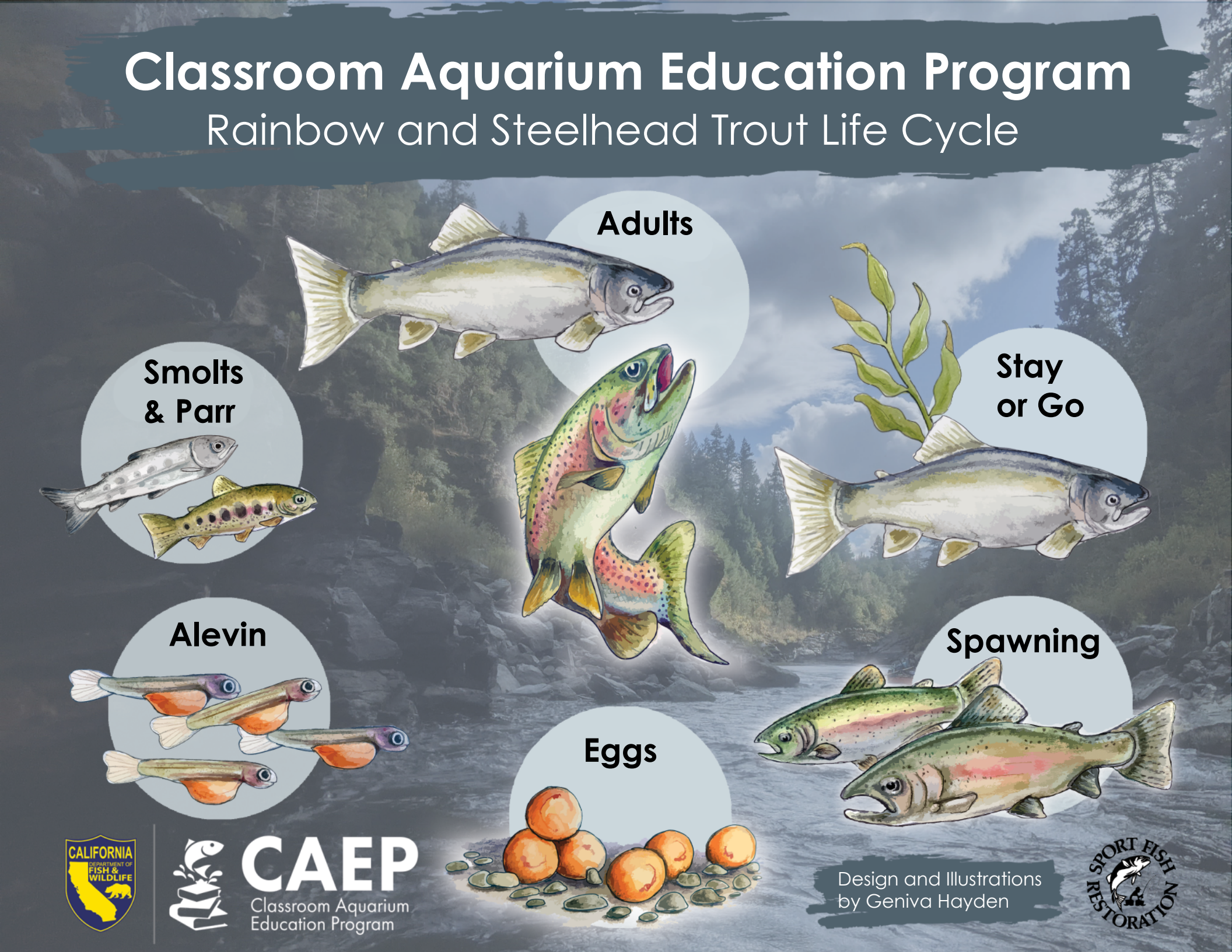
Classroom Aquarium Education Program

Rainbow and Steelhead Trout Life Cycle



CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

CAEP
Classroom Aquarium Education Program

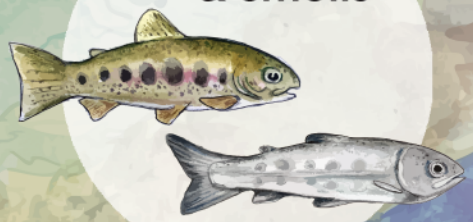
Design and Illustrations by Geniva Hayden

SPORT FISH RESTORATION

Oncorhynchus mykiss **Life Cycle**

Rainbow trout and Steelhead are the same species (O. mykiss)! However, their main difference lies in whether they remain in freshwater or migrate to the ocean. Check out the diagram below to see the key developmental differences throughout the various life stages of these fish.

Parr & Smolts



Alevin develop into parr or smolts depending on if they are remaining rainbow trout or becoming steelhead.

Adults



Although they are the same species, there are many differences between rainbow trout and steelhead.

Stay or Go



Steelhead migrate to the ocean while "resident" rainbow trout remain in freshwater for the duration of their life.

Spawning



Trout make the exciting adventure back home to spawn, facing many predators and obstacles on the way.

Eggs



Female trout deposit eggs into a nest or "redd" at the end of their life, which fosters the next generation of trout!

Alevin



Alevin are vulnerable and camouflage themselves among the gravel until they absorb their yolk sac and learn to swim.

Eggs



Ready for the Redd

Female trout create multiple nests called "redds" by wriggling their body into the gravel at the bottom of the river bed. Male trout then fertilize these eggs, and they begin the exciting journey to become rainbow trout or steelhead.





Life Begins

Tiny, translucent, fragile trout eggs will hatch around 30 days after fertilization depending on water temperature. These eggs are smaller than a grain of rice! The eggs appear to glow a beautiful orange color, hidden beneath the gravel.



Teeming With Trout

If you imagine all of these eggs fully developed into trout- the river would be jam packed! This doesn't happen because trout eggs are an important food source for nearly all animals in this environment. The trout help by nourishing the river and cycling vital nutrients to all of it's diverse inhabitants.

Alevin



Life As An Alevin

Alevin life isn't so bad! With a yolk sac attached to their body, these young fish don't need to hunt. However, their bright glowing red bellies can give away their hiding spot to predators. Alevin tend to stay in one location close to the gravel and are mostly active at night.





Into the Yolk Sac

Alevin do not need to eat, because their food is attached to their body. This egg yolk sac will continue to feed them vital nutrients for 2-4 weeks until they develop into parr and smolts.



"Hey - Rainbow Trout here! I wanted to let you know this word "alevin" is pronounced in a lot of different ways, the most common being "alvin" like one of those singin' chipmunks."



Fry

New Found Freedom

Once the yolk sac has been absorbed and baby trout continue to grow, they enter the next life stage becoming fry. At this stage fry swim confidently on their own and their main priority becomes searching for food. Mostly munching on tiny aquatic animals called zooplankton and larvae, fry are still incredibly small and seek shelter amongst aquatic vegetation.







Parr Mark Development

Some fry will develop into rainbow trout parr. As they grow, these faint spots along their sides called "parr marks" will become darker and more prominent.

Parr and Smolts

A hidden gene reveals itself to transform fry into steelhead smolts! Unique environmental conditions can trigger this "teenage" stage of a steelhead's life.





Steelhead Smolt

Steelhead smolts take on a new look as they prepare to embark on their journey to the ocean. During this process referred to as smoltification, smolts develop a shimmering silver appearance and ultimately grow significantly in size.

Rainbow Trout Parr

Both steelhead and rainbow trout begin as fry. While steelhead eventually gain their silver shine, rainbow trout will remain loyal to freshwater and are referred to as "parr" in this teenage stage. A range of colors emerge on the rainbow trout at this time, most notably brown speckles and a bright line across their side foreshadowing their iconic adult form.

Smoltification

A Brand New Look

After alevin become fry and prior to their journey to the sea, young steelhead go through a process of physical developments called 'smoltification' where changes occur to their body that aid them in adapting to their future in the saltwater environment of the ocean.



How Do They Know?

Conditions such as water temperature, space and acess to the ocean can trigger the smoltification process.

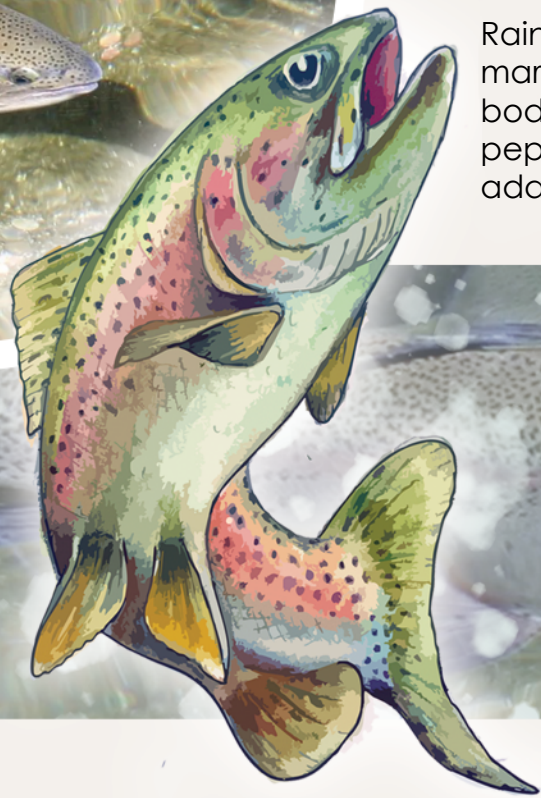
Why the Sudden Change?

This process is necessary for steelhead to complete their migration. This metallic silver color helps defend against predators in the ocean looking up at a light sky, or down at dark marine waters.

Adults







Rainbow Trout

Rainbow trout can be identified by their colorful pink marking on the lateral band across the middle of their body. Paired with thousands of small black speckles peppered across their scales, rainbow trout are uniquely adapted to thrive in a freshwater environment.



Steelhead Trout

Named after their striking chrome color, steelhead trout appear especially large, sleek and flashy. They are often twice the size of resident rainbow trout! Their appearance changes as they spend more time in salt or freshwater.

Ocean Migration



At Home in the Ocean

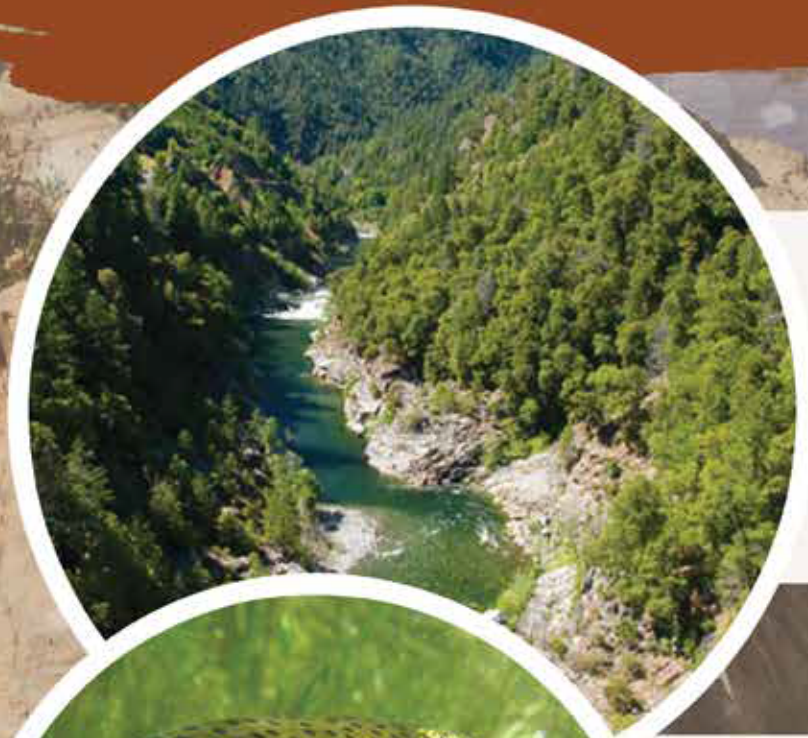
Steelhead can spend multiple years in the ocean! Through eating large amounts of squid, crustaceans and other small fish, steelhead grow significantly in size before making the trek back upstream to breed in their spawning grounds.



Adapted for Marine Living

The bright chrome shine of a steelhead's scales can deter predators. From above, birds of prey like osprey and eagles may mistake the reflection for sparkling water, while marine predators like seals may not see the steelhead as their shiny underbelly reflects back the dark ocean expanse.

Remaining in the River



At Home in Fresh Water

Rainbow trout, often referred to as "resident trout", do not migrate to the ocean as steelhead trout. Instead, resident trout live their entire life cycle in rivers, streams or even lakes. These fish can live up to six years of age, with some exceptions living as old as 10 or more!



Adapted to River Life

Resident rainbow trout maintain their beautiful pink and green colors with black speckles to best camouflage into freshwater environments. Unlike their steelhead counterparts, resident trout to not migrate to the ocean or require as much nutrients to grow in size. Remaining small is a huge benefit to resident trout.

Spawning



Coming Home

Many rainbow trout and steelhead return back to their birthplace or "natal waters" to breed. Steelhead migrate all the way from the ocean back upstream! Several challenges and obstacles can be faced along the way.



The Next Generation

Spawning involves female trout creating nests in the gravel called redds. Females lay eggs while male trout fertilize them separately. Once fertilized, the female trout gently cover the eggs with a thin layer of gravel to keep eggs safe and oxygenated.

Nutrient Cycle



Life Flows Along the River

Elements like oxygen, carbon and nitrogen flow along the river's churning waters. Aquatic plants, algae and bacteria absorb a variety of nutrients cycling it throughout the entire food chain. From productive soil bacteria to hungry trout and even soaring osprey, this cycle is necessary to sustaining life great and small.



Beginning From the End

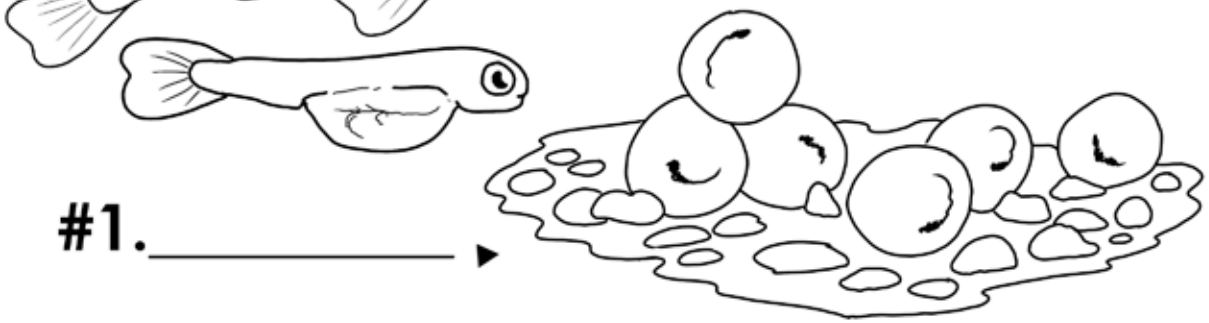
Rainbow trout and steelhead have the incredible ability to lay eggs multiple times throughout their life. When their life ends, their bodies decompose and continue to provide life sustaining nutrients to the entire environment.

Rainbow and Steelhead Trout Life Cycle

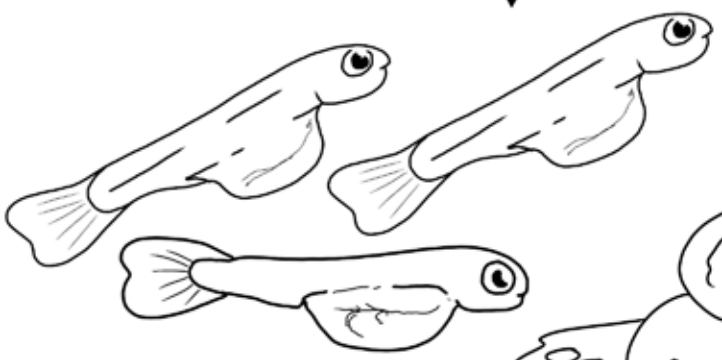
Coloring Sheet Activity

Learn More

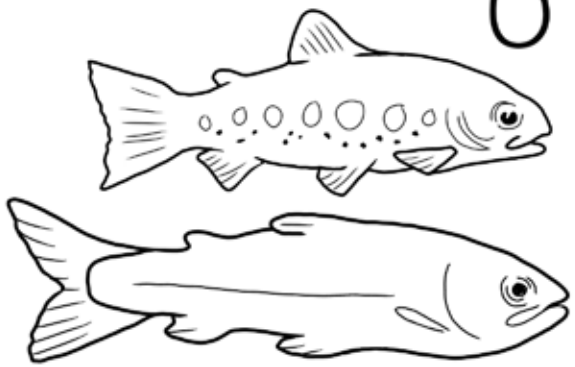
#1._____



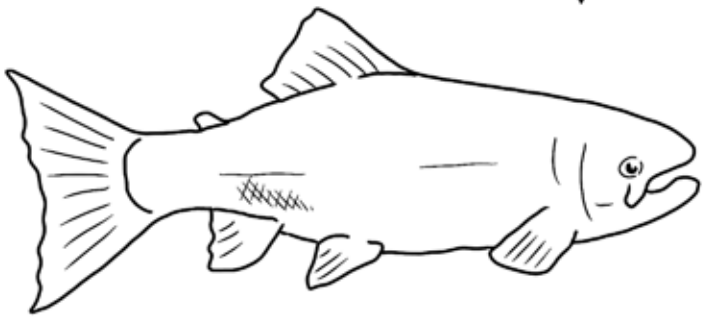
#2._____



#3._____

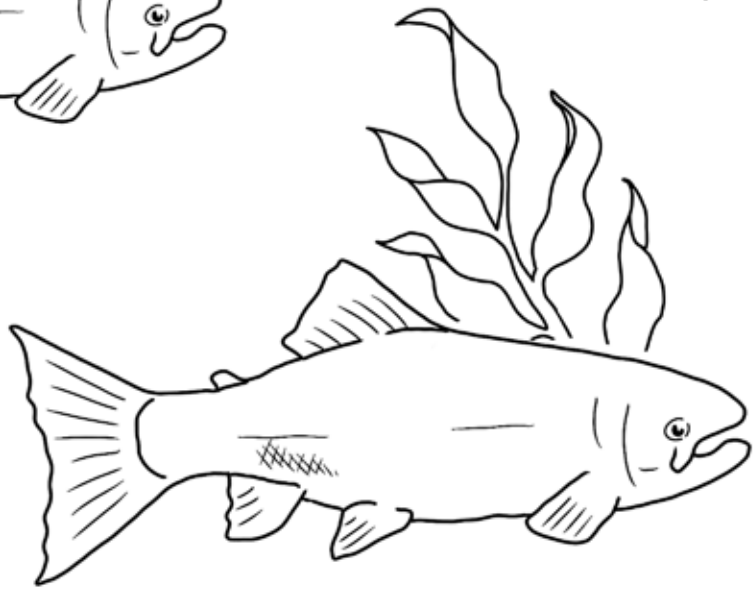


#4._____





#5._____



#6._____

