

PA Trout In the Classroom: About Trout

Trout

Identification

Brook trout

Salvelinus fontinalis
PA's Official State
Fish



Brown trout

Salmo trutta



Rainbow trout

Oncorhynchus mykiss



Golden rainbow trout

Oncorhynchus mykiss



Worm-like pattern
(vermiculation) on back.

Brook trout has
red spots with bluish halos.



Front edge of fins white or
lighter in color.

Brown trout has dark spots, few
or none on tail.



Rainbow trout has dark spots, especially on
tail, and a pink lateral stripe.



Golden rainbow trout has
deep-yellow or orange
coloration. Some have
darker gold stripe.

Illustration: Ted Walke

BROOK TROUT (*Salvelinus fontinalis*)

A Pennsylvania native trout, this vibrant and stunning salmonid is the state fish. Brook trout are also known as natives, brookies, and speckled trout. Brook trout occurs naturally in small, cold, clean streams. These fish adapt to ponds and lakes, as well as instream beaver ponds. Brook trout has wild populations in Ohio, Susquehanna, Genesee, Potomac and Delaware River Watersheds. Naturally self-sustaining populations can be found in limestone, spring-fed streams and cold, mountain creeks with mountain laurel, rhododendron, and hemlock overhangs providing shade. Brook trout are unique in that they can tolerate relatively acidic waters but not temperatures over 65 degrees Fahrenheit.



Brook trout populations span throughout the northeastern United States through the Great Lakes and south along the Appalachian Mountains to Georgia. Spawn occurs in the fall, from mid-September to early November. Eggs develop over winter and hatch in early spring.

Brook trout are members of the Char family identified by the following characteristics:

Physical characteristics	
Body color	Dark green, Worm-like pattern known as vermiculation on back.
Sides	Shade of light green/lavender tone with irregular marks. They also have scattered red dots surrounded by blue halos.
Belly	Pale yellow/orange with black streaks down the middle.
Fins	Pectoral, pelvic and anal fins are orange with white edge and black stripe.
Size	
At maturity (two to three years of age), wild brook trout range from 5 inches to 18 inches long, depending on the availability of food, shelter and water quality.	
# of eggs	
Adult females, depending on size, lay 100-1,000 eggs and 1-2% survive.	

BROWN TROUT (*Salmo Trutta*)

Not native to Pennsylvania, brown trout have naturalized and become the main trout species in streams previously dominated by brook trout. Brown trout were introduced to the United States in the 1800s from various locations, including Scotland and Germany. Pennsylvania received its first brown trout in 1886. Brown trout are closely related to Atlantic Salmon (*Salmo salar*).

Brown trout spawn in October through mid-November, a little later than brook trout. The female digs a shallow, gravel nest, a redd, on the stream bottom where there is good water flow to oxygenate the eggs. After spawning, the eggs are covered with a layer of gravel. Eggs develop over winter and hatch in the spring.



Brown trout can be identified by:

Physical characteristics	
Body color	Brownish in overall tone.
Sides	The back and upper sides are dark brown to gray/brown, with yellow/brown to silvery lower sides Large, dark spots are outlined with pale halos on the sides, the back, and dorsal fin, with reddish-orange or yellow spots scattered on the sides.
Belly	White with a pale shading of yellow.
Fins	Clear, yellow-brown, and unmarked.
Size	
At maturity (two to three years of age), brown trout range from 5 inches to 18 inches long, depending on availability of food, shelter, and water quality. A trophy brown trout can exceed 30 inches.	
# of eggs	
Adult females, depending on size, lay 4,000 – 12,000 eggs and 1-2% survive.	

RAINBOW TROUT (*Oncorhynchus mykiss*)

A western North American species, native to the Pacific slope from California to Alaska. Rainbow trout were introduced throughout the state in efforts to restore degraded trout fisheries. In the wild, rainbow trout sustain reproducing populations in only a handful of fast-falling creeks scattered throughout the state. As stocked, hatchery-raised fish, rainbow trout inhabit every major watershed in PA.

Rainbow trout spawn from mid-March through April. The female digs a shallow gravel nest, a redd, on the stream bottom where there is good water flow to oxygenate the eggs. After spawning, the eggs are covered with a layer of gravel until hatch in late spring or early summer.



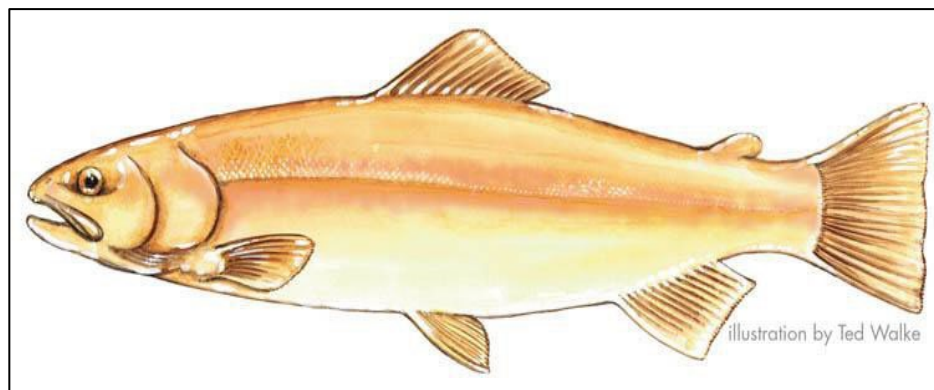
Rainbow trout can be identified by:

Physical characteristics	
Body color	Silver-gray to dark green
Sides	A pinkish/reddish lateral stripe; sometimes with lavender or orange overtones from the gill cover to the tail. Dark spotting along the back and sides.
Belly	White belly
Fins	The caudal fin (tail fin) and adipose fin have small, dark spots. The pectoral and pelvic fins are pinkish with no spots.
Size	
At maturity (two to three years of age), rainbow trout range from 5 inches to 18 inches long, depending on availability of food, shelter, and quality water.	
# of eggs	
Adult females, depending on size, lay 100-12,000 eggs and 1-2% survive.	

GOLDEN RAINBOW TROUT (*Oncorhynchus mykiss*)

The golden rainbow trout is a rainbow trout raised through artificial fish culture conditions and stocked as a novelty for angling. Originally found in 1954 in the West Virginia hatchery system, the West Virginia Centennial Golden Trout was hybridized with rainbow trout in PA to produce true, genetic palomino trout. Palomino trout was first stocked in PA in 1967 as an average and trophy-sized fish. Today golden rainbow trout are raised only as trophy-sized stocked fish.

Spawning in the wild is unlikely due to the golden trout's high visibility to predators and anglers. Although their food preference is like other trout, the golden rainbow grows larger and faster than rainbow trout. This hybrid vigor is common in crossbred plants and animals.



Golden rainbow trout are identified by:

Physical characteristics	
Body color	Bright orange with no spots
Sides	Pink or red tones on their cheeks and a reddish lateral stripe.
Belly	White belly
Fins	Pinkish lower fins with no spots
Size	
At maturity (two to three years of age), rainbow trout range from 5 inches to 18 inches long, depending on availability of food, shelter, and quality water.	
# of eggs	
Adult females, depending on size, lay 100-12,000 eggs in a hatchery setting	

THE LIFECYCLE OF TROUT

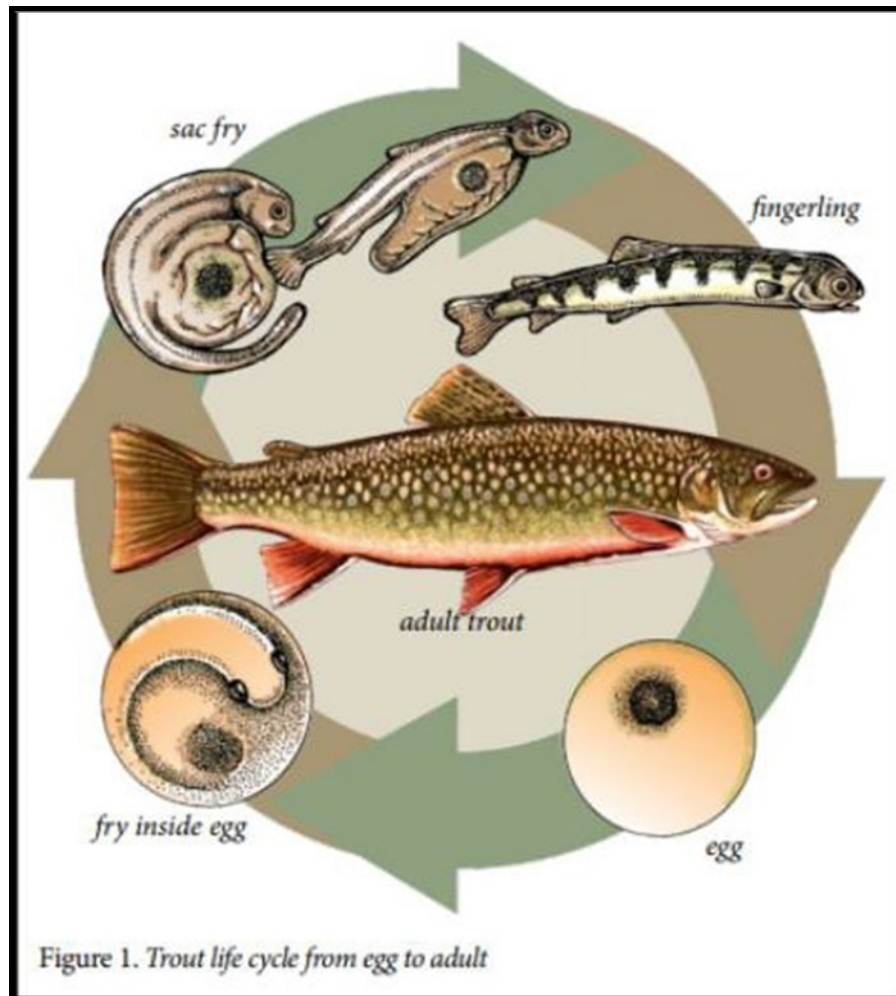
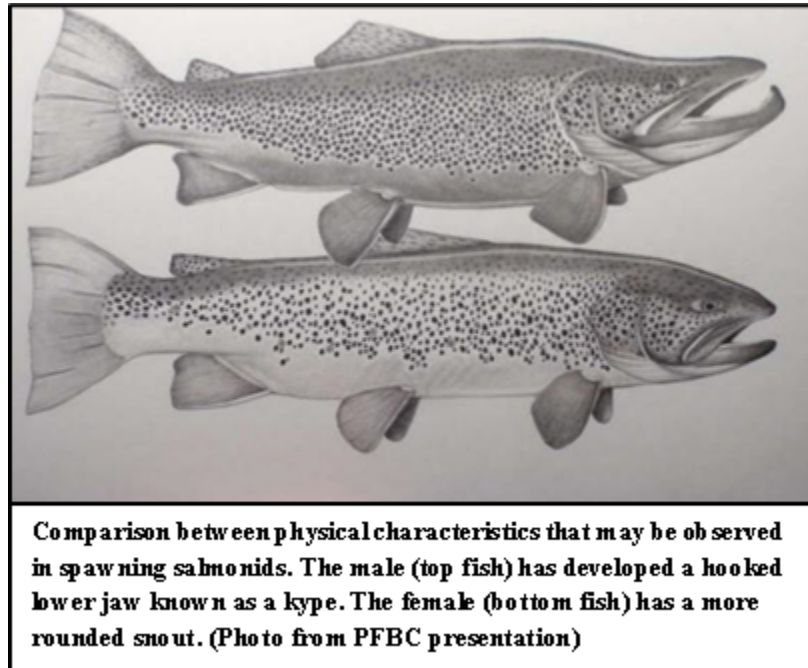


Illustration: Ted Walke

HISTORY OF SALMONIDS IN PENNSYLVANIA

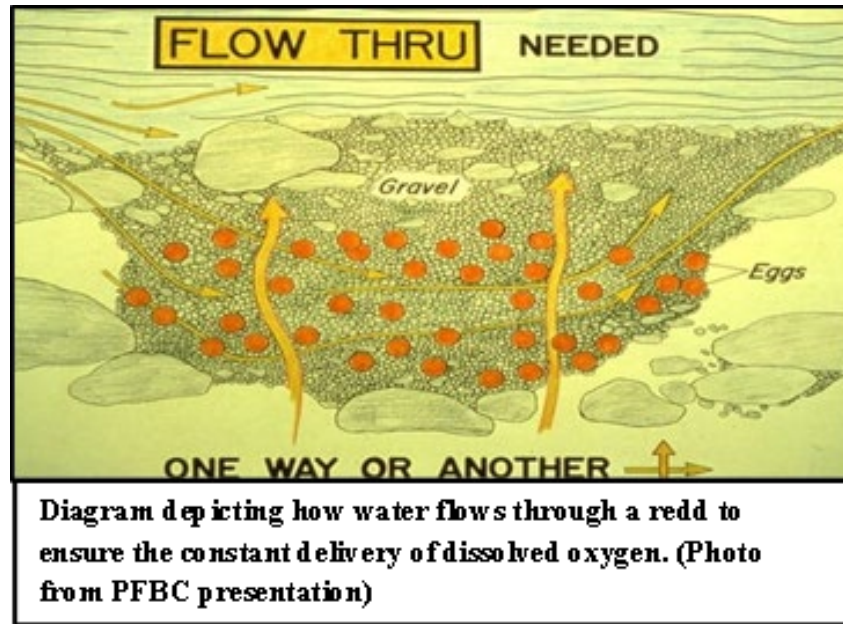
Fishes within the trout and salmon family (Salmonidae) live in either freshwater all their lifecycle or migrate to the ocean and return to fresh water to spawn. Anadromous species live primarily in a marine environment and migrate to a freshwater environment to spawn while catadromous species primarily live in a freshwater environment and migrate to a marine environment to spawn. Trout and salmon spawn in spring or fall over gravelly shoals in small streams.

During spawning season, males may develop a brighter coloration than females. Mature, large male salmonids develop a hooked lower jaw, a kype, and a laterally compressed body shape. Females have a rounded snout and fuller, rounder body shape.



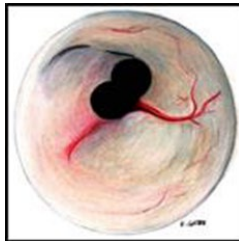
To spawn, a female digs a shallow dish nest in the gravel by lying on her side against the bottom and swimming forward energetically. This motion flushes out the stone to create a nest or redd. The eggs fall into the spaces between the loosened gravel to allow cold, clean, well oxygenated water to filter through. Redds may be covered with slightly more gravel by the female to protect the eggs from predators and sunlight.

Depending on water temperature, eggs hatch in four (4) to ten (10) weeks. Young trout stay in the redd until the yolk sac is absorbed and they move out into the stream for food. The presence of reproducing trout populations is used as an indicator to stream health. Trout reproduction occurs in the highest quality streams in PA.




SALMONID LIFECYCLE

A. EYED EGGS

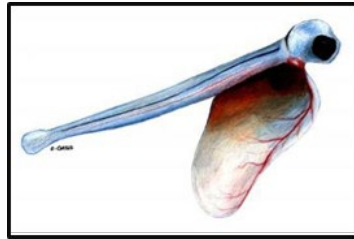


Once eggs have been fertilized in the redd they are termed “green eggs” and are the most vulnerable point of the lifecycle. Eyes will appear as they develop increasing their stability and is the egg stage at delivery to the classroom.

As eggs develop, they receive oxygen from the steady waterflow and nutrition from the yolk sac. In nature, 1-2% or ten (10) to 20 eggs will survive to spawning age. Watershed and trout health and food availability.

 **CARE TIP-** Eggs do not get fed. Their nutrients come from within. Be sure to remove any eggs that look foggy or fuzzy. Use a turkey baster to do this.

B. ALEVINS (*pronounced Al-a-vin*) or SAC FRY



A newly hatched trout is still attached to and utilizing the yolk sac for nutrition. The sac contains protein, carbohydrates, vitamins, and minerals. The yolk sac serves as a “mini-lunch bag” that feeds the trout until it is completely absorbed. Once the yolk sac is absorbed, the “button up” stage begins, and trout emerge from the gravel and to search for food as a “swim-up fry”.

Alevins begin breathing through their gills at hatch. The rate of respiration can be observed by watching the number of gill movements. As cold-blooded animals, the metabolic rate depends on the environment temperature. Temperature controls the rate of respiration. As a result, trout breath and grow slower in colder temperatures and more rapidly in warmer temperatures. Warmer temperatures will reduce body growth because of inefficient digestion and respiration.

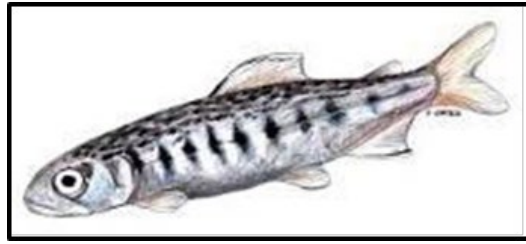
When eggs hatch, the alevins stay nestled at bottom of the stream until the yolk sac is fully absorbed. The yolk sac shrinks as they begin to develop teeth and the digestive and respiratory systems mature. It takes a week or two for the yolk sac to completely absorb.

At this stage alevin are extremely fragile and susceptible to predators, siltation, pollution, floods, or any disturbance in the water.



CARE TIP- Sac fry do NOT get fed. Their nutrients come from the yolk sac they are still attached to. They do not move much during this stage. Remove any that look fuzzy or do not move when gently squirted with a turkey baster.

C. FRY



1 inch or less

Swim-up Fry: Trout reaches this stage at full absorption of the yolk sac, and the trout emerge from the gravel in search of food.

Fry/Parr: A hatched trout less than one inch in length and has actively searching for and eating food. Dark vertical lines on their sides called parr marks become visible.

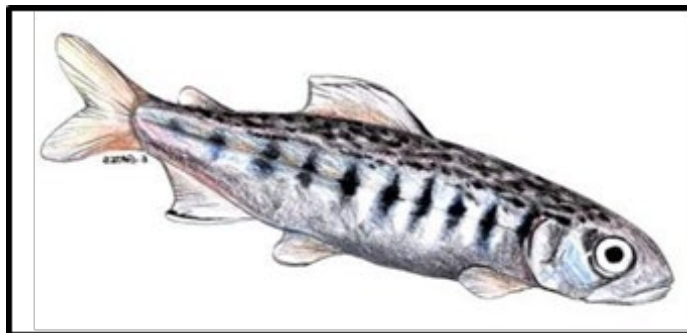


CARE TIP- Swim-up fry must be fed immediately! For feeding instructions refer to “Trout Care”. Some trout never learn to feed and will die. These non-feeding fish are called “pinheads” (*big heads, small bodies*) and should be removed. It is very normal to see a mortality spike with pinheads. Efficiently feeding trout are fry.

D. FINGERLING

A young fish one (1) to three (3) inches in length.

A warm, clean Aquarium with appropriate feeding amounts will raise healthy fingerlings by spring. In nature, fingerlings spend time in shallow waters hiding beneath rocks and vegetation to avoid predators. Fingerlings eat small insects and plankton.

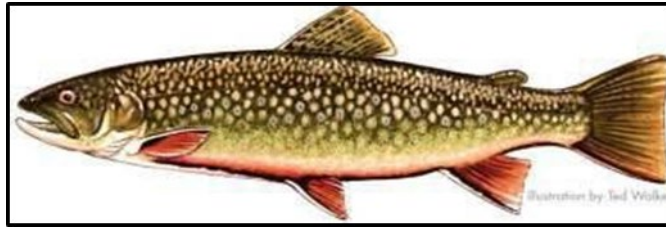


1 to 3 inches

E. ADULT TROUT

Adult trout can range in size based on species and the environmental conditions in which they live.

Adult trout initiates the reproductive cycle. The age of first reproduction and time of year varies between species. Adult trout feed on aquatic and terrestrial macroinvertebrates, other fish, and small mammals.



 **RESOURCE:** [ALL ABOUT TROUT - PENNSYLVANIA TROUT IN THE CLASSROOM](#)