

Big Plans for Small Eggs



Exploration Question:

What are some of the toughest challenges for a chinook salmon during its lifetime?



Today we are going to read about the life a Yakima River chinook salmon (*Oncorhynchus tshawytscha*) might have starting from an egg to a returning, spawning adult.

Along the way, read about the hardships faced by our salmon and see if you can **find 5 challenges that salmon have to endure or avoid to survive.** These hardships are what make their lives some of the toughest in the world for any animal!

You do not need any materials other than the sheets here, though a pencil and paper or some way to write notes might help you remember!

A Redd for Red Eggs



Vocabulary:

Redd: A salmon's nest made in the gravel in a river/stream.

Predator: An animal that eats other animals.

We begin where many animals begin their life, as an egg! Our little chinook salmon was laid in a **redd** along with 5000 brothers and sisters just in the Yakima River just below Cle Elum Dam on Lake Cle Elum.

Being buried under the gravel in the redd provides some safety, but all it takes is a strong current or a passing animal to sweep away the rocks for a **predator** like a trout to find them! Our little salmon has to hope that the stream does not have a flood that would wash away all the rocks and eggs and that it can stay hidden and not be eaten.

One thing about the egg is that it is firm and feels like gel. This is to allow air to move in and out of the egg for the developing baby salmon, but it is also a great place for bacteria and fungus to grow on, which can kill the salmon before it hatches. Our little salmon also has to stay healthy while developing to survive and hatch.

Out of the Egg, Into the Gravel



Vocabulary:

Alevin: A newly hatched salmon with their yolk sac attached.

Current: Flowing water in a stream or river.

Our little chinook salmon was able to survive for 45 days in the egg and has finally hatched! Its head has two dark eyes, it has a tiny backbone and tail, and it has a large yolk sac attached to its belly. We can now call our salmon an **alevin**.

Since our salmon is still developing its fins and tail, it has a very tough time swimming, so how will it find food to survive? Thankfully, our little salmon has all the food it needs as an alevin in its yolk sac under its belly! The yolk sac has a lot of nutrients that help the still developing salmon grow as it consumes it, absorbing the yolk over time. While it is growing, it is getting stronger so it can be ready for the next stage in its life.

During this growth time, the alevin will stay in the gravel nest, hiding from predators and staying out of the fast **current** of the river. One wrong move and our little salmon might be food for a trout or it might get tossed around in the rocks and the river downstream.

Small Fry, Big Changes



Vocabulary:

Fry: Baby salmon that are able to start eating and swimming.

Side-channel: A part of a river that is split from the main river.

After 80 days hiding in the redd, our little chinook salmon was able to grow bigger and stronger, absorb all of its yolk sac, and is now ready to start swimming and eating! We call them **fry** at this stage, and this is when our little salmon gets to venture out into the river to look for food for the first time and to start its journey downstream.

Since our salmon is still small, it will need to navigate the river carefully. The strong currents can still pull the baby salmon into danger, but having the ability to swim allows it to escape and find slower, calmer water to relax in like log jams and **side-channels**. There, our young salmon likes to eat tiny insects and regain its strength so it can continue its journey downstream.

Leaving the redd also means our salmon is able to be seen more easily by predators. Lots of birds, bigger fish, and even large insects would love to snack on our little fish! Thankfully our fish is starting to show color and markings that act as camouflage.

Salty Bays and Shrimp Buffets



Vocabulary:

Smolt: Young salmon that are getting used to salt water.

Estuary: An area where fresh water and salt water mix.

Our little salmon has made its way down river, through all of the dams, and is almost ready to head out to sea! There is just one problem, right now our salmon's body is meant for fresh water, but it needs to go out into saltwater soon!

Thankfully, our salmon has grown into a **smolt**, and is ready to begin changing into a fish ready for salt water over a period of time. The best place for that would be the **estuary**. The estuary at the mouth of the Columbia River is the perfect place to find water so the fish's body can slowly get used to salt. If it heads out too early, the salmon wouldn't survive the much saltier ocean.

To the salmon's delight, an estuary is also an area with a ton of food perfect for growing salmon! Our little salmon will grow 2-3 times its size larger than when it first arrived, feeding on the many insects and invertebrates like shrimp.

The Big Blue Ocean



Vocabulary:

Krill: Tiny shrimp like crustaceans that gather in millions.

(Fish) School: A group of fish banding together for safety.

The little salmon we started with has now grown into a large juvenile salmon, much like a human teenager. It has prepared itself in the estuary growing big and strong, and is now able to go out to the salty ocean in search for bigger food!

The salmon loves to feed on small fish, but it's favorite food to find are **krill**. There are thousands and thousands of krill when in groups. Our salmon gobbles up everything that it can and loves the larger meals it gets out in the ocean, but it still can't let it's guard down.

The problem with the ocean for fish is that they cannot hide anywhere because there's nothing except water around them! That is why salmon and other fish will swim together in a **school**, so that there are more eyes to look out for predators and so there's a chance some other salmon gets eaten instead of themselves.

The Road to Home



Vocabulary:

Instincts: Behaviors and urges caused by outside signals.

Passage Barrier: Something that blocks fish from migrating.

After a few years of dodging predators and eating fish and krill, something in our now large, adult salmon is trying to tell it something. The salmon's **instincts** are kicking in, telling it that it is ready and that it is the right time to start making its way home to the stream it was born in.

How does the salmon know how to find its home river? Scientists are not entirely sure yet, but they think a lot of it has to do with the "smell" of the river. It is thought they remember this smell from when they were young fry growing up in their home stream.

After our salmon finds the mouth of the Columbia River, it heads upstream and begins to change, much like when it was a young smolt. The salmon's color will change to red and darker colors, its head will change shape depending on if it is male or female, and its body has to get used to freshwater again since it has left the ocean. Now it has to get through any and all fish **passage barriers** to get back to the Lake Cle Elum Dam.

The Cycle is Complete



Vocabulary:

Mate: A reproductive partner to make babies with.

Kelt: A salmon after it has spawned.

The journey home is not easy for our salmon. Many of the same dams and predators it faced on the way down, our adult salmon has to face now, but while also fighting the current of the river to go upstream.

Finally, after many days, our adult salmon has made it to the bottom of the Lake Cle Elum Dam. Our salmon begins by choosing a **mate**. The female will then use her tail to dig out the redd, lay the eggs in the redd, and one or more males will be right behind her to fertilize those eggs. After they have been fertilized, the female will bury the ends using her tail once again.

After mating, the adult salmon, now called called a **kelt**, will stay near the redds for a few weeks before dying in the river, providing food for insects to later feed the salmon babies after they hatch, starting the cycle once more.