



Introduction

This series of Scales & Tales is intended to be used sequentially. The fact/fun sheets are written for kids ages 8 —12 and may be photocopied and distributed separately or as a set. Each sheet illustrates some aspect of the life cycle of the Pacific salmon with information on one side and an activity on the other.

There are also suggestions for extension projects which can be done at school, at home, at the library, or in the community.

- Not Eggsactly Exciting*.....pros and cons of life as an embryo
- Lunch Bags for Little Fish*.....all about alevins
- A Free-Swimming Fry*salmon fry, their predators, and their prey
- Pacific Salmon Species*characteristics of the 5 species
- Growing and Changing Fast!*.....the maturing smolt or juvenile
- Cruising the Ocean*.....adults and migration
- Salmon Anatomy*.....body parts of a salmon
- The Last Lap*.....the journey home to spawn

If you would like further information, please contact

Department of Fisheries and Oceans
Community Involvement Division 555 West
Hastings Street, Vancouver, B.C., V6B 5G3

or your local Department of Fisheries and Oceans/
Salmonid Enhancement Program, in the blue
Government of Canada pages of your telephone book.

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For The Teacher or Leader:

Summing Up Salmon

Their Natural Life Cycle

Salmon begin their life in freshwater streams, rivers and lakes. They grow and mature in the ocean and return to spawn and die in the same stream in which they were born.

Their life cycle begins in gravel streambeds. Mature females returning to spawn dig a nest, called a redd, in the gravel. Here they deposit up to 6,000 eggs, depending on their species. The average is between 2,500 - 3,000. The eggs are immediately fertilized by the male salmon. Then they are covered with gravel by the female for protection.

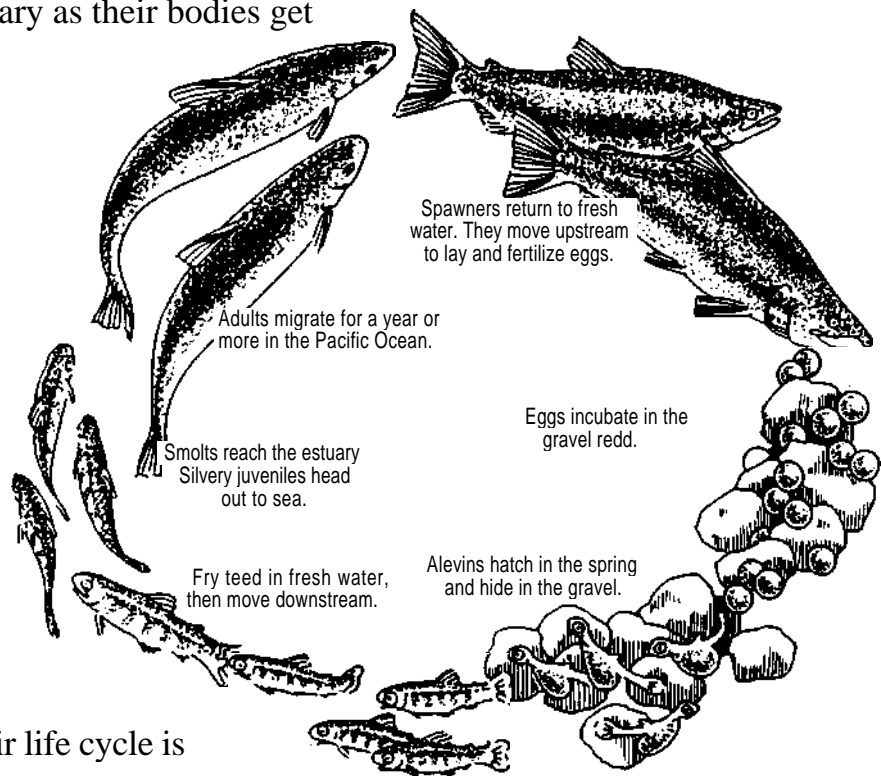
The eggs incubate under the gravel over the winter months. When the salmon hatch they are called alevins. Alevins have a yolk sac attached to the underside of their bodies from which they receive nourishment. In the spring, when the yolk sac has been absorbed, the miniature salmon emerge from the gravel as swim-up fry.

Coho, chinook and sockeye salmon will remain in freshwater for a time. Chum and pink salmon migrate to the sea soon after emerging from the gravel as free-swimming fry. The amount of time spent in freshwater depends on the species and sometimes the location. Salmon fry eat constantly and grow quickly. When they reach what is called the smolt stage, they move downstream and linger in the estuary as their bodies get used to saltwater. Smolts will then migrate to the ocean.

Ocean migration patterns vary in distance and direction. Many salmon travel along with ocean currents in circular routes. Some wander as far as 3,200 kilometres from their stream. Others stay closer to home. The salmon grow to adulthood on rich seafood diets,

including small fish such as herring and anchovies.

When they are ready to spawn, the salmon return to the stream where they were hatched. During the difficult journey, their bodies change in colour and shape. Once the eggs are laid and fertilized, their life cycle is complete and the salmon die.





The Last Lap

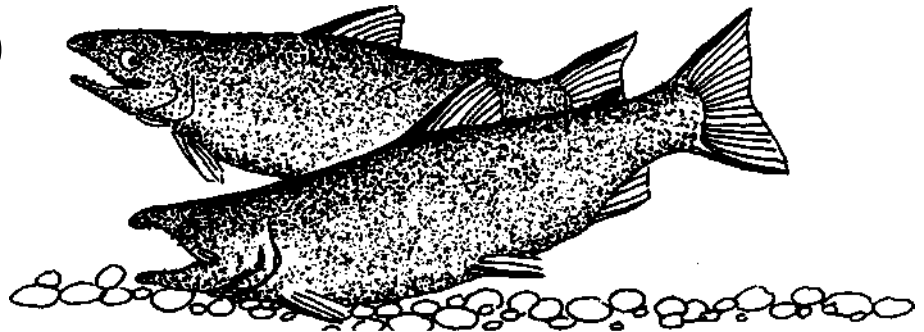
Whew! Am I tired! Am I battered! I've only got a few more kilometres to go before I reach my spawning grounds. It may get pretty hectic with all the redd digging that I'm going to be doing so I thought I'd rest a minute and bring you up to date on the latest in my life history.

Remember: When I started this story I was a tiny orange egg with a slim chance of survival. Back then I was always complaining about how dull life was. What did I know? I was just an egg tucked in a redd. Well, life certainly hasn't been dull these past few years. Especially these past few days. Maybe I'll just list a few of my close encounters of the dangerous kind:

- nipped by a harbour seal - good thing I'm a strong critter;
- scooped up by a bear - good thing I'm a slippery critter;
- delayed for a few days as I tried and tried to leap over a waterfall - good thing I'm a determined critter.

Not only has this old body had to work hard, it has really changed in appearance. The changes started once I left the ocean and began to swim in freshwater again. All of a sudden I stopped eating.

My only source of energy came from my stored body fat. I'll



have just enough energy to get me through all the spawning activity ahead.

I have begun to lose the slimy mucus that covered my scales. My skin has become thick. My scales have been *resorbed* — that means disappeared into my skin. I have lost my silvery colour and instead have become quite dark. My teeth are long and fang-like and my jaw is hooked. Actually, I'm quite fierce looking.

That's only half the story.

My insides have changed too. My kidneys and gills have adapted to freshwater. The most exciting change is that my ovaries are full of eggs. (It seems like only yesterday I was an egg myself). In just a few years salmon go from being teenagers (smolts) to old folks (spawners). In people the change takes 60 to 70 years.

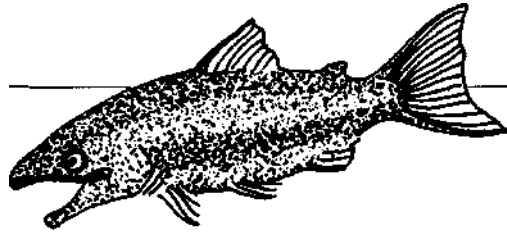
Tomorrow or the next day, I will reach the spawning grounds. I will rest for awhile in a quiet pool. When I'm ready to spawn I'll find a mate. Then the hard redd-digging work will begin. I can just imagine what my caudal fin will look like when I'm

finished. But I bet I dig some fine looking redds.

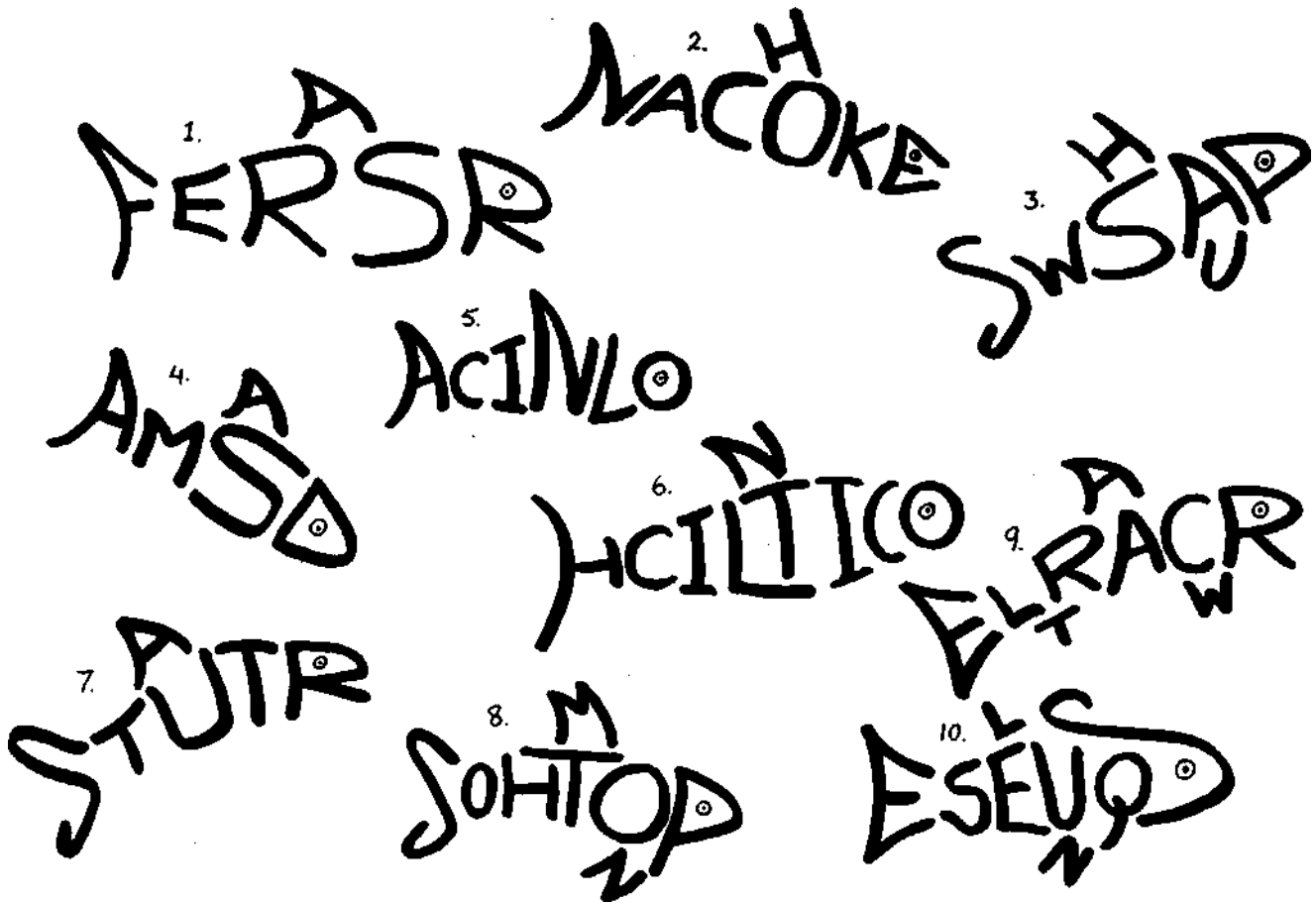
I'm not exactly sure how all the actual spawning stuff will work. I know I'll try and lay all my eggs. I hope most of them will be fertilized by my mate so they'll at least have a chance to start developing. After the spawning part comes the guarding of the redd part. Then in a few days comes the dying part. All Pacific salmon die after they spawn - it's all part of our natural cycle. Our bodies will be eaten by other critters that live in and near the water. The parts of my body that aren't eaten will decay and decompose and become part of the natural food chain of this stream.

If I don't get a chance to write once I get to the spawning grounds I know you'll understand. Got to go now — and forever. It was terrific talking to you. You were all fine listeners and I'm sure you'll think of me whenever you think of clear, cool, unpolluted water. Remember, each and every one of you can make a difference to us salmon and to our environment.

Leaping Letters



Many spawning salmon, especially sockeye, head up the Fraser River. They are returning to spawning grounds in the many streams that flow into the Fraser. The leaping fish below are made of letters which spell out the names of some of the lakes and streams on their route. Use a map to help you with the long ones! You will see that the Fraser River and its tributaries cover almost half the province!



Other things to do:

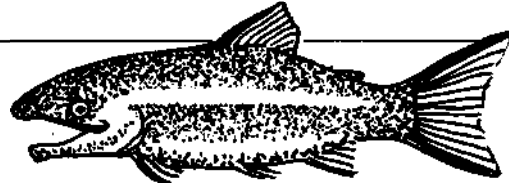
Make up some leaping fish using letters that spell out the names of spawning streams in your area. See if your friends can figure them out.

Most salmon return to spawn in the same stream in which they were laid. After they hatched, and as they grew and began to swim about, they were imprinted with the smells and tastes of their home stream. These "memories" guide them on their return. Think about a salmon stream you know about. What smells in the water might make it different from another stream? What happens if there is a change in the stream due to siltation, pollution, or an obstruction?

Answers: 1. Fraser 2. Nechako 3. Shuswap 4. Adams 5. Nicola 6. Chilcotin 7. Stuart
8. Thompson 9. Clearwater 10. Quesnel



Salmon Anatomy



You have a body. I have a body. So far we're even! But you live In the air, while I live in the water, and that means a lot of differences between us. I've checked a great book on Salmon Anatomy out of our school library. While you're reading about *my* body, think about how salmon and humans are the same and how they are different.

Head: The salmon's head contains the eyes, teeth, nostrils, mouth and gills. The area in front of the eyes above the mouth is the snout.



Eyes: Fish can see to the front and back at the same time because each eye works by itself. Eyelids and tear glands are not needed. Water keeps the eyes wet and clean.



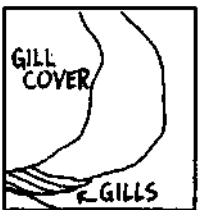
Mouth: The mouth is used to catch and hold food. Fish do not chew before swallowing. The mouth is important for breathing, too.



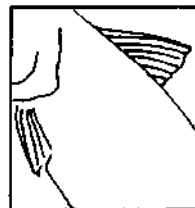
Nostrils: Salmon have an excellent sense of smell. They can detect very faint odors in a stream. Salmon use this ability to find their home stream for spawning.



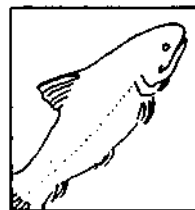
Gills: Like people, fish need oxygen to breathe. They gulp water into their mouths and force it out over the gills. The gills are full of blood vessels, like human lungs. They take oxygen (a part of air) out of the water.



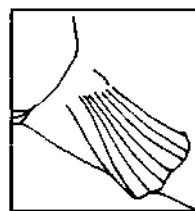
Body: The area Just behind the gill coverings is called the pectoral or chest region. The belly extends from the pectoral fins to the anus.



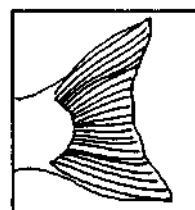
Lateral Line: Most fish have a line running along each side of their body. The little holes In the line help the fish sense movements of other animals and objects In the water.



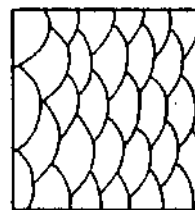
Fins: Fish swim by body movement and by sculling with their tall fins. Fins on their backs and sides are mainly used as rudders, brakes and devices to keep them upright In the water.



Tail: The tall is the part of salmon behind the anus. The slender section between the base of the tall fin and the dorsal fin is called the wrist. Another name for tall fin Is caudal fin.



Scales: The bodies of most fish, salmon included, are covered with scales. These are small, hard plates that overlap like shingles on a roof. They are covered with mucus or slime. This protects the fish from disease and helps it slide through the water.



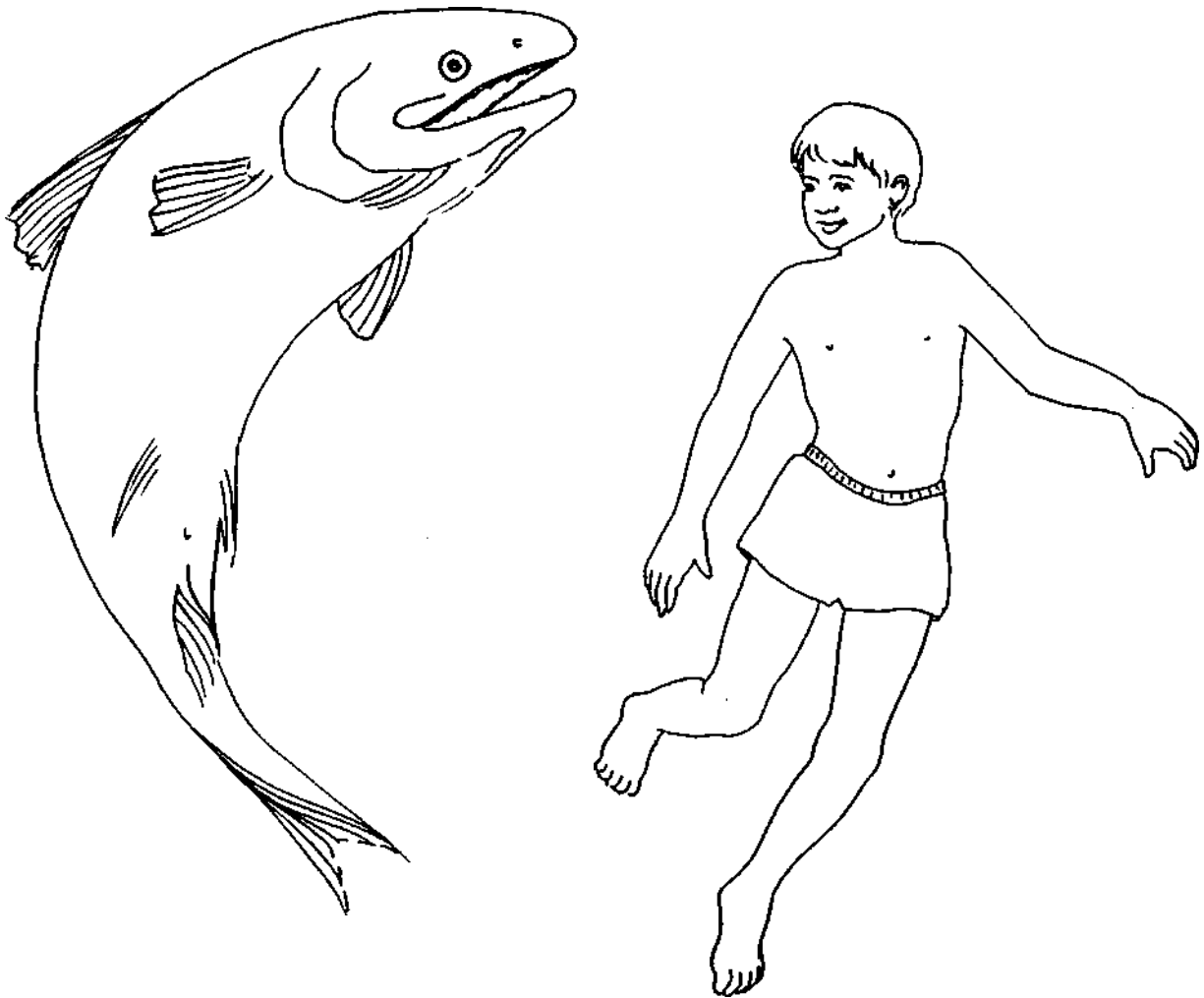
Trading Places

If a human and a salmon could



trade places for a week,
each other!

What would the fish need to help him get along on land? Add body parts to the fish that would let it walk, breathe, and eat in our world. Do the same for the boy. Remember, he'll be under water; so he'll have to watch for predators, find food, and do all the things that salmon do.



Other things to do:

Read up on SCUBA divers in the library. What does SCUBA stand for? What equipment does a diver use that makes him or her more like a fish?

Write a story about your week as a fish. What do you look like? What happens to you?



Cruising the Ocean

Hello again. It's me, your friendly, no name, journal-writing, coho salmon. I'm an adult now. In human terms I'm only two and a half years old. I have a great life. There's only one thing I'd like to change: I wish I could fly! I don't want to be a bird, but I wish I could get a bird's eye view of the Pacific Ocean.

It seems like I've travelled hundreds of kilometres, but I can't picture where I've been on my ocean migration. I keep swimming. I can see water and critters all around me. But it would be great to have a map.

That's better. Now I can see where I've been and where all

the other species of salmon hanging out.

Remember when I was a y salmon and I said I wanted an adventure? Well, I've certainly had a few thrills and near spills out here in the salt chuck. I barely escaped being caught in a huge seine net and I came this close to touching a whale's tongue.

The food in the good old Pacific is abundant and tastes terrific. I usually go with the "catch of the day", which today happens to be my favourite — herring.



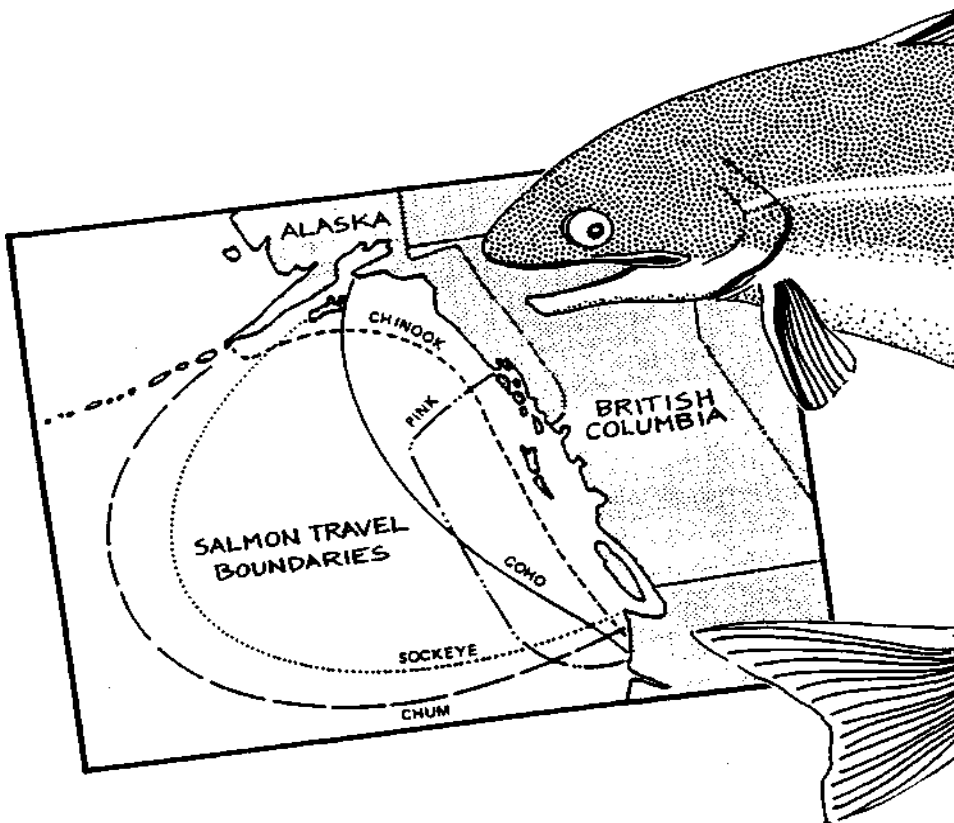
I keep wondering if I'm being guided by ocean currents or a compass in my head. Maybe we are following the same route our parents took. Maybe our migration is affected by all kinds of things, like the earth's magnetic field. Maybe it's all about water temperature.

What a mystery. Where are Nancy Drew and The Hardy Boys when you really need them? I guess this amateur sleuth better stop trying to solve the who am I, where am I going type mysteries or I'll be the hero in a new "whodunit": The Mystery of the Inquisitive Coho".

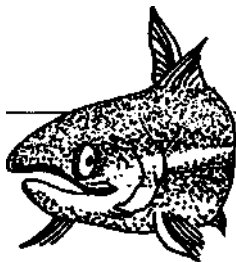
I think you get the general idea of what ocean life is like. Lots of swimming, lots of eating, lots of growing, lots of avoiding predators. Of course, I'm not travelling alone. There are about 200 of us coho in this one school.

What I haven't really talked about is what I look like. At the peak of my development (and maybe I should whisper this part in case any anglers are in the vicinity), I look terrific. You've probably seen pictures of some of my friends. They are usually posed with a smiling angler. You know the shot and the caption - Fisherman weighs in THE BIG ONE.

Fortunately there's no happy, smiling angler in this portrait of yours truly and my Cruise Chart.



Let's Go Fishing!



Lots of you humans want to catch a handsome adult salmon like me! There are three types of salmon fisheries competing for the pleasure of scooping me out of the water - work out what they are by finding the letter in each clue. The first one is done for you.

The first is in OCEAN but not in LOCATE
The second is in BOAT but not in BOTTOM
The third is in TAIL but not in SAIL
The fourth is in SHIP but not in SHAPE
The fifth is in WAVE but not in WHALE
The sixth is in SEA but not in SALT

The first is in COHO but not in HOOK
The second is in HOOK but not in HAKE
The third is in SWAM but not in SEAWEED
The fourth is in CHUM but not in LUNCH
The fifth is in NET but not in TON
The sixth is in DART but not in DATA
The seventh is in SCALE but not in SEAL
The eighth is in GILL but not in GULL
The ninth is in CATCH but not in TOUCH
The tenth is in EEL but not in FEED

The first is in SEINE but not in DINE
The second is in PINK but not in TAKING
The third is in GROW but not in GREW
The fourth is in HERRING but not in WEIGHT
The fifth is in DIET but not in HIDE

The three kinds of salmon fishery are: _____, _____, and _____ . If you are not sure how they are different, make a trip to the library and do some research. What boats or gear are used in each? Do all three fisheries happen in the same places, at the same time of year?

Other things to do:

Have you ever taken part in any or all of the three types of salmon fishing? Describe or make up a Whopper Story about the time you caught THE BIG ONE!

Find out about the Head Recovery Program, salmon tagging, and the Catch and Release Program by calling your local Fisheries office.

Do a market survey. Make up a short list of questions to ask your family and friends. Remember, the more people you ask, the more accurate your resulting data! Some sample questions: Which species of salmon do you prefer to eat: pink, chum, coho, Chinook, or sockeye? What is your favourite method of preparing salmon? What vegetable tastes best with a salmon dinner?

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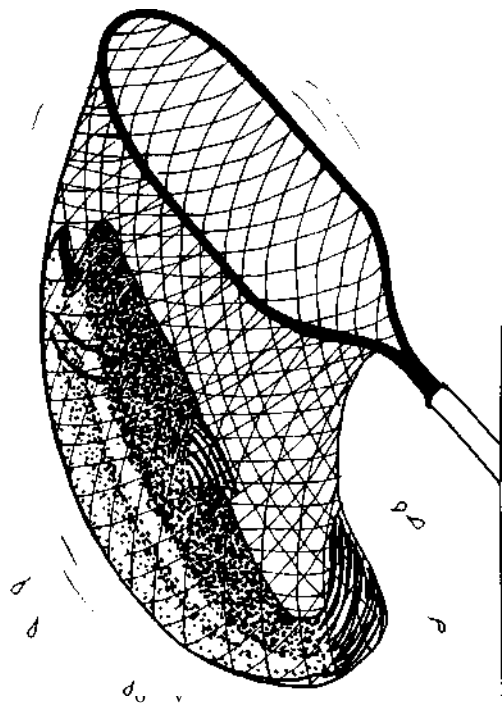
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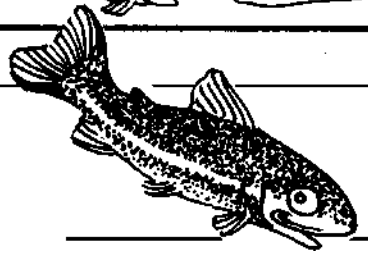
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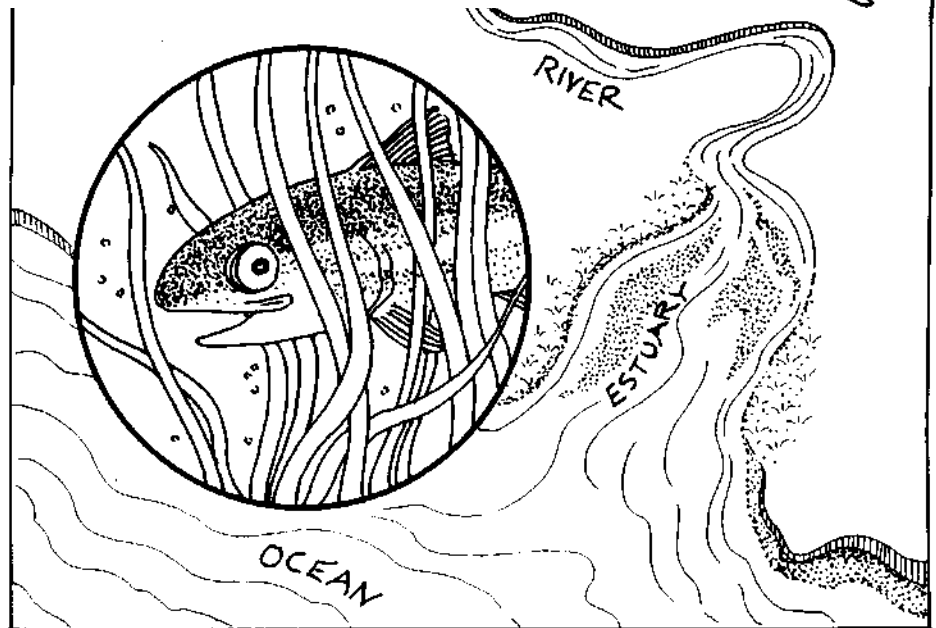
DeFINition of a smolt: A young salmon undergoing changes in preparation for entering saltwater. Also known as a juvenile.

That's me all right — a smolt. Those changes that the definition says I'm undergoing are pretty weird. (I think I know how human teenagers must feel.)

First of all, I'm losing the pan-marks on the side of my body. I'm also becoming silvery all over. Guess I won't be needing the same kind of camouflage in the ocean as I need here in the stream. I'm also becoming restless. At first I thought it was just spring fever but now I realize all the young coho are gathering together and moving toward the sea. Good thing I'm changing on the inside as well as the outside because I have a feeling that life in saltwater will take some getting used to...

DeFINition for migration: To move seasonally from one place to another.

That's me again - a migrating smolt. Not only is my body (both inside and out) changing, but I'm on the move. I've travelled many kilometres in the past few days. Yesterday I got a chance to try out some of my new changes. A bunch of us were just migrating along



when. Tuck." I got a whole gill full of not too great tasting water. My first reaction was to turn back. Then I thought, "call the pollution control hotline." I took another taste and the light went on upstairs — the water wasn't polluted, just salty. This area of the river we're in now is different from our home stream. The water is brackish — partly fresh and partly salt. It must be nature's way of gradually getting us used to Life in the ocean. I sure don't want to miss that part of my life.

DeFINition of an estuary: A place where fresh water mixes with salt water from the sea.

Aren't dictionaries great? Now I know what to call this place. That's where I am right now - an estuary. I think the definition

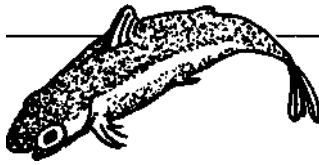
should also say: "a place where a young coho smolt meets lots of food and also lots of critters looking for food". Wow, this place is both exciting and scary. In human terms, the experience would be similar to suddenly finding yourself, a small town type, dropped off in the middle of a freeway at rush hour.

I'm not sure how long I'll be in the estuary — as long as it takes, I guess, to get a little bigger, a little more used to salt water, and a little readier for the big adventure ahead of me.

DeFINition of an adventurer: One who seeks the risky, the new and the unknown.

That's definitely me. See you in the Pacific.

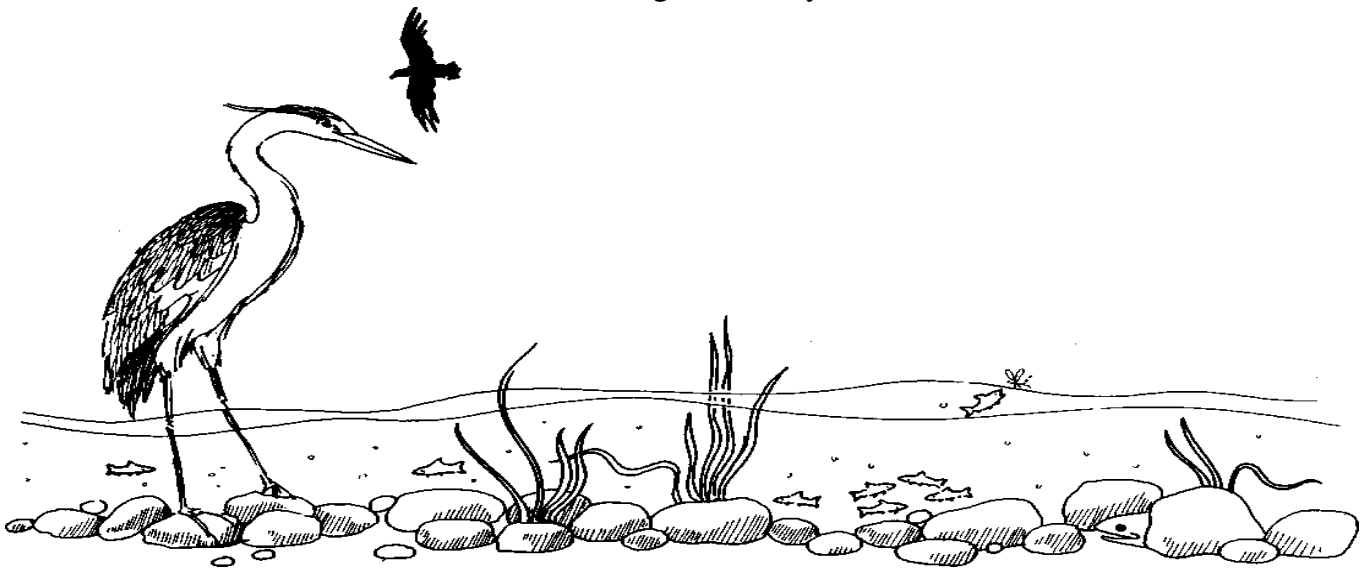
Fishy DeFINitions



Here are a few more salmon words, Match them with the definitions at right. There are more watch definitions than there are words, so out for fishy definitions! Answers are upside-down at the bottom of the page.

1. brackish water
2. cobble
3. ecosystem
4. fingerling
5. fry
6. gill
7. imprinting
8. predator
9. prey
10. riprap

- a. interaction of living creatures with each other and the world around them
- b. a salmon with a damaged tail fin
- c. word describing how a salmon stores up information about its home stream
- d. water polluted by factory waste
- e. young salmon which has left the gravel and is starting to feed
- f. water-worn stones, between 10 and 30 cm across
- g. a natural sonar device by which fish find their way in the dark
- h. animal (including humans) that hunts and eats other animals
- i. young fish, about 10 cm long
- j. rocks used to keep streambanks from eroding
- k. animal that is hunted and eaten
- l. slightly salty water
- m. organ used by fish to breathe



Other things to do:

Write a story about the picture, using some of the words listed above. If you chose incorrect definitions for any of them, make sure you use them in the story. That's a good way to fix them in your memory.

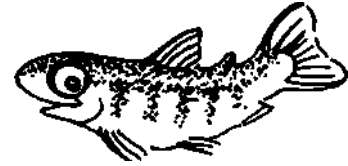
Find someone who has lived in your area a long time, and ask them how your nearest stream has changed over the years. For example, are there culverts to allow the water to flow under the road? Have the banks been cemented? Are there any dams or other obstructions? Ask the person if the stream was ever home to salmon or if there are fish in it now.

Answers: 1. l 2. f 3. a 4. i 5. e 6. m 7. c 8. h 9. k 10. j



Pacific Salmon Species

Five futures for a fast-growing fry!



Now that I am a free-swimming fry, I really must pause in my fish tale and explain the BIG PICTURE to you.

Up until now it has not really mattered what kind of salmon I was. All types of salmon look and behave pretty much the same when they are eggs and alevins. Now, however, it's a different story.

In a nutshell it works like this. There are five species of Pacific salmon. Each one spends a different amount of time in fresh water growing and developing. This is called the rearing phase.

When we reach just the right size for our kind of salmon we begin a journey towards the

downstream we continue to change (inside and out) until we are ready to live in salt water.



Fry Smolt

We change from being called fry to being called smolts or juveniles.

Once in the ocean, each species spends a different amount (2, 3, 4, or 5 years) of time travelling out into the big, blue Pacific.

When we are adults we return to fresh water and make our way up the same river we journeyed down as young fish.

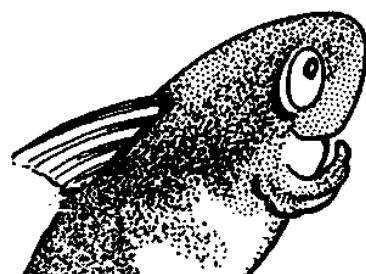
How heavy do adult salmon usually get?

Pink	1.5-3kg
Chum	4-9kg
Coho	3-9kg
Sockeye	3-5kg
Chinook	4-16kg

Once we have reached our home stream we spawn and die.

So much for the BIG PICTURE. Now back to my own personal story. When I am ready, I will make my way downstream to the ocean. Before I go I will know all the sights and sounds and especially the smells of the water. Everything about this stream - the rocks, the roots, the other animals - will be *imprinted* in my brain. I don't even realize this imprinting is taking place. After I have lived in the ocean, and it is time for me to return here to spawn, I will be guided upstream by the smell of this good old stream.

How long and where do salmon fry rear?



- Pink - in a stream, from a few days to a few weeks
- Chum - in a stream, from a few days to a few weeks
- Coho - in a stream or a lake, for a year
- Sockeye - in a lake, for 1 to 3 years
- Chinook - in a stream, for 90 days (or sometimes a year)

How long do salmon live?

Pink	2 years
Chum	3-4 years
Coho	3-4 years
Sockeye	4-5 years
Chinook	2-7 years

sea. During our trip

Identify Me!



1) Here's a "salmon speak" code. Each letter has a matching number. Look for a pattern in the number/letter pairs provided, and complete the code.

2) Now, using the salmon-speak code, fill in the blanks. When you've finished, the details of my life will reveal which species of salmon I belong to!

A	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s
2	_	4	3	_	_	_	10	9	_____	_	_	_	_	_	15	_	_	20
t	u	v	w	x	y	z												
		21	24	23														

I will spend _____ rearing in this _____ . During
 16 13 6 26 6 2 17 4 16 2 20 19 2 11 20 19 17 6 2 14

that time I will have to _____ for _____ and be alert for _____ !
 11 16 16 12 5 16 16 3 15 17 6 3 2 19 16 17 20

While I'm _____ , everything about the _____ — the _____ , the
 8 17 16 24 10 13 8 20 19 17 6 2 14 17 16 4 12 20

_____ The _____ - will be _____ in my
 17 16 16 19 20 16 19 7 6 17 2 13 10 14 2 11 20 10 14 15 17 10 13 19 6 3

brain. After _____ years of travelling in the _____ I may weigh as much
 19 24 16 16 4 6 2 13

as _____ kg. Then, probably in late _____ , I will come back here to
 20 10 23 13 16 21 6 14 1 6 17

_____ , guided by the smell of this good old _____ !
 20 15 2 24 13 20 19 17 6 2 14

What species of salmon am I? _____

Other things to do:

Many salmon in British Columbia do not develop in streams - they live the freshwater part of their lives in a hatchery. Find out if there is a hatchery in your community. All hatcheries welcome visitors at certain times of the day or week, so take along your notebook and sketch pad and do some research.



A Free-Swimming Fry

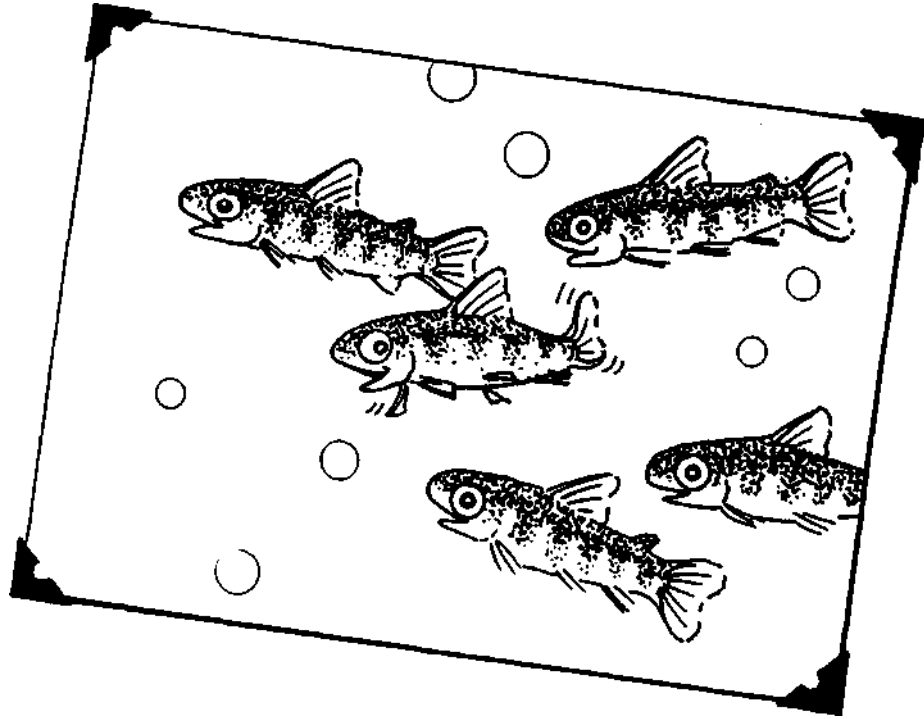


Boy oh boy, or should I say girl oh girl. Life is sure different for me these days. I want to let you in on all the exciting changes that I've been experiencing. I don't know quite where to begin. If you believe that a picture is worth a thousand words then take a peek at this photo taken of yours truly just last week.

Can you pick me out? Just look at me. No more yolk sac. No more living in an under-gravel redd. No more avoiding light. I'm a free-swimming salmon fry these days. (My rate of development is still controlled by water temperature. I realize that you know this rule by now but it's important enough to repeat: **THE WARMER THE WATER, THE FASTER I GROW.** Of course, the water must be between 4°-14°C. Fussy little critter, aren't I?).

There is one other **BIG RULE** for salmon fry: **EAT OR BE EATEN.** I can assure you the eating and growing stuff is becoming more and more important every day. My neighbourhood - this gently flowing little piece of river — is really not such a gentle place in which to live.

Most rivers and streams (creeks too) are actually divided into desirable and less



desirable areas. The dividing lines are invisible but we know the difference. In the "good" areas there are plenty of insects and plankton to eat. There is also more streamside cover in the "better" neighbourhoods, such as bushes and trees for shade.

The trick to becoming a successful fry, which is a living fry, is to establish a territory and then defend that area from other fry. The real trick, though, is to be big enough to have the energy to do the establishing, the defending and the hunting. Oh,

and then there's the darting. Just a minor point. It almost slipped my mind. The Darting Thing. If you forget the darting part there won't be any worries tomorrow or the next day about defending the territory and snacking on insects — because something will be snacking on you.

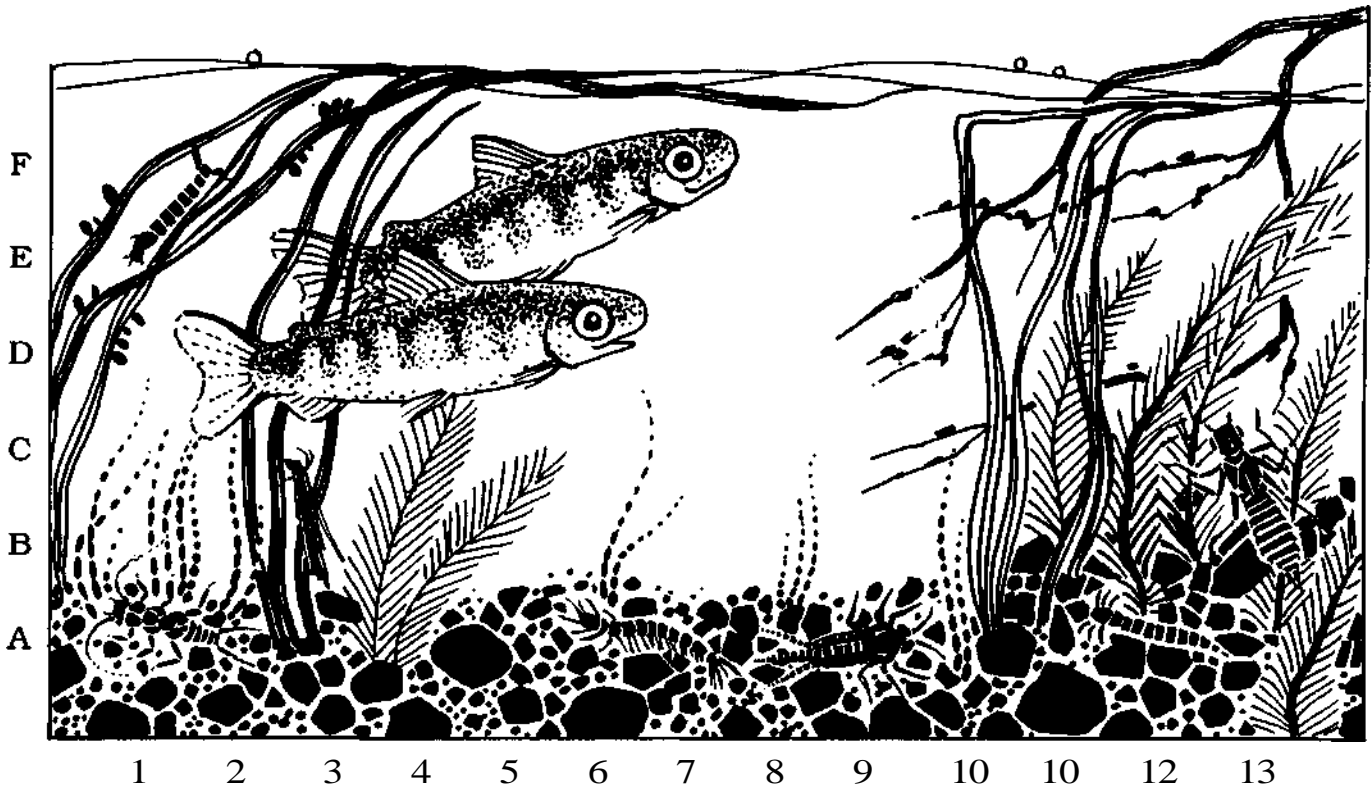
To sum up what life is all about as a salmon fry, it's easy as 1,2,3!

1. Eat lots
2. Grow bigger.
3. Avoid predators.

Eat... or Be Eaten!



All insects hatch from eggs. Then they go through other stages of development before they become adult insects. Some live for a while as nymphs or larvae in ponds and streams, providing a source of food for salmon fry. Help these fry find a good dinner. Circle seven insects hidden in the stream.



Salmon fry eat adult insects, too. Check your library to see what some of these insects look like when they grow up.

- Answers**
- A1 — Stonely nymph
 - E1 — Mosquito larva
 - B3 — Caddisfly larva
 - A6 — Whirlig beetle larva
 - A8 — Mayfly nymph
 - A12 — Crane fly larva
 - B13 — Dragonfly nymph

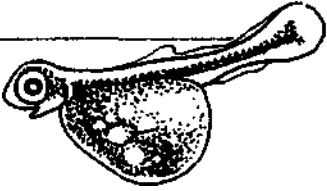
Other things to do:

There are many birds, reptiles, mammals, and fish that might enjoy having a salmon fry for lunch. Draw some of them, from a "fry's eye" point of view.

Imagine you are a newspaper reporter for the *Wildlife Times*. Visit a nearby stream and spend some time observing exactly what is going on in and near the water. Conduct an interview with a) an animal that might be eaten by a salmon fry, b) an animal that might eat a salmon fry.



Lunch Bags for Little Fish



Bet you don't recognize me. I'm still down here in my under-gravel redd. I'm still pinkish orange and fragile but I'm not round anymore and I'm no longer a salmon egg. I'm still me but now I'm on *alevin!*

Let me explain. When salmon eggs hatch they are called alevins. Two days ago I hatched so that makes me an alevin.

Don't worry. I'm not going to fill you in on every little detail of my life, but I would like to share some things with you. First of all, I ha

That bulge on my underside is my yolk sac. It's a little bulky-looking but I may as well get used to it. For the next 30 — 50 days it's going to be my food cupboard.

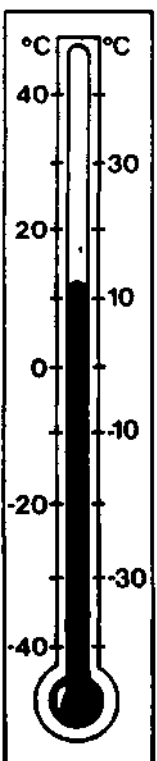
This yolk sac of mine contains all the protein, minerals and salts that I will need for my living and growing. All those goodies (but no junk food) are packed in my own little attached lunch bag. As my body grows bigger my yolk sac gets smaller. By the time I am ready for real food, I will be slim enough to wiggle my way up and out of my gravel nest. Then it will be goodbye, redd; hello, swimming around in the water.

I'd better not get too far ahead of my alevin story. I get impatient because I have so little control over my development -everything depends on the water temperature. The warmer the water, the faster I grow. We sure are different from humans. When we "talk" warmer water we're not talk-

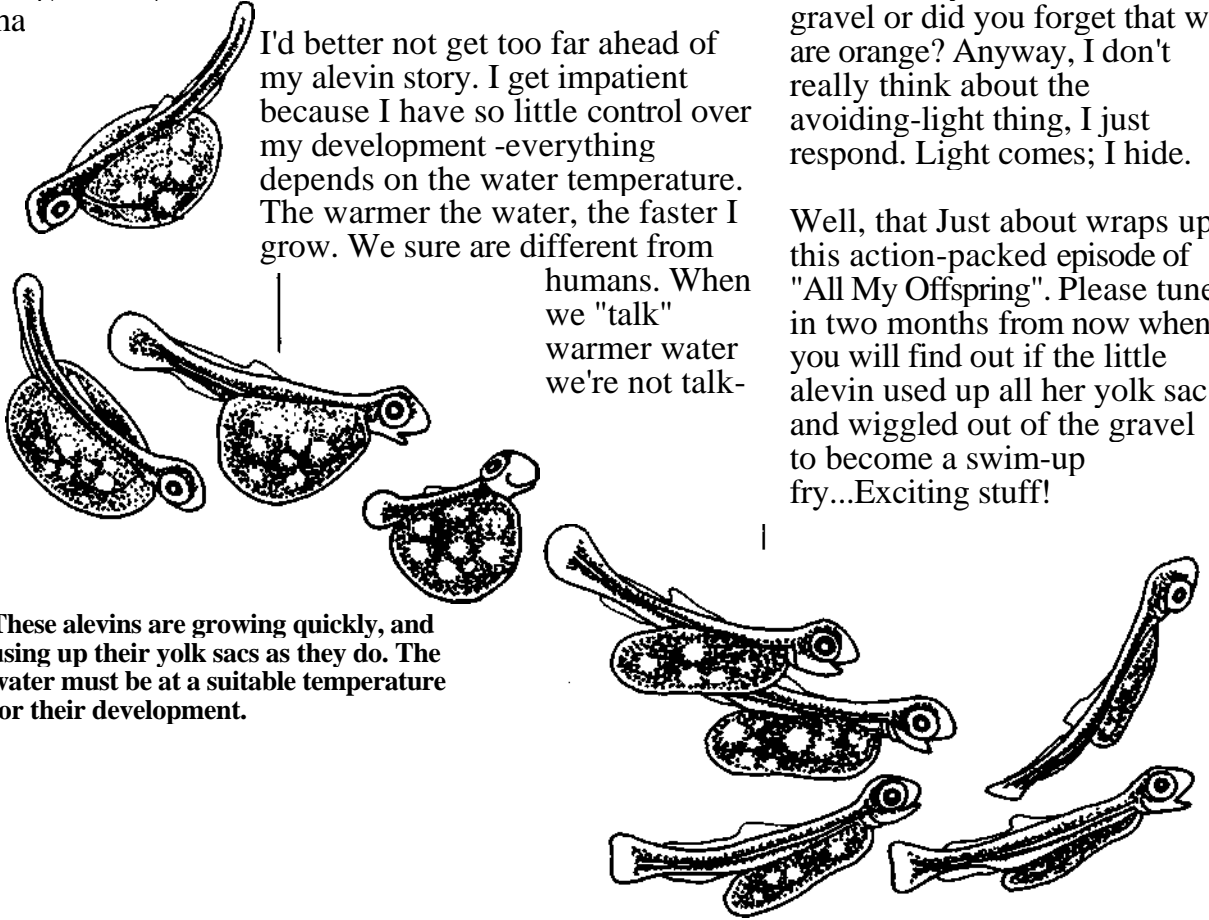
ing bathtub warm. (Remember we salmon are cold-water fish.) When the temperature gets above 14° C we get very uncomfortable.

Speaking of differences. Are you afraid of the light? I didn't think you were but / sure avoid it. No night light for me. The darker the better. I'm not absolutely sure why I wiggle away as quickly as I can if any light penetrates down here. It probably has something to do with the fact that alevins are fragile and defenceless. We don't exactly blend in with the gravel or did you forget that we are orange? Anyway, I don't really think about the avoiding-light thing, I just respond. Light comes; I hide.

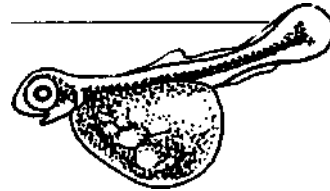
Well, that Just about wraps up this action-packed episode of "All My Offspring". Please tune in two months from now when you will find out if the little alevin used up all her yolk sac and wiggled out of the gravel to become a swim-up fry...Exciting stuff!



These alevins are growing quickly, and using up their yolk sacs as they do. The water must be at a suitable temperature for their development.

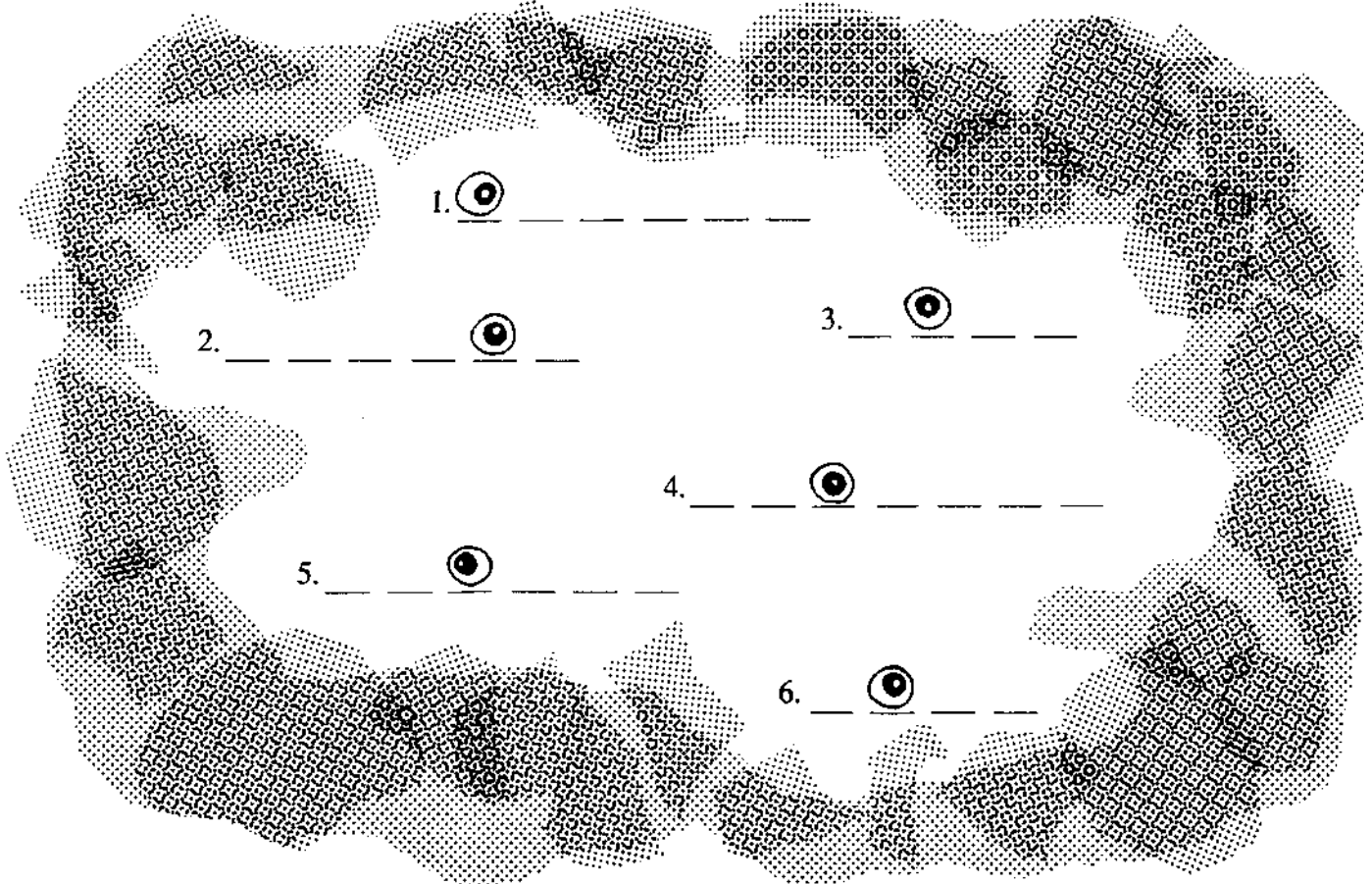


Down in the Dark



These alevins are hiding in the gravel. It's so dark down there, all you can see is their eyes! Solve the word clues and fill in the blanks, using the eyes for the letter "O".

1. Eggs and yolk sacs are coloured _____
2. When an alevin grows up, it becomes an adult ____
3. The mixture in an alevin's "lunch bag" is called the _____
4. Alevins need _____, minerals, and salts to grow.
5. Alevins grow more _____ if the water is too cold.
6. Salmon are _____ -water fish.



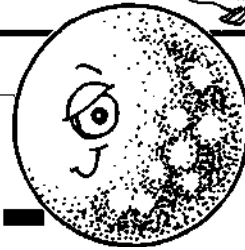
Other things to do:

Imagine you are a research scientist. Design an experiment to test the hypothesis that alevins instinctively avoid light.

Alevins' "lunch bags" contain all the protein, minerals and salts they need. How about *your* lunch bag? Draw yourself a big, fat sandwich containing at least one thing from each of the Canada Food Guide food groups: dairy, meat, vegetable, grain and fruit.



Not Eggsactly Eggciting



Some animals are born ready for action. Many animals are born looking like miniature copies of their parents. Most animals are born with at least one parent still alive. Me, I'm a salmon egg and I have to fill in 'none of the above' to all of the above.

I'm not exactly complaining. But life so far, as a salmon egg, has all kinds of downsides and, quite frankly, not too many advantages.

The biggest drawback is that, although 2500 of us were laid in this underwater gravel nest (redd), only one in ten of us will ever see the light of day. That's because we are so sensitive. The least disturbance of the streambed means death to most of us. Changes in water level will kill hundreds of us. Add predators, flooding, pollution

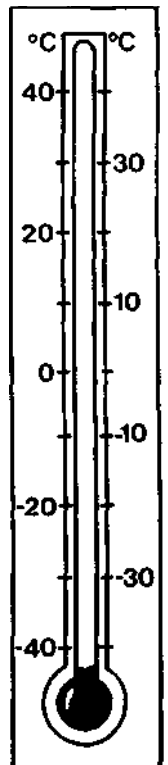
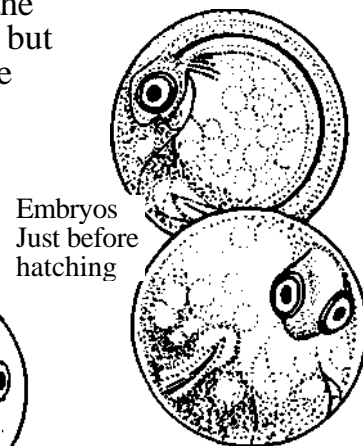
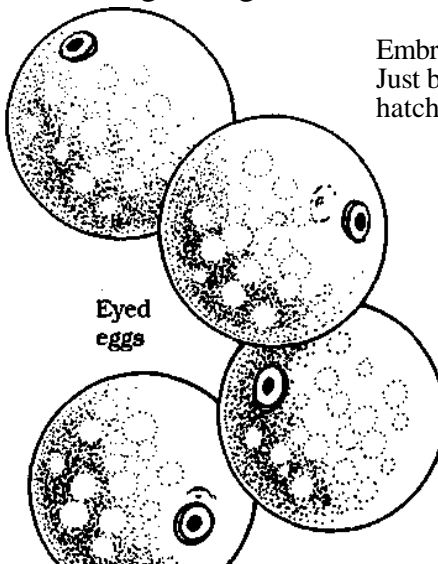
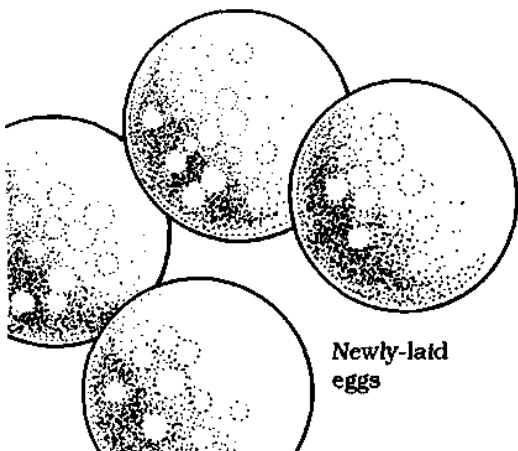
and disease to the list and that leaves very few survivors. Those of us who do live do so in the dark. We salmon eggs are not high profile creatures until later in our lives.

Enough of doom and gloom. On the positive side, I am orange. I am about 7 millimetres in diameter, and I weigh almost 220 milligrams. My shell is soft and transparent. It's made up of two layers - the outer casing and a membrane on the inside.

I would like to say that I have some control over my own development. But, like most young critters, I don't. Technically I'm known as an embryo. That doesn't mean much to me down here in the dark. Soon I will have eyes but I don't think that will make much difference either. I know I am growing inside

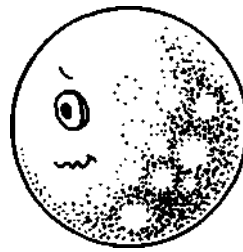
this shell. I also know that my rate of development depends on the temperature of the surrounding water. The warmer the water the faster I grow. Of course, being a cold water kind of fish, I can't tolerate temperatures below freezing or above 20 degrees Celsius.

I've just about eggshasted the pros and cons of life as a salmon embryo. I can hardly wait until I hatch, which will happen in about 3 months. I bet you can hardly wait either because that means you will get to read another chapter in my continuing story!



What do you think the water temperature is today? Indicate the temperature on the thermometer.

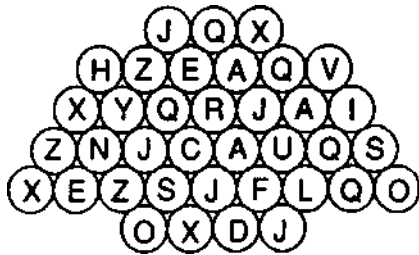
Eggsposed to Danger!



Being a salmon egg is risky business. Some of the conditions that kill salmon eggs are:

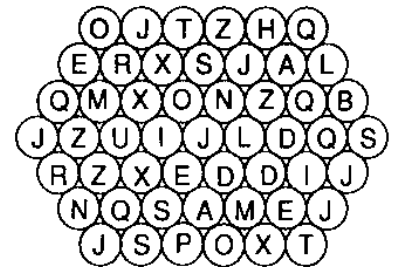
- 1) pollution
- 2) movement
- 3) silt clouding the water
- 4) extreme temperatures
- 5) a change in the water level

Hidden in each of these groups of eggs is a situation that may cause **one or more** of these conditions. To find out what's happening to put these salmon eggs at risk, decode the message by crossing out eggs marked J.Q.X, or Z. Then circle the condition(s) (1,2,3,4, and/or 5) that might be caused by that situation.



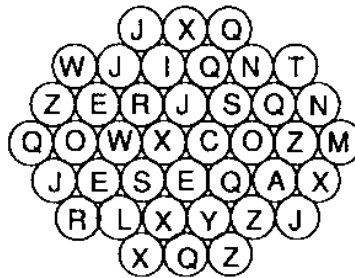
Decoded message:

This can cause 1 2 3 4 5



Decoded message:

This can cause 1 2 3 4 5



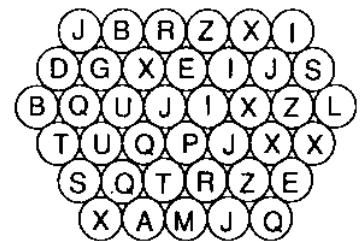
Decoded message:

This can cause 1 2 3 4 5



Decoded message:

This can cause 1 2 3 4 5



Decoded message:

This can cause 1 2 3 4 5

Other things to do:

Can you think of other natural and human-made stresses that might put salmon eggs at risk? Can you think of ways to prevent these things from happening?

How many eggs are on this page? Colour every tenth egg, to show the 10% that will survive to hatch.

Build a model of a salmon redd (a frisbee or paper plate makes a good base for a stream bed).