PA Trout In the Classroom: Trout Habitat Needs & Making the connection from aquarium to stream

Trout require cold, clean, well-oxygenated water, ample food source, and shelter to survive.

COLD WATER =*52-56°F*	
Why?	Trout need cold-water ecosystems. Cold-water streams result from snow melting, rainfall, springs/groundwater, and/or cold feeder streams. Vegetation along the stream bank provides shade to assist in maintaining cool water temperatures and protection

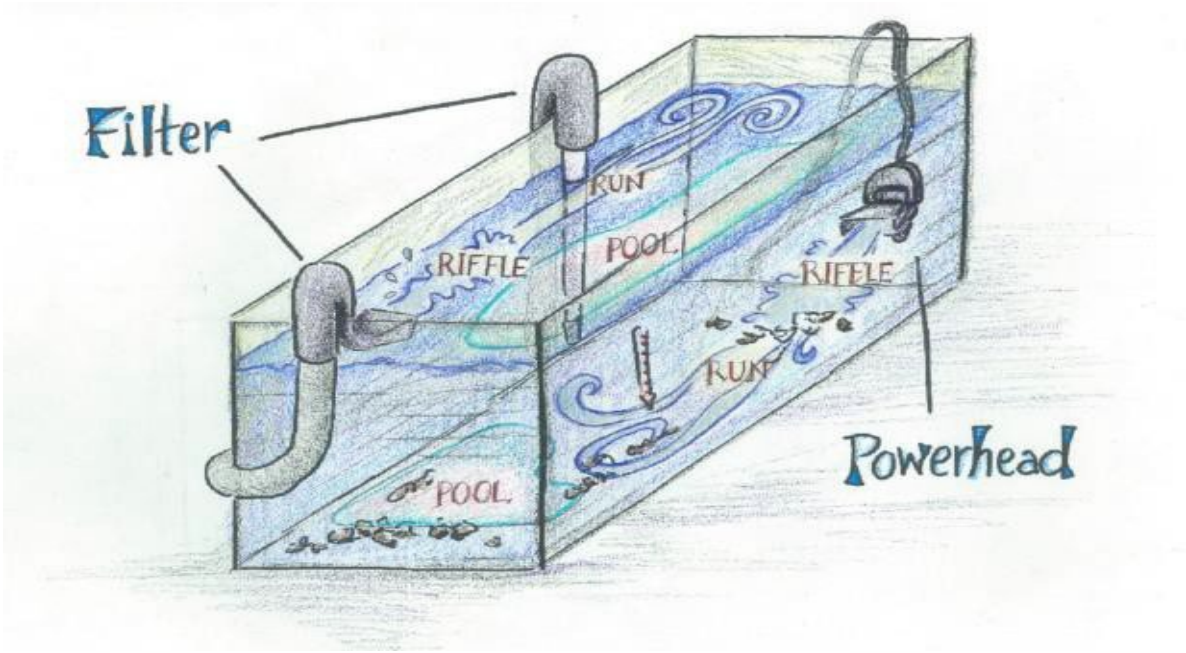
CLEAN WATER = *no chlorination, no sedimentation, pH = 7, and low levels of ammonia and nitrites*	
Why?	A healthy cold-water stream ecosystem is cleaned by bacteria, scavengers, and aquatic plants. It provides ample amounts of water exchange through rain, snowmelt, and groundwater. A natural stream's carrying capacity for trout is not usually an issue because of flowing water and diverse holding areas for trout. ***CARE TIP:*** **Aquariums are closed systems with no natural water exchanges; therefore, water quality and carrying capacity can impact trout health. Cycling your aquarium is important to have a good nitrogen cycle. Over feeding/excess food increases ammonia levels. A 55-gallon aquarium can sustain 80-100 based on trout size and water quality. More than 120 trout in the aquarium may require an early release to maintain trout health.**

OXYENATED WATER: *High level of dissolved oxygen (DO) (above 7 ppm)*	
Why?	A healthy, cold-water ecosystem is full of dissolved oxygen because of constant water flow over boulders, stones, wood debris (riffles, runs, and pools). The water is cold, and cold water holds more oxygen. ***CARE TIP:*** **Using an air stone and maintaining water temperatures at 52-56 degrees Fahrenheit will maintain proper DO levels.**

FOOD: *Trout feed upon varieties of the following: macro-invertebrates, crustaceans, terrestrial insect life & other fish (sometimes their own young)*	
Why?	Healthy trout habitats are diverse in their food sources, enabling trout to be opportunistic hunters.

SHELTER: G*ravel, boulders/woody debris, shallow pools, stream bank vegetation*	
Why?	Trout need a variety of shelter depending on the life cycle stage. Availability of habitat and shelter promotes healthy trout populations. Clean gravel, shallow pools and riffles provide spawning and nursery areas for trout. Boulders, woody debris, and streambank vegetation provide food resources and protective refuge for adult trout.

MAKING THE CONNECTION FROM STREAM TO AQUARIUM

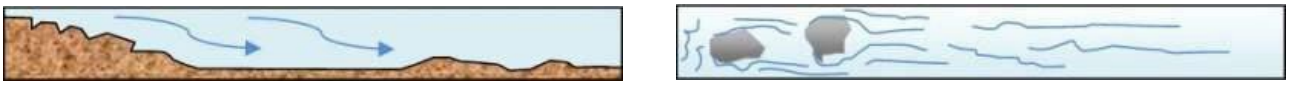


This diagram illustrates how a classroom "cold-water ecosystem" creates flow patterns like a natural stream setting.

Riffle: A fast moving, rocky segment of stream where the water is less than three (3) feet deep.

The water is more turbulent and oxygenated. Riffles contain an abundance of food ranging from algae to aquatic insects.

Run: Runs are a long, smooth flowing, fast segments of stream typically following a riffle.



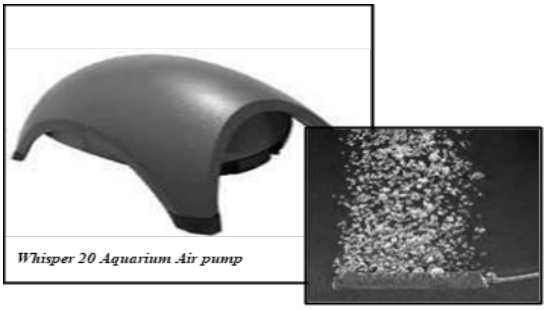
Ranging from three (3) to six (6) feet in depth, runs are deeper than riffles and have no white water.

Pool: A deep, slow moving and usually dark segment of stream

Pools provide cover from predators and prey for adult trout. Pools may be the only part of a stream that still has water during periods of drought.

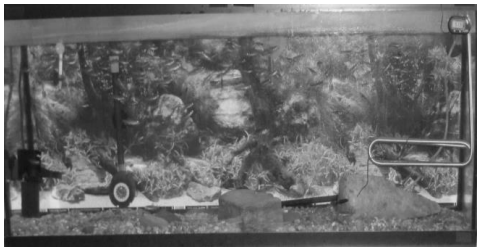
COLD WATER	
Aquarium	***Natural Habitat***
The chiller maintains the optimum water temperature for trout.	Trees, snowmelt, and underground water sources such as springs keep streams cool.

OXYGENATED WATER	
Aquarium	***Natural Habitat***
The air pump and air stone add oxygen to the water. The power head and the filter output add Aquarium circulation.	Streams gather oxygen as water flows over rocks and waterfalls, and aquatic plants increase oxygen levels. Cold water better retains oxygen levels.



CLEAN WATER	
Aquarium	***Natural Habitat***
The 407 Fluval Canister filter and a thin layer of gravel encourage the growth of microorganisms which turn harmful ammonia into somewhat harmless nitrates. The powerhead encourages water circulation throughout the Aquarium.	Clean water is stored and gradually released by a healthy watershed system. Bacteria and scavengers that eat decaying matter clean the water, and plants absorb nitrates. Wetlands are some of nature's best filters.

SHELTER	
Aquarium	***Natural Habitat***
Create a depression in your **freshwater substrate (river jewels)** to simulate a natural redd and serve as a nursery until they hatch. A customized "hatching" basket built as shown in the video may also be used: http://www.youtube.com/watch?v=QiCBC2MYmi0	The adult female brook trout will create a nest called a "redd" in the gravel to lay her eggs. The eggs are protected from light and have enough cold water, flow, and oxygen to develop.



Brook trout redd