The wolf devoured a goodly portion of the flock. When the unfortunate boy complained, the elder of the village answered:

“A liar will not be believed, even when he seeks the truth.”

## Stone Soup

An ill-clad tramp knocked at the farmhouse door one wintry noonday. “I cannot allow you to enter, for my husband is not home,” explained the woman of the house. “And I haven’t a morsel to offer you,” she quickly added. Her voice betrayed her unmasked derision toward the tramp.

“Then you could certainly use my soup stone,” interjected the tramp, pulling from his pocket what appeared to be an ordinary stone. Interested, the woman asked how it worked. He replied that if only he had a potful of water and a fire, he could show her. Furthermore, he claimed that the wondrous stone, when added to plain boiling water, could make the most remarkable soup imaginable.

After the tramp advised that undoubtedly her husband would thank her for the marvelous supper, the woman succumbed to her desire for an easy meal, and she bade him come in. Soon the water was boiling. After plunking the stone into the pot, he tasted the liquid. Commenting that it needed seasonings and a bit of barley, he sent her to the pantry and called for some butter if she could spare it. No sooner had she returned than he tasted it again, observing that clearly, a good soup required potatoes and vegetables. These she also obtained. A third time the tramp—evidently a connoisseur of fine soup—tasted it and stated, “The stone has worked its magic; chunks of chicken and some broth will perfect this soup.”

When the full aroma informed them that the soup was complete, the woman served the tramp and herself. They ate well and managed to save a bowlful for her husband who was coming up the road, it seemed. Hastily, the tramp thanked the woman for the use of her pot and fire. Then he stuck his hand down into the pot, pulled out the stone and licked it clean, and dropped it back into his pocket. The woman of the house enthusiastically invited him to return next time his travels brought him into the vicinity. “I would be delighted,” answered the tramp courteously. Smiling, he left.

## The Selkie Girl

### A Scottish Folk Tale

One beautiful Midsummer Night's Eve, a fisherman from Shetland walked on the sandy shore. It was twilight, and beyond the rocks he heard silvery laughter. As he drew nearer, keeping himself hidden from view, he saw lovely girls dancing on the beach. On the ground nearby lay several sealskins, so the fisherman realized that the girls were selkies. Then he took hold of one of the sealskins, at which the maidens ran, boldly snatched their skins and dove under the waves. All but one. This selkie girl began crying out in a strange language as if begging him for her skin, but when the fisherman gazed into her deep brown eyes he could not return her skin to her. "Stay here with me and be my wife. I will love you and care for you always," he tried to make her understand. And since no amount of beseeching caused him to relinquish her skin, the selkie girl had to go with the fisherman to his home where he locked her soft, smooth skin in a box and hid it away, keeping the key with him at all times.

They were married and settled down in his little home by the sea, and in time they had two children, a boy and a girl, who were human beings like their father in every way save their deep brown eyes and the little webs between their fingers and toes. Although the selkie truly loved her family, she often walked restlessly on the beach. Sometimes a group of seals would linger with her near the rocks, and they spoke together in the strange language. Thus thirteen summers passed, when one day the daughter found a key. "Look, Mother, it's Father's key. It must have fallen from his pocket," reported the daughter. And the selkie's heart beat fast and hard as she held the key and searched for the box where lay her sealskin. Then she gathered her children to her and told them for the first time about her life under the waves. "I do love you and will always be watching over you. When you need me, come to the rocks during the twilight."

The selkie lovingly kissed them and hugged them before she walked to the rocks on the sandy shore, wrapped her skin round her and dropped into the sea. When the fisherman returned home and discovered the empty box, he knew that he would never see the selkie girl again. But whenever the children were sad or lonely they scampered with their little webbed feet onto the rocks during the twilight, and a sleek seal with deep brown eyes would swim to them and speak to them in the strange language that eventually they could understand. And every Midsummer Night's Eve they swam and splashed joyfully in the sea with their mother until the dawn of the new day.



## The Stag at the Pool

by Aesop

A stag overpowered by the heat came to a spring to drink. Scrutinizing his own shadow reflected in the pool, he greatly admired the size and variety of his antlers, but felt disappointed in himself for possessing such slender and inadequate feet. While he was thus contemplating himself, a mountain lion appeared and crouched to pounce upon him. The stag immediately took to flight. Exerting his utmost velocity, as long as the terrain was even and open, he kept himself at a safe distance from the mountain lion. But entering a copse he became entangled by his antlers, and the ferocious feline assailed him. Alas, too late he reproached himself. "Woe is me! How I have deceived myself! These feet that would have safeguarded me I have despised, and I gloried in these antlers which have proved my destruction."

Moral: What is most truly valuable is often underrated.

## The Fox and the Goat

by Aesop

A fox one day fell into a deep well and could find no means of escape. Overcome with thirst, a goat arrived at the same well, and seeing the fox, inquired if the water was beneficial. Concealing his miserable plight under a merry guise, the astute fox indulged in a lavish praise of the water, remarking that it was excellent beyond measure. Excitedly, he exhorted him to descend. The goat, mindful only of his thirst, thoughtlessly jumped down. Then as he drank, the crafty fox informed him of the difficulty they were both in and suggested a scheme for their common escape. "If," said he, "you will place your forefeet upon the wall and bend your head, I will run up your back, and will help you out afterwards." The goat readily assented and the fox leaped upon his back. Steadying himself with the goat's horns, he safely reached the mouth of the well and began to leave. When the goat upbraided him for faithlessly breaking his promise, the insidious fox turned around and cried out, "You foolish fellow! If you had as many brains in your head as you have hairs in your goatee, you would never have gone down before you inspected the way up, nor have exposed yourself to dangers from which you had no means of escape."

Moral: Look before you leap.

## Saint George and the Dragon

Saint George was a noble knight, born in the province of Cappadocia. At one point he traveled near the city of Silene in Libya. Outside of this bustling city was a fetid marsh, wherein there dwelt a dragon that was poisoning all the countryside. Whenever he approached the city, he poisoned the populace with his breath, and therefore the desperate people attempted to placate him. Daily they proffered two sheep for him to eat. When the supply of sheep was exhausted, however, an ordinance was passed which stipulated that the children and adolescents of the city should be chosen by lottery. Whoever the lot fell upon, wealthy or poor, he or she was delivered to the dreadful dragon. One fateful day the lot fell upon the king's own daughter, fourteen year old Princess Cleodolinda. And the sorrowful king began to weep profusely, for he loved his sweet daughter greatly.

After the king had his daughter dressed like a royal bride, he embraced and kissed her and gave her his blessing. Then soldiers accompanied the princess outside the city wall to the location where the dragon was used to coming. They abandoned her. As she waited there, Saint George passed by, and seeing the lady in dire distress, he inquired about her situation. In reply Princess Cleodolinda begged him to go on his way lest he perish also.

While they were thus speaking, the terrible dragon appeared and advanced toward them. Saint George, who was on his horse, drew his sword, made the Sign of the Cross, and courageously charged toward the dragon. He struck him with his spear in a vulnerable spot, injuring him severely. The beast dropped. Then Saint George asked the maid for her belt, which he tied around the dragon's neck. When he had done so, the subdued dragon followed Princess Cleodolinda meekly. She maneuvered it toward the city wall, where in the view of many astounded citizens, Saint George dispatched the malevolent creature. He called out to the elated inhabitants, "Believe in God and Jesus Christ. And be baptized." Then the king and all his people were baptized, whereupon Saint George departed to other distant lands.

## Units 4 and 6 Sources

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## Sapsuckers: Saptappers



There seem to be four species of sapsuckers, which are types of woodpeckers. Each one has its own location. Living in every province and territory, yellow-bellied sapsuckers comfortably make their homes from the southern Yukon to the wild and boisterous Atlantic Ocean because they like the trees of the boreal forests. Obviously a Canadian bird, the yellow-belly lives from coast to coast. While the yellow-belly is Canada-wide, the redchest, redneck, and Williamson's species locate and breed entirely in British Columbia and southern Alberta since they like mountains and hills.

Appearances are deceptive. Unfortunately, the appearance of the busy, hard-working sapsuckers can be and is confusing. Except for the Williamson which has a black head, the other three are redheads, although some show greater brilliance than others. While one proudly shows off a yellow or red belly, and another has a red neck, nevertheless all have red heads. Looking so much alike, most sapsuckers seem to be redheaded woodpeckers because of their habits as well as appearances.

They are continuously tapping for food. While sapsuckers like to eat dragonflies, moths, and beetles, they also rapidly tap, tap, tap to find wood-boring insects and the sweet, sticky sap rising in the trees. Especially they like the sap of aspens, poplars, birches, and tamaracks, although in the West they also tap into conifers, which is a fancy name for evergreens. Tapping into a maple, they can reach the rising syrup just as humans do. In winter they will begin to tap, and by summer they will have nearly sixty holes in a number of trees. They know good sap days. When it is sunny, they are busy tapping because the sap is running and rising. On cold and cloudy days, the sapsuckers stay at home since tapping for food is hopeless.

Drumming fascinates them. Sapsuckers, like all woodpeckers, love to drum because it expresses their personality. While they are songless birds, sapsuckers are wonderful rhythmic musicians. Throughout the forest they can find and use dried limbs that resonate like drums, but they always possess one favorite limb where they drum expertly for three hours in the morning. Sapsuckers drum high. Repeatedly they drum low and in a broken series: prrrrrp prrp prp prp. Drumming is an obsession with sapsuckers of all species.

Sapsuckers do not suck as their name suggests, but are really tappers, who avidly seek and drink the sap of various trees when it is rising in the spring. At the same time many humans also tap the sugar maple, hang buckets, and return later to collect the syrup because they like it on pancakes or want to make a sweet flavored sugar. Eagerly, certain birds in the tropics tap oil palms in order to get slightly tipsy on palm wine. Sapsuckers also get tipsy. Instead of calling them sapsuckers, possibly these tree tappers might be named saptappers.

## Silly, Sappy Name

In appearance the observer immediately notes the red of the sapsucker, which stands out above all other colors. However, the wings are black with white stripes, patches, and spots.

Humorously about the yellow- and red-bellies, Barry MacKay commented: “Indeed, the two species are so similar that confusion reigns, even among the sapsuckers themselves.” Lumping them together, scientists once called them the same species while even now referring to a super-species because of their similarities. If the happy sapsuckers cannot tell or see themselves as different, why should the scientists?

They tap for food. Surprisingly, they do not suck the sap but rather consume the syrup that oozes out of the holes, by rapidly darting the tongue in and out. Touching the sticky, sweet sap with the tongue, it is pulled into the mouth. The tip of the tongue is fringed like a brush. The holes are square. While designed and laid out in horizontal or vertical rows, the holes can also form spirals around the branch because the sap must be trapped as it moves up from the roots. Obviously, the tapping stops and the sipping for food starts when the wells are all completed, the sun begins to warm, and spring rapidly approaches.



Drumming is part of courtship. Apparently, females seek out and stay with the best musicians who possess the most musical and rhythmic drums. When a second lady responded to the drums, as occurred in one instance, there clearly was a war between the two, as the first pursued the other, “giving her no rest for several days.” The first mate was determined to chase the second from the neighborhood and proclaim her property over the male because they had begun to build a nest together. After her success she began drumming out her own short message of triumph on the drum: prrrrrrp prrp prp prp.

All four species of sapsuckers live in areas of the beautiful and diverse province of British Columbia. Consequently, the yellow-bellies live in the forests of the far North while the red-breasted, which are also called redchests, inhabit and enjoy the coastal forests. Spreading over the Okanagan and Kootenays, the rednecks and Williamson’s sapsuckers happily mix a little juicy fruit with their diet of sap because all four species have a sweet tooth. The species flourish in B.C.

They can’t suck. Despite their goofy and unsuitable name, sapsuckers are physically incapable of sucking because it requires lips; they have beaks. Avidly they tap and drain mountain ash, apple, thorn apple, birch, and maple trees, which supply a syrup the sapsuckers love. The trees often die. This is the most grievous loss in the parklands of the prairie provinces. While sapsuckers do not suck sap, humans have given them a name so silly, so sappy, it sucks.

## Sapsuckers Don't Suck

For many reasons sapsuckers like to drum. Frequently, the male drums to define his territory, to attract and keep a mate and to celebrate the new, tiny white eggs in the nest. The sapsucker is a musical chap who, if no dead limb is at hand, will drum away furiously on tin roofs and even on a single fence wire, which he plays like a master fiddler. Drumming, drum, drumming the sapsucker has a special drum where he can mix high and low tones, soft and harsh tones, loud and quiet tones, and no one should touch it because it is his special possession second only in importance to his nest. When a bird watcher climbed up to examine his drum, the sapsucker was much displeased. The bird watcher reported: I did not know he was in the vicinity, but it seemed he saw me from a nearby tree. I was invading his privacy, desecrating his shrine, and the bird was much put out. With spread plumage and a sharp note, [he] demanded plainly enough [to know] what my business was with his drum.

The male chooses the site and chips out the nesting hole, usually in a dead or partly dead branch or tree, while the female lays three to seven white, glossy eggs that hatch in about two weeks. Both genders help incubate. Bringing food and feeding the young takes up a whole month because after that, they can fly and search for their own food. By the time the young are strong fliers, the sapsucker family prepares to begin its migration from Canada to the Southern states, sometimes to Mexico, and even occasionally to Central America. Hurriedly, in late winter they are again on their northern migration to catch the rising sap and build new nests in Canada.

The four species of sapsucker, which belong to the family of woodpeckers, are grouped in one super-species because they often inter-breed where their locations overlap. Consequently, new, bright colors and patterns emerge. In the forest it becomes difficult to distinguish one species from another. They sometimes look alike. Since they dearly love sap, none of the species live or nest in the open, treeless prairie of southern Saskatchewan.

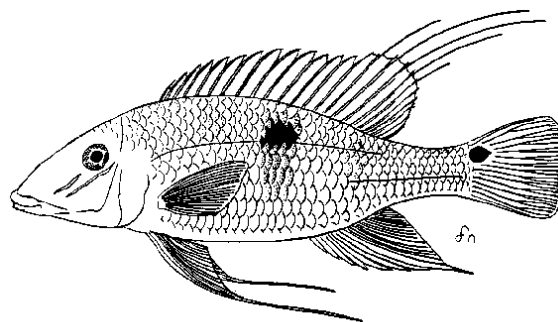
Tapping for food, they know not to tap the shadowy, northern exposure of the tree where the sap flows less freely. When one series of holes fails to provide enough, the sapsucker drills another. Upon a warm day as the sap runs quickly, the busy, greedy sapsucker sits and gorges himself by his wells, hour after hour. As fast as the wells fill up, he sips them dry. Speedily the sapsucker, which hops from well to well, spends his entire day draining the fluid from his sixty holes. He never ceases tapping for food because he suffers from a craving for sap.

Oddly enough, sapsuckers do not suck. When the hole that penetrates the bark in the tree has been drilled, they hold their beaks close to it, the brush-like, fringed tongue scooping the liquid into the mouth. Throwing their heads back vigorously, they swig down the liquid as if dippy, drunk, and delirious. With one hop the sapsucker reaches the next hole and while brushing more liquid, seems overjoyed because it will do this for hours. Hence, sapsuckers brush and sip, but they will not, cannot and do not suck.



## Cichlids or Mbuna

In Malawi cichlids (pronounced sicklids) are called mbuna. Possibly the African name is easier to pronounce. Ranging from two to thirty centimeters in length, the smaller varieties are valuable to aquarium owners, the larger ones for human food. Aquarium owners value the mbuna because of their bright colors. While most species only weigh a few grams, the larger food type reach two kilos. The most valuable mbuna are the small ones.



*Satanoperca zilieth* Kullander and Ferreira, 1998

Inhabiting all of the fresh water lakes in Eastern Africa, mbuna are plentiful. Species live in different levels of the lake like humans in an apartment block. Some families inhabit the lowest level near the bottom while others live in various “floors” in the middle, and many occupy the top or penthouse where the sun rays penetrate. Similarly, in a well-planned aquarium some fish swim at the top, some in the middle, and others at the bottom. Mbuna are East African natives.

The diet is obvious from the shape of the teeth. Usually cichlids possess two sets of teeth. Those in the front are sharply pointed because they must capture the victim. In the throat the second set chews the food. Scraping the algae from the rocks, some species have teeth like steel brushes. Since they must crush shells, the strongest teeth and jaws belong to the snail feeders. Teeth reveal diet.

Before mating, one species creates an unusually huge sand nest. While the male extends only three centimeters in length, the nest which he builds can be as high as thirty. It looks like a large pile of sand on the lake bottom when he has completely finished. Laboriously he moves the sand one tiny mouthful at a time. What is the nest for? That is not clear. Possibly the nest becomes a signal to curious passing females that this young buck is ready to mate. The nest is not used. Mating takes place in the water above it.

Malawian mbuna can be easily sold. Admiring their brilliant colors and aggressiveness, aquarium owners also become fascinated by mouth breeding. Instantly mbuna become conversation pieces. While in North America aquarium species usually come from fish farms, in Europe buyers who demand them will want a guarantee that they are purebred. In France or Germany a pair of tiny mbuna may sell for 300 dollars. Mbuna mean much money. So Malawians sell as many cichlids as they can ship.



## The Watery Home

Cichlids are the most colorful fish in the world. In every color and shade, cichlids are unimaginably beautiful. Brightly painted in blues, reds, and yellows, they are not seeking to hide. Many are variegated. They dart around happily in yellow and black, green and orange. Gliding in their beautiful blooming brightness, they seem to cry out: “Look at me! I am the most colorful fish in this lake.”

Aquarium cichlids are flown regularly to Europe for sale. Since a large catch might contain a thousand, a netful is worth much money. Four or five are placed in a plastic bag half full of water. Oxygen is pumped into the bag and then closed with a twist tie. Piling them carefully, thousands of small bags are quickly rushed by truck 65 kilometers to the international airport. Rapidly loaded on a sleek jetliner, they begin their twelve-hour flight. They move quickly. Oxygen is limited. Timing becomes essential. In the morning the mbuna land in Europe where they are ready for sale.

Mating is highly unusual. There is an elaborate courtship. In Lake Malawi the cichlids are mouth breeders. As the female lays one egg at a time, she takes them into her mouth. Nuzzling the male, the female induces him to release sperm. Immediately the female inhales the sperm which fertilizes the eggs. Mbuna are called mouth breeders because the eggs are incubated in the mother’s mouth. Mating is peculiar.



Surprisingly, every species of cichlids clings to its own diet. For some algae, clinging to the rocks becomes their staple fare. Drifting in the water, clouds of plankton, which is a combination of plant and animal life, attract other types. A few eat small water insects and animals such as crab. Their menus vary. While some kinds are strictly vegetarian, others love fish and seafood. There is little in a lake which one or other of the species does not include in its diet.

Primarily, mbuna are territorial. While the sand builder vigorously patrols the water above his nest, the plant eater strongly defends his algae garden. If one lonely cichlid is scooped from the water and dropped back into the lake two kilometers away, he will quickly swim back to his exact stretch of territorial homewater. Sighing he will whisper, “Home sweet home! It’s watery and it’s nice.” Mbuna strongly believe in personal and private property. They seem to say, “This is mine, totally mine! Beastly intruders beware!” Seldomly do they move in schools. They are not groupies. All are individualists. Total loners. Patrolling vigorously, they individually defend their territorial rights which define their watery home.

## Territoriality

Fish eaters are common. Many cichlids include the eggs and the young of other species in their food. Pretending to be dead, one type looks pale and rotting to lure the young of others so as to prey upon them. Cleverly another kind mimics its prey in order to get close to scrape the scales from its sides. With a fierce protruding jaw, one variety crashes into the head of another fish so that she spits out her young. Many feed on nothing but the young of other species. They are predators.



Mbuna which live around rocks stake out a territory for mating. As algae-eaters, the male defines an algae garden as his personal space. Clearly he knows that the abundance of algae will attract females. Defending his garden by patrolling its borders, the male angrily chases off competitors. Occasionally he is driven out. A new male takes over. Another owner is in charge. The new occupant patrols his mating area as if to say, “Oh, come, pretty young maidens, to inspect the luscious algae garden in my home.”

Enjoying warm tropical waters, cichlids dominate Lake Malawi. With 1,000 species the lake contains kinds which exist nowhere else in the world. Having the largest number of species anywhere in the world, Lake Malawi is the homeland. The waters swarm with them. The food is plentiful. The conditions are ideal. Lake Malawi forms a cichlid paradise.

The bigger cichlids are sold daily in Malawi. The largest called chambo and about thirty centimeters long is one of the finest frying fish in the world. What a marvellous casserole they make, baked in thick cream with cheese. Nearly round in shape another species is the size of a sardine. Like sardines, bones are eaten. To ensure survival of the mbunas, Malawi created the first freshwater and underwater park in the world. Otherwise stocks might decline because truck loads of fish leave the dock side hourly to be sold in the cities of Malawi.

Aggressively males and females defend their territorial property against invaders. After completing, the male jealously guards his nest against intruders. Should one appear, they battle. Locking mouths, the two male fish shake each other violently until one is defeated and darts away. A mother also defends her territory and brood of young against attackers. At the first sign of an enemy, she chases him away. Frequently she demands that the young flee back to her mouth. Can you imagine the sight? Twenty-five tiny juveniles all at once scrambling desperately to swim into the mother’s mouth. While males defend a mating ground against competitors, females protect their brood. Both are territorial.

## Hibernating Sharks

The breeding behavior of sharks is unlike fish and more akin to mankind since it takes place internally. Among fish, eggs are laid in the water over which the male throws his sperm. Since sharks breed by internal fertilization, the young grow within the mother, swim, and hunt independently right after birth. Surprisingly, a basking shark may produce six million eggs inside her body, but only one or two offspring, which are called pups, will be born.



Gestation lasts three years. At birth pups are five feet long and easily big enough to look after themselves because they hunt by instinct. The eager, active pups will become mature and ready to breed in four years.

Size and location are vital. Following the warm currents out of the tropics, tiger sharks might end up in New Zealand or British Columbia. In the winter they swim and hunt near the coral reefs in the Caribbean, Indian, and Pacific Oceans all the while keeping fairly close to the equator. The largest and heaviest basking shark at thirty-nine feet was caught off Nova Scotia and an even larger one—forty five feet—off Norway. Amazingly, the liver of the basking shark can weigh up to fifteen hundred pounds. Slowly the great white shark swims at two miles per hour, never stopping because it uses vast amounts of oxygen, which its gill rakes extract from the water. While the basking shark is large in size and hibernates, the tiger shark migrates to various locations.

All sharks are predators. Obviously, the huge gentle giants, the basking and whale shark, live off small sea creatures. Since they do not kill humans, we fail to think of them as predators. The tiger and lemon sharks are predators on all living things which enter the ocean, while some reef sharks have become remarkably tame. In some coral reefs, sharks have been trained to take fish from divers without biting or harming them. Researching humans are always curious about the intelligence of animals, and this behavior demonstrates a good deal of it because a wise shark should not “bite the hand that feeds it.” No matter how tame a wild creature appears, however, humans should always treat predators with respect.

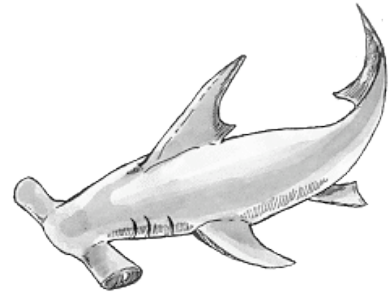
While some experts claim the tiger shark is quite gentle, for most humans it means trouble. In one fearful and gruesome report, a tiger shark attacked a life raft on which two men and a woman were sitting. Killing and eating one man, the shark quickly returned to snatch and swallow the woman. The second man escaped. Surprisingly, there are pictures of human divers swimming along with tiger sharks where the animal is as gentle as a kitten. Nevertheless, human swimmers should be wary because tiger sharks are proven man-eaters.

Basking sharks hibernate. About November when winter sets in, there is very little food in the cold oceans of the temperate region, not nearly enough to maintain and sustain the huge basking sharks. Consequently, they retreat to the floor of the sea where they lie still, stop eating, and use little oxygen. They are in a coma. Dropping their gill rakers, which rake or filter the plankton, basking sharks cannot eat until they grow new ones in the spring. While they are comatose for five months, basking or hibernating sharks resemble bears and other animals which hibernate because they must live off stored fat.

## Pygmies and Giants

The migration of sharks is frequently dictated by the search for food. By gliding and cruising gently through water with their mouths wide open, the great, gentle whale sharks draw in tons of water while their gills strain out the plankton, which consists of tiny creatures, tiny shrimp, and tiny arrow worms. Hunting fish of all kinds, the lemon shark feeds on mackerel, squid, and groupers, sometimes forming packs to attack a large school. While going after large fish like tuna as well as sea lions, seals, and dolphins, the great white can last for a month without eating. Clearly, tiger sharks are the most exciting because they hunt and eat anything and everything including car license plates and gasoline cans. Food quality doesn't matter.

Teeth are vital to predators. When a shark's tooth rots and falls out, quickly a replacement grows in. Boasting huge teeth with sharp serrated edges, sharks' jaws clamp firmly together like a zipper over the prey. Surprisingly, the whale sharks do not have teeth because their tiny prey are caught in gill rakers, which hang like vertical Venetian blinds in their wide mouths. Nothing is so frightful as a huge shark mouth filled with wicked-looking, sharp teeth. In short, teeth are frightening.



Extremely little is known about the breeding behavior of the great white shark because it cannot be kept in captivity, because it is constantly moving, and because no pregnant female has ever been captured. When the great white reaches a certain size, it abruptly retreats to the bottom of the ocean floor where it stays for the rest of its life. Here birthing may occur. In addition, when males reach a certain size, they change sex and become female, which explains why large sharks captured and killed are inevitably female. Living mysteriously, great whites wisely keep away from humans. Humans, consequently, can only guess at their breeding habits.

Sharks and humans should completely avoid each other because they are not compatible. Before making the kill, the shark locates and circles its prey while nudging it with its long sensitive snout. Peculiarly, helicopter engine noise over shipwrecks which attracts sharks, can be dangerous since humans in the water often become targets. Learning that the sound of a helicopter means people in the water, the sharks begin to circle in preparation for a strike. While the largest sharks—whale and basking—may appear frightening, they are really gentle giants eating only plankton. Men never need fear them.

While sharks come in sizes from heavy, huge giants to tiny, short pygmies, they are located in all of the five oceans. Ranging over the tropical seas, the great white and tiger sharks obviously love warm water while the basking shark prefers to live in the temperate North Atlantic and North Pacific. The whale shark, called a gentle giant because it only eats plankton, is the world's longest at sixty five feet while the pygmy shark at eight inches is the smallest. Happily thriving in warm tropical oceans, the lemon shark prefers shallow waters, which are increasingly polluted and therefore a threat to its future. Chemical pollutants are worst. From huge, gentle giants to tiny pygmies in size, sharks are located and flourish worldwide.

## The Great Predator

Varying in size, sharks are widely located in the world. While the whale shark is the longest at sixty feet and heaviest at seventy tons, the second largest is the basking shark, which gets its name from its habit of lying on the surface of the ocean because it loves to bask in and enjoy the sun. These are the largest. Commonly, sharks are more average in size, such as the great white and tiger shark, where weights are just around one ton. Tiger sharks get their colorful and unusual names from their striped colors. With a weight up to 400 pounds and a length of ten feet, lemon sharks—yellow in color—are examples of the smaller ones. Located in every ocean of the world, sharks come in all sizes from tiny to huge.



More is known and recorded about the breeding behavior of the lemon shark than any other predator species because it can easily be raised in captivity. While the female gives birth to as many as ten eager, hungry pups, they first lie on the bottom in the shallow water and then swim away breaking their umbilical cords. Fearing

cannibalism of the older males, the young pups remain for some weeks in the shallow inshore waters, where sometimes they form hunting packs or gangs. Normally they hunt alone. Sadly, in Florida one marine biologist hand-raised ten lemon shark pups only to have them eaten by an elder male, which had been recently placed in his laboratory aquarium. To learn about breeding behavior, humans need to raise more sharks in captivity.

Generally, sharks are not friendly to humans. Detecting a single drop of blood in more than a million gallons of water, the great white is the most deadly of the large man-eating sharks. However, the tiger shark also possesses and utilizes its excellent sense of smell so that it can pinpoint prey which may be hiding in the darkest and murkiest waters. When smell is so vital, it is hardly surprising that two-thirds of the shark's brain is given over to interpreting it. Blood smells create a frenzy. In an instant powerful jaws and sharp teeth are pushed out to swallow its prey because sharks eat anything including humans.

Sixty species of the reef sharks, including tigers, are vicious predators. When being carefully removed from its dying mother's womb, one infant—really only an embryo—bit and injured a scientist who sought to rescue it. Hiding, swimming, and hunting around the coral reefs of the tropics, the gray reef shark attacks with tearing, slashing bites. It drives off tiger sharks. Normally, sixteen-foot tiger sharks can stalk, kill, and swallow most species of reef sharks because they are vicious beyond belief. In groups reef sharks engage in feeding frenzies where thousands of fish are killed and swallowed. Thereafter, for days predator reef sharks can go without food.

Lemon sharks are probably the most vicious and dangerous to humans because they hunt in shallow water where people are most likely to swim. Particularly attracted to bright colors which are frequently used in bathing suits, the lemon shark, named after its bright yellow color, can be dangerous by suddenly turning violent and aggressive. Splashing in the water can provoke all sharks but especially lemons, whose predation can create the desolation of a battlefield. Since the tiger shark has launched more fatal attacks on humans than any other, it is feared as a predatory killing machine which regularly will kill and eat anything including man. It is a fearsome hunter. It has fearsome teeth. It inspires fear. In the right mood the tiger shark—the great predator—is extremely dangerous to humans.

## Wild Carp: For Food

Carp have adapted to habitats all over the world because they are so extremely flexible. While they originated in freshwater slow-moving rivers in Central Asia, carp spread first into China and later into Europe where Aristotle refers to them in ancient Greece in 550 B.C. By that time the Chinese had begun to breed and develop golden carp because a poem of that date refers to them. Preferring shallow, almost swampy areas, which have an abundance of aquatic life, carp lurk in the weeds in river beds. They bask in the sun. On hot afternoons carp came to the surface to enjoy the sun. Originally from a habitat very hot in summer and quite cold in winter, with human help, carp have spread more widely than any other freshwater fish.



The history of carp as food and golden carp as beautiful, exciting fish, which stretches far back into the dim, dark past, becomes clearer in the Sung dynasty (960–1279). Among the elite classes most families were breeding and rearing goldfish as household pets. Clay aquariums soon followed. While China sought to keep the breeding of goldfish a secret, when it did spread to Japan about 1500, the Japanese breeding industry became, and still is, world famous. More innovations followed. Rapidly, transparent carp followed fan tails; unicolors gave way to bicolors, then tricolors. Breeding ultimately became so sophisticated that multicolored calicoes were developed. Change, development and new species dominated the history of carp because of the fascination of Oriental people with them.

Spawning is unusual. Males arrive first at the spawning site, which is a stretch of calm water with green weeds growing in it and which they have selected and chosen. Swimming back and forth in eager and obvious excitement, the male continuously and impatiently look for the females to arrive. They dive at one another. They raise their backs. They spout water. When the females arrive, they remain huddled in a group away from the frolicking males. Eventually one or more males come to nudge the females toward the male group like a bold man asking a woman to dance. At first reluctant, one and then another female move into the dancing ring. The spawning ritual is about to start because very soon all of the females will join in when they believe they have been sufficiently coaxed. Spawning is dancing.

Carp eat anything. In the wild they stand on their heads to dig around in the mud. Using their barbels, which are often called “touch organs,” they dig and search for insects, snails, and worms as well as shoots, roots, and leaves. Each carp has four barbels, two short ones above the lips and two long ones on either side of the mouth. These are feelers and diggers. The wild crucian carp, from which the ornamental species were originally developed, did not have barbels. Consequently, goldfish and lovefish do not have touch organs either since they do not munch in the mud like the other species of carp. While in the wild carp food is quite varied, in aquariums it can be monotonous because humans usually feed them prepared commercial food. Carp tire of it.

Among the many species of carp hatched and grown for food, one variety in Russia was selectively cross-bred to grow at a faster rate so that it gained five kilos in one year. Since the lovefish of Japan can grow to be two feet long and ten kilos in weight, they are better raised in ornamental garden ponds because they are far too large for most aquariums. Usually an orange-red color, golden carp (goldfish) can be bred to be almost any color. All-white albinos are blind, and all-dark blackamoors have bulging telescopic eyes. Calicoes or spotted fish also exist. Carp are genetically flexible. Coloring of a wild crucian, the ancestor of the golden carp, is a yellow-brown. From this species over a period of 2,500 years, all other goldfish descended. Providing food for people on five continents, the many species of wild carp truly are a boon to mankind.

When European settlers migrated to North America, Australia, and New Zealand, they naturally brought their favorite food fish with them to the new habitat. Today wild carp can be found in the ten provinces and three territories of Canada, all over the United States, and into northern Mexico. Of all the continents, only South America has no carp. Obviously, European settlers carried and adapted carp in Africa where it now inhabits the freshwater rivers from the Cape, up the Nile to Cairo. If the habitat is cold and rivers freeze over, carp hibernate in the water below the ice. They are flexible. Living in hot countries, carp merely breed faster, grow faster, and develop faster. Consequently, carp can be found in the Yukon and Siberia as well as in Zaire and Indonesia because they tolerate hot and cold. Carp enjoy a world-wide habitat, which makes them the earth's most adaptable fish and most sought after for food.

## Golden Carp: For Pleasure

The early history of the golden carp is long forgotten so that instead a number of charming and fanciful legends have taken its place. Supposedly, a terrible drought struck the province of Shensi, and the Chinese prayed to the gods for rain. Falling in cloudbursts, the rain fell in torrents such that golden carp surprisingly appeared in the puddles. Or after the drought the storm stirred and churned up the deepest depths in the ocean and tossed the goldfish into the air, from which they fell into a lake where ordinary fishermen found them. Or while the golden fish were playing in the clouds in heaven, they became careless and tumbled down to earth. There is a love legend, too. When a man left a beautiful girl who was desperately in love with him, goldfish appeared in her tears as they fell to the ground. Somehow there must be a happy ending because all love stories deserve one. Lovely as the legends are, they tell us little about the beginning history in China of breeding golden carp just for pleasure.

There are easily 2,500 species of wild carp eaten by humans all over the world. While one of those species was called crucian [crew-shun], which lived in the rivers of China, humans developed it into the golden carp or what are commonly called goldfish. In Japan another species was developed, the beautiful ornamental carp or koi, the Japanese word for “love.” Breeding, breeding, and breeding has developed and refined 125 fancy species of golden carp. There are five ancestral koi. Consequently, three major branches of carp exist: the food species, the golden carp, and ornamental koi types because it is the most versatile of fish and the most easily bred for pleasure.



Developing ornamental fish is an art which for 2,000 years was unique to China and Japan. Carefully selecting and cross-breeding allowed the Chinese to develop most of the beautiful and unusual species of the golden carp. While live brine shrimp in the diet of the goldfish can greatly enhance the red-orange color, manganese sulfate in the water will increase and deepen blue colors. In fact, developing ornamental fish can be profitable since one koi of exquisite appearance might sell for one thousand dollars and because prizes in beauty contests for golden carp range as high as 15,000 dollars. Contests are extremely serious. The Japanese particularly combine pleasure with profit in developing ornamental carp.

Carp are bred and raised in artificial habitats. In Europe fish farms which raise carp are common, where they are fed by automatic machines. Quickly the carp learn to hit the button or lever when they are hungry, a system which saves labor and prevents under- and over-feeding. Pulling bell ropes, the beautiful ornamental carp in the palace of Versailles in France can indicate they are hungry. While hatcheries in Japan sell 100 million golden carp a year, the largest hatchery in the United States only sells five million. Europeans and North Americans are usually behind the Japanese in this business because the latter had been breeding carp for generations before America was discovered. Canada has a thriving industry. Thus, hatcheries and fish farms are



artificial habitats for fish for food while aquarium and ornamental garden pools are artificial habitats for carp kept for pleasure.

When females reach the spawning grounds which the males have surveyed and selected, they remain away to one side slowly swimming in their huddle as if unconcerned about the ritual dancing so vigorously proceeding a few feet away. Eventually, a few males will come over to nudge the females toward the spawning ritual, and eventually they will go, followed eventually by all of them. While the females tend to be in the middle, the males jive on the outside moving faster and faster, the area becoming smaller and smaller. After thirty minutes or so, one female followed by another and yet another will freeze and release the roe or eggs. The dance continues. More roe is released, followed by clouds of milt or white semen from the males. Dancing more vigorously than ever, the ritual continues. The shallow, cloudy water is roiled by the thrashing fins because each female will release roe three or four times before the mating dance ends. Without doubt the spawning ritual is most pleasurable to watch.

## Ornamental Carp: For Beauty

While carp species are a favorite food in Europe and in Eastern Europe, prepared and served as the traditional main course for Christmas dinner, in some areas of the United States they are considered too fatty and coarse. Having reached plague-like proportions, destroying and wiping out pike and trout, Americans have regularly engaged in mass poisoning of rivers. In China the breeding and development of beautiful species of golden carp became an art. Most Chinese have possessed an aquarium or garden pond because the carp were beautiful, not difficult to care for, and live for years. Chinese created new species. They bred for shape. They bred for color. Fascinating new species have come out of the Orient: lionheads, celestials, and pompons, peacock and veil tails, albinos and blackamoors, fan tails, and calicoes, which are spotted and multicolored. Frequently, the koi or lovefish species developed much more vivid colors than the golden carp since Japanese breeders were more interested in color rather than odd shapes. They bred for beauty.

It has been long forgotten when the selection, breeding and development of ornamental carp began in China. In Japan, however, people became fascinated in northern Honshu Island when they brought the carp into their homes during the long, cold winter. Living in jars and buckets carp fascinated the Japanese, who gradually began the selection and breeding of them, which led ultimately to a major modern industry. While breeding golden carp, one discovers that they can easily regress to ancestral type because many of the species are unstable. Clearly, among the young fry some are deformed. Others regress to the wild type born with long bodies, green in color and with a single fin like its ancestor, the crucian carp. Many must be killed. Sometimes only one percent are selected to be raised and bred as ornamental fish. They are selected for beauty.



It was fairly late in the history of golden carp when they reached Europe, and later yet when Americans began to purchase and breed them. In the eighteenth century Europeans became fascinated with these small, beautiful fish which could be kept in any home, even poor ones, since they did not require heaters, aerators and filters. Just as the Chinese peasants had kept them, so the European poor could do so also. The European elite went wild. At a banquet for hundreds of guests, the emperor of Russia decorated the table with round water glasses like brandy snifters. Swimming vigorously in his own tiny aquarium, a goldfish graced each guest's water glass. Eventually and for about fifty years goldfish would become popular in America, to be replaced by far more expensive hobbies: tropical fish inside the home or ornamental carp or koi in a garden pond. Reviving because of new shapes and colors being developed in the Orient, the goldfish industry in North America is once again making history. It brings beauty to people.

Aquariums must be very large if spawning rituals are to be held in them since there must be space for the male dance and the separate female huddle. In addition there must be ample and fresh oxygen because the fish use up great quantities of it in the frenzy of the spawning ritual,

which can take place four or five times a day during the mating season, April to June. When the female has released her roe three or four times in the mating ritual, she stops and drops out of the dance and lying on the river or aquarium floor breathes very heavily because she is completely and utterly exhausted. Eating extra food prior to the spawning season, the golden carp put on extra weight, which they lose during these rituals. Dancing uses energy. Clearly, the carp use extra food and oxygen during the spawning ritual which demonstrates beauty in movement.

The roe which the female produce during the spawning ritual is very sticky and clings to the watergrass in the dancing area. Each egg has a small outside pocket where the sperm should lodge if fertilization is to occur. Since the sperm remains alive only two minutes after its release by the male, it must quickly find a pocket. Many eggs are never fertilized. Since many eggs are unfertilized and wasted, over the mating season the female will release two million eggs hoping that some offspring will survive because the eggs and the young are eaten by almost everyone, including adult carps and even the parents. Maturing rapidly—in two and a half days if the water is very warm, or fifteen days if cold, the young are called “fry” until twelve months when they become “yearlings.” Finally, not until three years for the males and four or five for the females, will the yearlings be mature enough to engage in their own spawning ritual of beauty.

## Veils and Tails: For Fun

The history of the carp is firmly bound up with the Chinese people who worked for centuries to perfect and develop new species. Around 1500 the Mandarins competed feverishly to create new species to give to, and impress, the emperor so that a new breed like the pompom was developed, which had a growth on its head looking like a fur hat. Whenever a new attractive feature was developed, usually there was a price to pay, however. Golden carp with pretty telescope and bubble eyes have impaired vision, while fan tails, double tails, and veil tails swim slower than ordinary carp. Clearly, in genetics almost every advantage brings a disadvantage because you may get beauty but give up good vision and speed in swimming. Pretty albinos are blind. Developing a beautiful characteristic may be fun, but it brings along a less favorable one, or so the history of carp has demonstrated.

Developing ornamental fish can be hazardous because many of the species are unstable, which means that they readily lose characteristics you may wish to keep. For example, the completely sooty black of the blackamoors is the least stable of all the colors. Ones with golden bellies will slowly and surely change and turn orange later in life. If you left golden carp to their own devices in a garden pond, they would, in a few generations, revert to the ancestral crucian carp since the species are yet unstable. Many fry will revert. In a hatching of thousands, few will be the fan tails, double tails or veil tails which breeders want. Consequently, reversion to ancestral type and instability are two major problems when developing ornamental carp for fun.

Carp are omnivorous. This means they like and eat meat as well as vegetables, which they rarely get when housed in aquariums. Surprisingly, some aquarium owners feed bits of chicken and tiny green chunks of celery to their goldfish, reporting that their fan tails, double tails, and veil tails are crazy about them. Growing to an average of six to eight kilos, wild carp live from twenty to thirty years. In an aquarium one goldfish lived contentedly for seventy years and in lakes they often grow to thirty centimeters. Carp don't have stomachs. Chopping, grinding, and chewing of food takes place in the throat because that is where the teeth are located. When carp are hibernating, they should not be fed. Since they can go for some days without eating food, some people only feed them on weekends when their hungry eagerness is great fun to watch.



Among the goldfish species, some are truly amazing. The celestial or sky gazer has eyes on top and is always looking straight up rather than sideways, which is the norm for most fish. Presumably, this continual staring into the heavens explains why celestials were bred and kept by Buddhist monks in their monastery pools in Korea. While the blackamoor are “considered the pinnacle of goldfish breeding in Great Britain” because of their velvet soot-like color, telescopic eyes, and veil tail, in Japan the favorite show fish is the kohaku (ko = red, haku = white) with

bright red and crystal white markings. Their colors are startling. Straining to produce strange shapes and unusual features—fan tails, double tails, and veil tails—in the species they developed, the Chinese concentrated upon goldfish, while the Japanese worked to get fun out of flowing grace and complementary coloring in lovefish.

In preparation for the spawning ritual which takes place in the spring, the golden carp in the aquarium should be fed extra food. While appetites are greatest at 26°C, carp eat little at 18°C and nothing at all at 10°C. Clearly at 10°C the fan tails, double tails, and veil tails think it is winter and time for hibernation, not mating. Finding a spawning area, and if lots of oxygen is available, the males will begin their untiring and frantic spawning frenzy. Females huddle and observe. Persuaded to enter the dancing circle, the fun begins because the females are as vigorously active in their quick turns and fin flapping, pushing, and shoving as males. Both males and females almost drop from exhaustion when the mating frenzy and spawning ritual are over, their fan tails, double tails, and veil tails drooping because they are weary unto death.

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