

Salmon in the Classroom Aquarium Setup Guide



This guide was established by the Alaska Department of Fish and Game, Division of Sport Fish to aid aquarium assembly suitable for raising Salmon in the Classroom in Southcentral, Alaska. It is recommended that you read through the complete guide prior to purchasing or before assembling your Salmon in the Classroom aquarium.

If you have questions about this publication contact:

Trenten Dodson
Production and Operations Manager
Kodiak Regional Aquaculture Association
907-942-0829

Essential Equipment:

- 29-gallon glass aquarium
- Aquarium stand suitable to support a 29-gallon aquarium
- Chiller: 1/10 or greater horsepower flow-throw chiller
- Aeration setup: Air pump, air-line hose, check valve, and air stone
- Filter with built-in pump hosing
- Intake pre-filter
- Clean aquarium gravel
- Thermometer
- Insulating foam board (24" X 96")
- Aquarium top with light
- 5-gallon bucket with lid
- Siphon hose
- 6-outlet power strip

Optional Equipment:

- UV-filter
- Portable aerator with batteries
- Dechlorination solution
- Egg basket
- Weight for air-stone

Assembly Tools and Supplies:

- Standard (flat head) screwdrivers
- Phillips screwdriver
- Tin snips or industrial scissors
- Utility knife
- 8 hose clamps that fit 3/4-inch (outside diameter) hosing
- 2 barbed poly pipe half bends (plumbing parts)
- Red color Teflon tape
- Razor blade

Tank Placement



A few things to consider when deciding where to put the tank:

Sunlight

Salmon eggs are very sensitive to sunlight, so it is important to ensure that tanks are not located near windows with a lot of sun exposure. Sunlight can also cause increased algae growth in the tank.

Heat from heater vents

Salmon are sensitive to temperature changes. Temperature can determine how fast a salmon develops. Placing the tank near heaters or devices that generate heat will increase tank temperatures.

Outlets to plug-in electrical devices

Outlets are required to power the devices that keep the salmon healthy. Ensure your tank is near a power source and make sure that students can see the tanks.

Water source

Water is frequently added and removed from the salmon tank. Water can spill and cause damage. Spills in major traffic areas can make surfaces slick and should be cleaned up immediately.

Foam insulation board

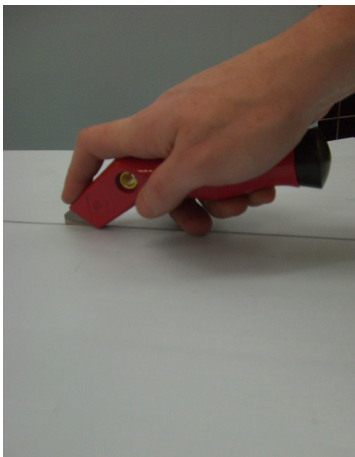


If the aquarium did not come with prefabricated insulation, then you will need to purchase and cut foam board to fit the outside of the aquarium. Foam insulation normally comes in 2 ft. x 8 ft. sheets. These sheets are commonly blue or pink. Color does not make a difference for this application. The insulation will help keep the aquarium cold. It is recommended that you do not use foam board that is greater than 2 inches in thickness.

This project will utilize almost the entire 2 ft. X 8 ft. sheet. It is recommended that the measurements are drawn on the sheet of insulation prior to cutting.

Here are the dimensions of the pieces that be will need.

- (2) 32 x 18 ³/₄ -front/back
 - (2) 32 x 5 ¹/₄ -taped together makes top
 - (2) 12 ¹/₄ x 18 ³/₄ -sides
 - (2) 15 x 5 ¹/₄ -outside bottoms
 - 7 ¹/₄ x 15 -middle bottom
 - 7 ¹/₄ x 3 ¹/₂ -riser under chiller
- (The above measurements are in inches)



Use a utility knife to carefully cut the pieces.



Aquarium Stand

Place aquarium stand in the desired location. If you are not using a factory approved stand, make sure that your stand can support approximately 260 pounds.



Insulation on base of aquarium

Take the three bottom pieces of insulation and lay them evenly across the aquarium stand. The pieces should overhang about one inch on the front and back of the aquarium stand. This overhang is the support for the insulation to be placed on the front and back.

Alternative: Place aquarium directly on stand. Use tape to secure exterior foam insulation directly to aquarium.



Aquarium

Carefully place 29-gallon aquarium on the foam insulation bottom pieces.



Remove aquarium stickers

Remove any stickers or advertisements from outside and inside the aquarium.



Clean aquarium

If tank is new rinse with clean water. Remove any sticky residue or algae from previous year. A razor blade may be needed to scrape off sticker adhesive or old algae. Scrubbing and removal of scum prior to adding cleaning solution will help in the cleaning process.

If cleaning solution is required, use Betadine Solution or a weak bleach solution (3/4 cup of Clorox® Regular-Bleach per gallon of water) let stand for approximately 10 minutes and rinse well. Let the aquarium dry in a well-ventilated area for at least 24 hours.

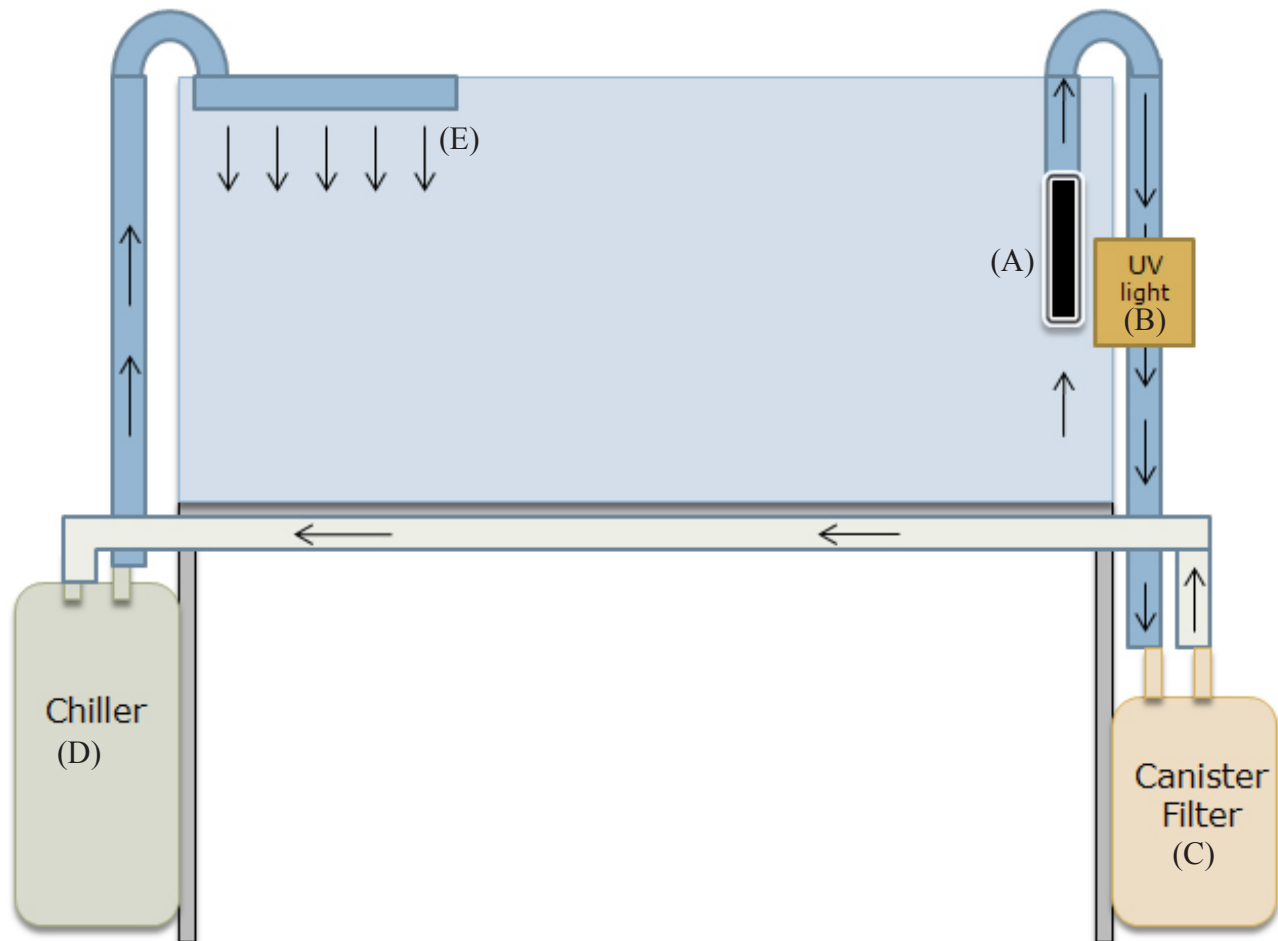


Unpack and place chiller and canister filter

Place chiller unit (left) and canister filter (right) inside the aquarium stand. No hoses have been connected. A small piece of blue foam is positioned to support the front of the chilling unit. Make sure there is adequate room to pull the filter in and out, and there is adequate room behind the stand for ventilation. Keep all additional pieces that came with both units.

If the chilling unit is too large to keep inside the stand, pull the filter out and install the chiller outside of the stand.

Water Diagram



Learning to plumb the aquarium will help in understand where the water is going and the basic function of each component.

Water is pre-filtered at the intake (A). The pre-filter reduces the chances that adventuresome fry will enter the plumbing. After the pre-filter, water passes through an optional, but highly recommended UV light (B). The UV light actively sterilizes the water. For positive bacteria development in the canister filter, it is recommended that the UV light not be left on all the time. Water flows through the UV light, water then travels to the canister filter (C). The canister filter pumps water and stores physical and chemical waste produced by fish. If ammonia-fixing bacteria colonies have established in the canister filter, then those colonies will be modifying harmful ammonia (waste) from the water. Water from the canister filter is then pumped to the chilling unit (D). The chiller decreases the water temperature as the water flows through the unit. Water then flows back up to the aquarium and through a perforated bar (spray bar) (E).



Intake

Assemble the factory-supplied intake assembly that comes with the canister filter unit, according to the directions.



Pre-filter

Install the pre-filter on the intake assembly. The pre-filter reduces the chances that adventuresome fry will enter the plumbing.



Ultraviolet light

Installation of a UV sterilization light may require cutting hoses. Hose lengths may vary depending on the distances between the aquarium intake hose (A), UV light, canister filter, chiller, and back to the aquarium. Lower left is a picture of the hosing and support bracket for the UV light. Additional hosing may be required if the components are distant from each other.



It is important that the hose does not kink or bind when going from the UV light to canister filter (lower right). To do this, a corner piece has been assembled that includes a hose (B), 90° polyvinyl chloride (PVC) corner, hose (C), 90° PVC corner, hose to canister (D). Prior to securing each connection, each PVC corner piece is wrapped with Teflon tape to assure there are no leaks. Secure the hosing to the canister filter on the “in” side. 9



Canister filter to chiller

Connect hosing (E) between “out” side of canister filter and the “in” side of the chiller.

Canister Filter

The canister filter in this aquarium setup provides two primary purposes: First, it pumps water (approximately 370 gallons per hour) to and through the chiller; and second, it stores waste and bacteria to remove physical and chemical waste. Canister filters often have multiple levels of filtration and media. Many of the of media are very porous, encouraging bacterial growth. Ammonia fixing bacteria remove harmful chemical waste from the water. To establish bacteria in your aquarium, make sure the UV light is off until the bacteria have had a chance to develop. If the canister filter contains carbon, it should be reactivated or replaced on an annual basis.

Chiller

There are two basic styles of chillers: the flow-through chiller, is also known as the “in-line chiller;” or the drop-in chiller also known as the “coil chiller.” Both styles are produced by a variety of manufactures, models, and sizes. The primary difference between these types of chilling units is where the water is cooled. On a flow-through chilling unit the water is cooled as it is pumped through the unit. The drop-in chiller unit cools the water that is around the coil that is inside the tank. Both styles have advantages and disadvantages.

Connect hosing to chiller output

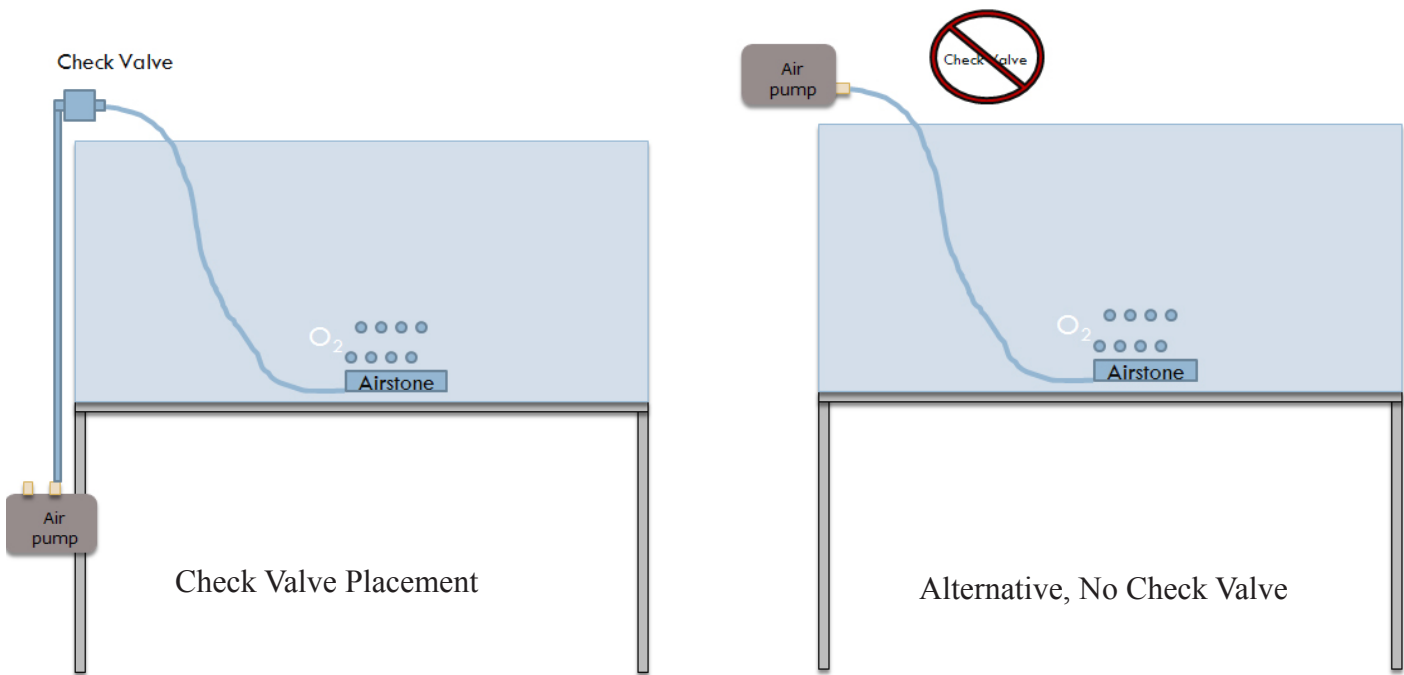
This hose (F) brings cold water back to the aquarium. The hose on the right of the picture carries water pumped from the canister filter.



Spray bar

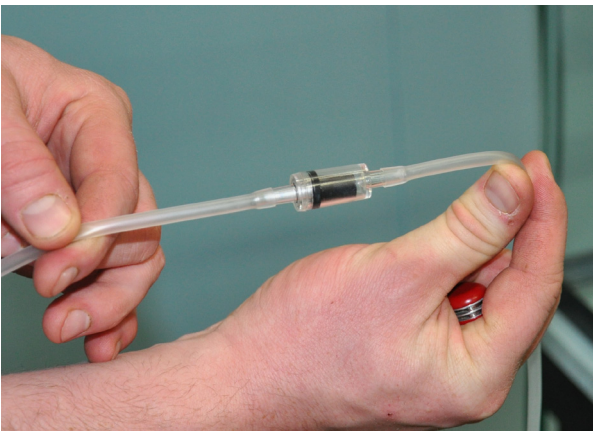
Assemble factory spray bar and output hose (F) from the chiller.

Aeration System



The purpose of aeration is to put oxygen into the water. Oxygen in the water that is usable to the fish is called dissolved oxygen (DO). Dissolved oxygen is critical for the survival of the salmon. Water that is cold will contain more DO than warm water. Dissolved oxygen can come from many places in nature. In the aquarium DO comes from two places in your tank: diffusion from the surface of the tank, and the air stone. Diffusion of oxygen across the surface of the water will not provide enough DO for your fish to survive that is why the air-stone is required. The components to your aeration system should include air pump, air-line hosing, check valve, and air stone. It may be required to cut air-line hosing specific to your tank setup. Installation of the check valve above the water line will assure that water does not accidentally flow back down your airline tubing. Additional weight may be required to keep air-stone on the bottom of your aquarium.

Alternative: If check valve is unavailable place air pump above the level of the water.



Assemble Aeration system

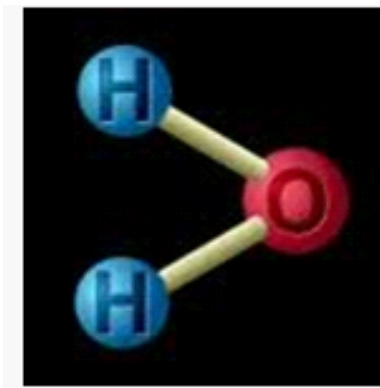
- air pump
- air-line hose (picture)
- check valve (picture)
- air-stone (picture next page)



Place clean gravel in aquarium

Evenly distribute gravel along the bottom of the aquarium. Place the air stone on the bottom which is part of aeration system.

Water



Young salmon require clean, cold water to develop properly. Start with the cleanest water possible. Here are a few tips to get the water with the fewest additives: 1) Get water from the best source possible, ask your local waterway council or aquatic education specialist for advice. 2) Do not use distilled water. 3) Let the water in faucet run for a couple of minutes prior to getting the water for your tank. This will allow impurities that have accumulated in pipes to flush out of the system. 4) Salmon will not survive in water containing chlorine. Chlorine is added to many drinking water sources. Chlorine will dissipate over time if it is exposed to air, or add dechlorination drops to the water you are adding to your tank.

Add water

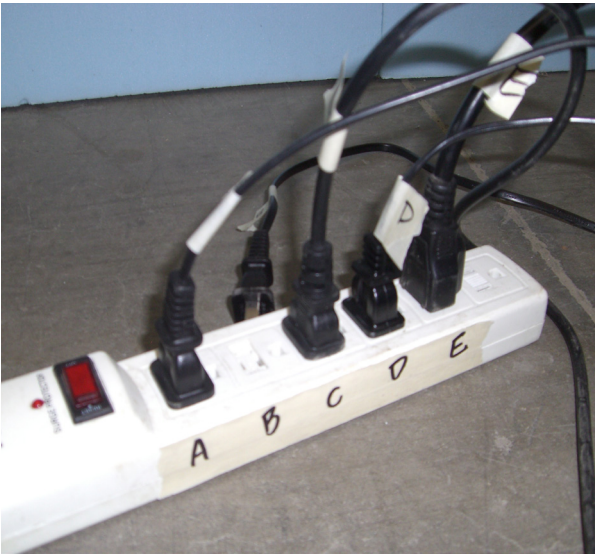
Fill the aquarium so the spray bar is under the water.





Add water to canister filter

Lift lever between input and output hosing connections; this will keep water from flowing down the hoses. The filter has a clip on each side to open the top. If this is the first time using the filter, check the media inside the canister and remove from plastic bags. Pour water into the filter until it is 3/4 full. Secure lid back on the canister filter and push down the lift lever and assure the input and output valves are secure.



Plug devices into power

A 6-plug outlet is recommended. As items are plugged in check to make sure they are working properly.

Helpful hint: Labeling power cords will help you know which cord goes to what device.



Aeration system

Bubbles should be coming out of air stone.

Troubleshooting:

- Check to see that the air pump is pumping air.
- Air pump may have adjustments to increase air flow.
- Check air-line hosing is not kinked or damaged.
- Check that the valve is installed the correct direction.



UV Light

Viewing window on UV-light should light up.

Troubleshooting:

- Check power connection
- Replacement bulb may be required



Canister Filter

When power is provided to the canister filter, you may hear the motor inside functioning, but no water will be flowing. To get the water flowing through the system to compress and depress the self-priming pump located on the top of the canister filter. This may take a few minutes of pumping.

Troubleshooting:

- Check power connection
- Lever between the input /output arm is down
- Aquarium water level is above spray bar
- Water was added to inside of canister filter

When the canister filter is functioning properly, water will be coming out of the spray bar. Additional priming may be required to purge air out of the water lines.



Check water lines for leaks

Follow the water lines and make sure all connections are secure and no water is dripping.

Troubleshooting:

- Tighten connections

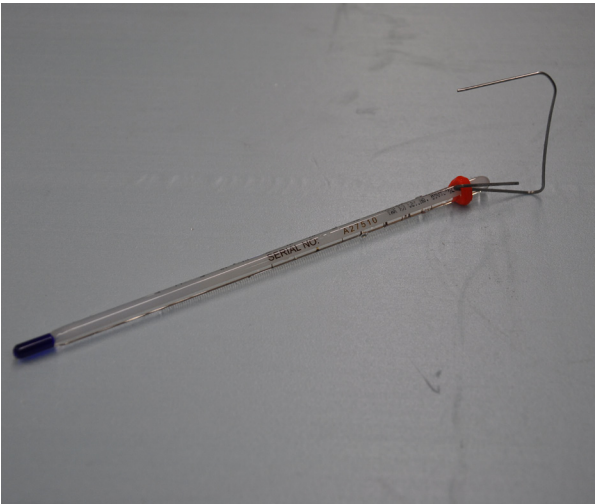


Power to chiller

Display is lit on the front of the chiller. Push the “set” button and “down” arrow until set at the desired temperature. This temperature does not accurately reflect the temperature in your tank, therefore a thermometer should always be used to determine the water temperature.

Trouble shooting:

- Check power connection
- Air filter on the front needs to be cleaned
- Make sure water canister filter is working



Thermometer

A basic paper clip can be modified to secure the thermometer to top of the aquarium, as shown in the picture,



Aquarium hood and light

The hood will need to be modified using tin snips or commercial grade scissors. See cut sections in picture.

Alternative:

- A piece of foam insulating can be used as the top of the aquarium.

WARNING! Salmon are extremely light-sensitive until they reach the fry stage. Do not turn on the light until the salmon reach the fry stage.



Installing foam insulation

Use tape to secure the pieces of insulation around the outside of the aquarium.



Congratulations, you have completely assembled an aquarium for raising salmon in your classroom. Your tank should be setup a run a few days to week prior to salmon egg delivery to let the system acclimate and water to become disinfected by the UV light.

Remember, you still need to perform routine water changes to maintain this aquarium.