4. FREQUENTLY ASKED QUESTIONS

4.1 ABOUT SALMON'S TALE

4.1.1 Who is the Salmon's tale educational program intended for?

The program is aimed primarily at Grades 5 and 6 students, but many teachers have adapted their teaching to classes ranging from Grade 3 to high school, all the way to the college level! The program can very well be adapted to classes of students with learning difficulties, as much as it can serve as the basis for an enriched science program. The program can be taught in any school in Quebec, but since the stocking must be done on a salmon river, schools need to consider if their location is appropriate for their involvement. If you have any questions, do not hesitate to contact our Salmon's Tale program coordinator at the FQSA.

4.1.2 How is the program structured?

The program is designed to take place over a 4-month period starting when the eggs arrive in the classroom and ending when they are released into the river. The aquarium should be installed at least 1 week prior to the arrival of the eggs. Teachers must register their class for the program in the fall the year before.

4.1.3 What are the main themes addressed in the program?

The Atlantic salmon serves as a common thread to address various issues. Wild Atlantic salmon populations are the perfect indicator of a healthy environment. Also, salmon rivers and sport fishing for this iconic species are an important contributor of the economy in many regions in Quebec. Salmon are as much a part of our history and heritage for both indigenous and non-native people alike.

Salmon are the ideal wildlife species to approach, popularize, and transmit fundamental knowledge about that deal with science, technology, and the history of Quebec.

4.1.4 What is the teaching approach?

The program makes students aware of the issues surrounding Atlantic salmon and its rivers, but also the environment in general and the impact that we have on it at large. They learn about the king of rivers through English, math, biology, and ecology activities, as the teaching material aims to integrate various concepts from different school subjects. The student's workbook includes multiple-choice or short answer questions, associative games, gap-filling texts, crossword puzzles and a role-playing game on an environmental issue concerning the exploitation of a salmon river. Our program is built on a competency-based approach and draws on research that emphasizes on how important it is to help students make sense of their learnings by explicitly linking them to varied and meaningful contexts. As proposed by the Ministère de l'Éducation, cross-curricular competency approaches and project-based approaches help break down the barriers between different school subjects, and help students create connections

between them. This program provides students with a broader understanding of the various disciplines taught throughout their education.

4.1.5 What kind of teaching material is used?

The student and teacher's books are used for learning through research and discovery. You may purchase hard copies of the books or print them directly from our website.

The books are designed to meet instructional objectives in English, mathematics, geography, and the natural sciences. They include several different types of exercises (multiple choice, crossword puzzles, role-playing, etc.).

The incubator installed in the classroom allows students to witness the early life stages of salmon. They will take responsibility for their care (monitoring the temperature, looking after the aquarium, feeding the fish) until it is time to release them into the river in early summer.

The FQSA also suggests watching a short 20-minute film available on its website: "Jusqu'à la mer", by Normand Bergeron and Francis Bérubé, which does a great job of explaining the life of Atlantic salmon in the river.

There is an online game that allows you to learn about the life cycle of salmon with the help of Salmo, our mascot! Developed in collaboration with Créo, this interactive game allows us to combine the course material with play and makes for a fun way to integrate some of the information in the program. The game is available for free online on our website www.histoiredesaumon.com (english version too)

4.1.6 How can I participate in the program?

The **registration form** you need to fill out is available on our website. We receive the forms directly from you via the electronic questionnaire. If you have any questions, you can contact us by email at info@fqsa.ca or by calling us at (418) 847-9191.

Next, you must fill out and send your order form to us, also by email.

If this is your first time participating in the program, we strongly recommend that you first read the detailed description of the program and learn about its wider implications.

4.1.7 What are the financial implications of the program?

The first year will require an outlay of approximately $1600 for the aquarium, the cooling unit, and the filtration system, that is to say, all the equipment for your incubator. Each year after that, the FQSA provides the salmon eggs free of charge and offers technical support to help you properly use the incubator and its components.

The following years' costs are minimal (changing the filters, carbon and Biomax). You can purchase hard copies of the student workbooks or have them printed using the document available on our website.

A space must be provided to accommodate the incubator system as well as to allow daily monitoring of the devices. We suggest installing the incubator system in the classroom or outside in the hallway, rather than in a study room or other unattended space. Make sure you have a table or platform that is leveled and wide enough. An aquarium filled with water is very heavy (180 kg) and requires good support.

You must dedicate time in the classroom to teach the program and integrate its contents into your curriculum. We suggest that you review the course materials before beginning the project and incorporate the activities into your curriculum from the outset, rather than seeing it as an extra activity. The wide range of subjects addressed, and the various exercises proposed are designed to meet the learning objectives set for your class.

4.2 USING THE AQUARIUM - INSTALLATION AND START-UP

4.2.1 What kind of equipment do we need to set up an incubator in the classroom?

All the material and the equipment needed to set up the incubator is specified when you register and fill out the order form. If you have participated in the program in the past and already have the necessary equipment, be sure to replace the filters every year (Carbon filter and Biomax pebbles and the white foam if they're getting dirty).

The refrigeration unit is the key piece in maintaining a viable environment for the eggs and fry. It consists of a compressor, a refrigerating tube, a motor, and a ventilation system. Contrary to the models previously used, the thermal exchanger is kept out of the water, preventing problems caused by ice build-up due to low water displacement.

You will also need some rounded rocks of various sizes ranging from 1" to 4" in diameter. The gravel can be found along the banks of a river, and will have to be brushed, cleaned, and washed. Use a bleach solution diluted in water (1/10) to wash the gravel and rinse several times.

4.2.2 Should the equipment be washed before use?

The incubator unit, gravel and filter unit should be rinsed thoroughly with water to remove any dirt and dust remaining from the time it was stored. If you are unsure about the cleaning method to use before storing your incubator, it would be best to re-wash the aquarium using only a bleach solution (1/10) and rinse it several times.

Be sure to rinse each unit thoroughly and repeatedly to eliminate any residual chlorine left from the bleach solution. Salmon eggs and fry are extremely fragile beings. Exposure to such chemical substances could be fatal to them, so take no chances.

4.2.3 What temperature should the incubator be initially set at?

First, check the water temperature in the aquarium before you start the cooling unit. After turning on the unit, set the temperature 1 degree below the current water temperature. You will need to gradually lower the temperature down to 5 °C. We suggest that you decrease the temperature by one degree per day and check it as often as possible to see if the temperature remains stable.

4.2.4 Do filters have to be installed immediately upon start-up of the incubator?

The Fluval system already has all its components built into the filter unit, so there is no need for further handling at this stage. However, they will have to be rinsed with water once a year, at the end of the program, before storage. Change the carbon filter and the Biomax pebbles to use again the following year.

4.2.5 Is it normal to see a difference in temperature between the thermometer reading in the aquarium and the incubator thermostat?

The aquarium thermometer may not display the same temperature reading as the unit's thermostat. Trust the thermometer reading. Experiment with the temperature differences between the two and try to adjust the filter unit so that the aquarium's water temperature gets as close to 5 °C as possible.

4.2.6 Is there anything special to prepare on the day of arrival of the eggs?

The day and time scheduled for the egg delivery will be made known to each teacher in the weeks prior to the event. Under normal circumstances, you should receive the salmon eggs in mid-February, early March.

Make sure that the water temperature has been stable between 4 and 6 °C for at least two days prior to receiving the eggs. This is the single most important thing to prepare before the eggs are delivered. On this day, a representative will come to your classroom to deposit the salmon eggs in the incubator and to provide you with further instructions.

4.2.7 Some of the eggs have changed color and are now white, is this normal?

The dull whitish color is a sign that the egg is dead. A certain mortality rate is normal at each stage of salmon development. You must remove any white eggs that you see using

the pipette and then throw them away.

Use the aspirator bulb or place your thumb tightly on one end of the pipette/baster and bring the other end of the pipette/baster close to the egg you wish to remove and gently release your thumb to suck up the egg. Put your thumb/finger back on and dispose of the egg in the toilet. Practice doing this to measure the suctioning and be careful not to draw in the live eggs along with the dead eggs.

4.2.8 What to do if foam appears on the surface of the water?

Scum/foam forming on the surface is quite normal. Use the net included in the starter kit to remove this type of matter from the water's surface.

4.2.9 The water level in the aquarium seems to have dropped, what can I do?

It is normal for the water level to drop over time due to evaporation, among other things.From the very beginning of the project, you should have a bucket, or a large jug filled with tap water that should be left to rest and settle for at least 72 hours to allow the chlorine to evaporate. Make sure that the water in this jug is kept at a temperature of 4-5 degrees so as not to create thermal shock in the aquarium. Eggs and fry are very sensitive to physicochemical changes in their environment. The bucket or the jug can be stored in the fridge or in another cool environment. Make sure everyone in your school is aware of the situation to avoid someone inadvertently feeding the aquarium directly with tap water or room-temperature water.

4.2.10 Is it normal for the aquarium to develop a particular odor after the eggs have hatched?

The distinct smell that may develop, reminiscent of a river or lake, is normal, especially after the eggs hatch and the fry start feeding. If the smell is too strong or abnormal, rinse the carbon filter with dechlorinated water.

4.2.11 Do we have to change the water temperature once the eggs have hatched?

The temperature should remain cool and stable for up to 2 weeks before the fry are released into the river. This prevents the fry from developing too quickly. Keeping the water temperature low also reduces mortality, decomposition speed and odors.

4.2.12 When should we start feeding the fry?

Only when the yolk sac has resorbed in the fry. After hatching, the fry begin their life relying on a food supply - the yolk sac. Therefore, they do not need to be fed at this stage.

Once their yolk sac is resorbed, you will see the fry emerge from the gravel looking for food. If you are unsure, throw a pinch of food on the surface and see if the fry approach it. If so, it is time to start feeding them; if not, wait until they emerge and start looking for food themselves.

4.2.13 How much food should we give the fry every day?

Sprinkle a small amount with your fingertips in the morning and in the evening. If you have a saltshaker type container, quickly turning it over once on the surface of the aquarium is enough. If you see the fish rush to the surface and eat all their food quickly, you may have to feed them a second pinch.

Remember not to overfeed them. Leftover food will accumulate at the bottom of the aquarium adding to the amount of organic matter in the tank. This will decrease water quality and could create odors.

- When should the fry be released in the river?

The fry should be released in the river when the water temperature reaches at least 10 °C, which is usually around mid-June. Plan with the nearest salmon river manager. This activity can be combined with a field trip event or a year-end class trip.

Find out about the river's current water temperature and begin to gradually increase the water temperature in the aquarium (1 degree per day).

4.2.14 How to prepare for the release/stocking of the fry?

Begin to gradually increase the water temperature 15 days prior to the release date. Refer to the release/stocking protocol. If you have any questions, do not hesitate to contact the FQSA program coordinator.

4.2.15 How long can fry survive in the container while being transported to the river?

Fry will need to be transported as quickly as possible to the river. They should not stay more than 30 minutes to 1 hour in the carrier bag, in the cooler, or in the bucket. Water temperature should remain relatively stable.

Oxygen depletes rapidly once there is no longer a filter to feed air into the water. Fry are very sensitive to physicochemical changes in their environment. Some fry may exhibit a blood-red color on their thorax, which means that they are under intense stress and must be quickly released into the water.

Should you have any doubts or if you have any questions, do not hesitate to contact us at the FQSA.

4.3 USING THE AQUARIUM - PHYSIOCHEMICAL

4.3.1 What is the ideal pH for the aquarium water?

The pH of the aquarium water should be around 7—tap water is ideal for this pH value. However, make sure to let the chlorine evaporate before adding the water to the incubator.

4.3.2 What is water hardness?

Water hardness is the amount of dissolved minerals found in water. Water hardness can vary across different regions depending on the nature of the earth's subsurface. The presence of shells for example, can cause water hardness to vary as well.

4.3.3 What is the ideal water hardness for the aquarium water?

The water hardness in most of Quebec's municipal water systems is suitable for salmon.

- What is the carbon filter used for?

The activated carbon found in the filter acts as a stabilizer. If impurities or chemicals get into the water (soap, chlorine, heavy metals), the carbon filter will absorb these contaminants and purify the water. The carbon filter can be installed in the aquarium from the start to stabilize the water that is going to be poured into the incubator.

4.3.4 What is the foam filter used for?

The foam in the filter is used to prevent larger particles from reaching the other filters' components. Its function is purely mechanical.

As described in the document, follow the instructions given for the different filters and for changing the water. Changing the water will cause nitrogen levels to decrease. However, do not change water too often, or replace an excessive amount of water. It is important to retain some of the bacteria found in the water, which are important in the nitrogen cycle process. These bacteria enter the water through the presence of fish, so you don't have to worry about them.