

TU's Salmon Survival Game



Purpose

This game shepherds children and adults through the life stages of salmon, while also emphasizing:

- the obstacles and threats that salmon face throughout their lives
- the survival rate of salmon in each life stage
- the pattern and distance of anadromous fish migration
- the reproductive strategy of salmon

Audience

TU's salmon life cycle game is intended for children and adults, ages 6 & up. Children on the younger end of the spectrum may need considerable adult guidance in the mechanics of the game, as it involves estimation and fractions.

Overview

Each game participant starts the game with a cup of lentils—this is their “redd” (nest) of freshly-laid salmon eggs. The participant visits each of nine stations, which represent the various life stages of the salmon. At each station, the participant rolls a die (or otherwise randomly selects) a challenge or obstacle that reduces the size of their salmon population and they pour the indicated fraction of their remaining lentils into a receptacle at that station before moving on. Most participants return to the starting table—their “natal stream” (stream where their eggs were laid)—with somewhere between two and five “fish” (lentils). Luckily, this is enough fish to lay a new nest of eggs, and the cycle of life continues.



Materials

- 10 lbs red lentils, in a container or two
- 16 small cups (4-6 ounces), to hold each participant's lentils
- 10 64-ounce plastic food storage containers (or other lentil receptacle at each station)
- 9 station labels (provided) either taped on container lids or put on nearby signs
- 9 station dice with possible threats/obstacles – either wooden blocks or cardstock (labels provided)
- tape, markers, scissors, cardstock, label stickers as needed
- an open space to set up the game!
- (optional) Salmon Life Cycle booklet handout (template provided)

Set-up

Preparation

1. Prepare nine stations with the nine station labels, either on the lids of the containers (as shown), or as signs to post around your playing area. Print the labels in color or use marker to color-code each label. Color-coding the stations makes set-up and clean up much easier!

2. Build the nine dice from the templates by either:
a. printing them on cardstock and building the cubes
b. affixing each square to each face of a block

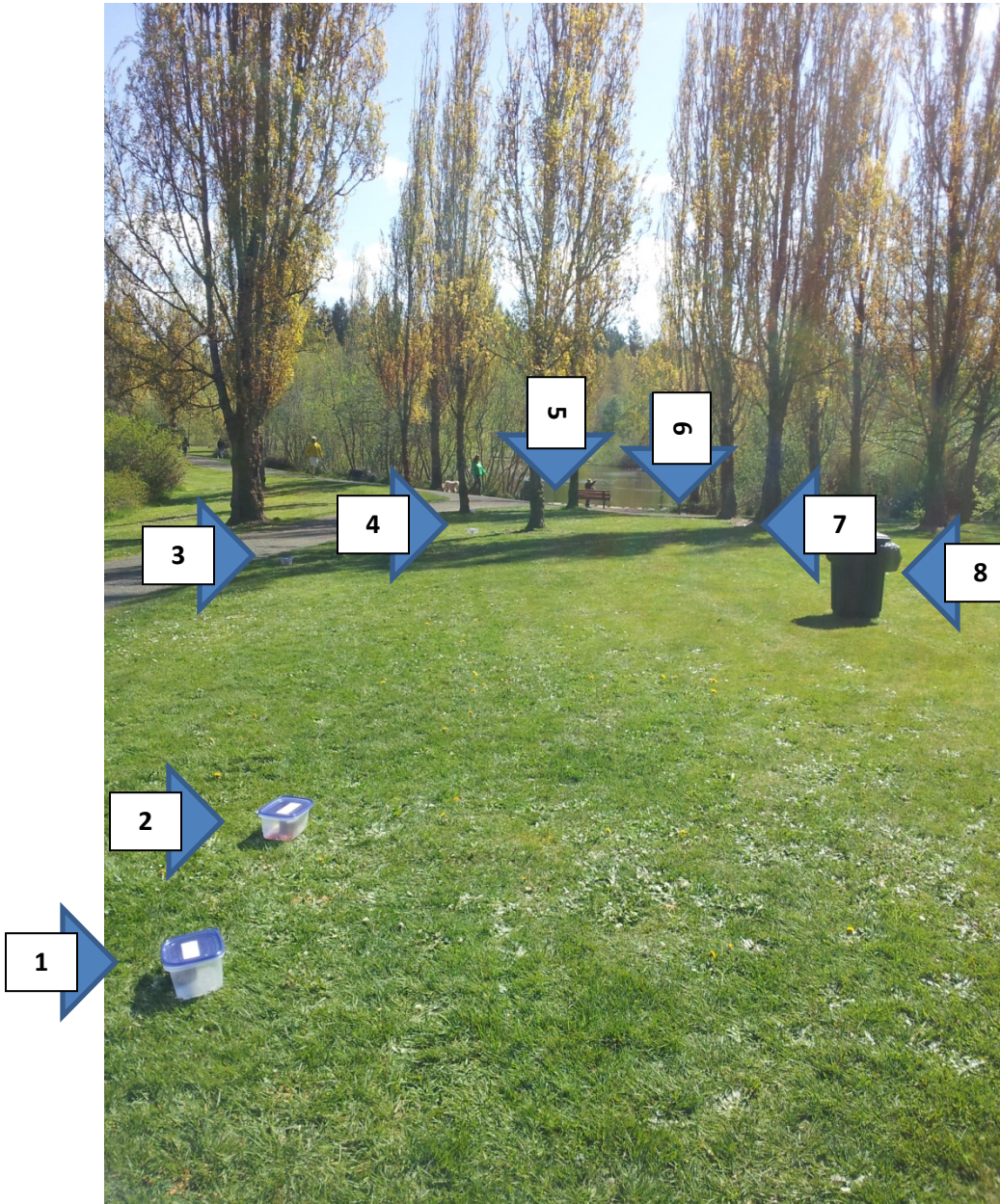


Print the dice in color or accent the dice with the color to match the station they belong to. Color-coding the stations makes set up and clean up much easier!



Layout

Set your stations up in such a way that each player must make a relatively long “migration” to play the whole game. You can see in the photo below that the pond served as the “ocean,” and the farthest station, 6, was all the way down there, very far from the starting table. Station 9 is out of the photo.



At each station, place the station label (sign or lid of container), receptacle for lentils (this might be the container that is labeled), and the die corresponding to that station.

Stations 1 and 2 should be very near each other (as they are both egg stages), and very near the “natal stream” home table. This way, you can assist players with the first few stations, to make sure they have the hang of it. Then, send them off on their journey, which should be a clear path, but quite far. I recommend having your players “swim” down one side of the field/space and then back up the other side.

The home table is ready to both send new players off on their journey (with a cup of lentils) and also receive returning players with their few lentils left. When players return, they should be able to turn in their cups and also pick up their optional booklet handout (attached worksheet).

As your visitors play

-You may find that it is helpful to have a volunteer or educator circulating during the game, helping with fractions, explaining unfamiliar words, and otherwise engaging the participants.

-From time to time, you will also need someone to go out into the field and collect lentils from the stations, especially 1-3, as those accumulate the most. Eventually you will need those lentils back at the starting table, in order to hand them out to the new incoming participants

Procedure

1. Each participant begins by arriving at the main table. There, give each participant a small (4 oz.) cupful of lentils and tell them that this is their salmon “redd.” Each lentil represents one salmon egg that could eventually grow into an adult salmon. In fact, the number of lentils that is in each cup is approximately the number of eggs that a pair of adult salmon lay in a redd.
2. Walk the participant to the first station, or send them to your educator or volunteer who is waiting there. At the first station, explain that salmon go through many life stages. Some salmon make it through all the life stages, but at each life stage, there are threats and obstacles that can prevent a salmon from surviving. Each station shows the participant what life stage they are at and also presents some obstacles that at least some of their salmon will have to avoid.
3. Have the participant read the text of the first station label. Then explain that the die has some of the threats that are posed to salmon at that life stage. They must roll the die to see what happens to their salmon. Have the participant read whatever threat their salmon face from the die, and the fraction of how many succumb to that threat.
4. The participant then pours that fraction of their lentils into the station receptacle. Remind the participant that, at each station, the fraction they read is to be applied to however many lentils are left in the cup (not the total that they started with). For example, if the participant rolls that $\frac{1}{2}$ of their salmon are eaten by a big fish, then they pour **$\frac{1}{2}$ of their remaining lentils** into the receptacle before moving on.
5. The participant must then visit the next 8 stations, and roll the die at each one.
6. When the participant returns to the table with however many salmon they have left, ask about what happened. Ask how many salmon they have left. And ask how many are needed to build a new next and lay a whole new batch of eggs.
7. Have the participant return their cup and any remaining lentils. They can then pick up a booklet to illustrate, in which they can capture some of what they’ve learned. You might even provide crayons or colored pencils for them to get started at your booth.

Questions

What happened to all your salmon?

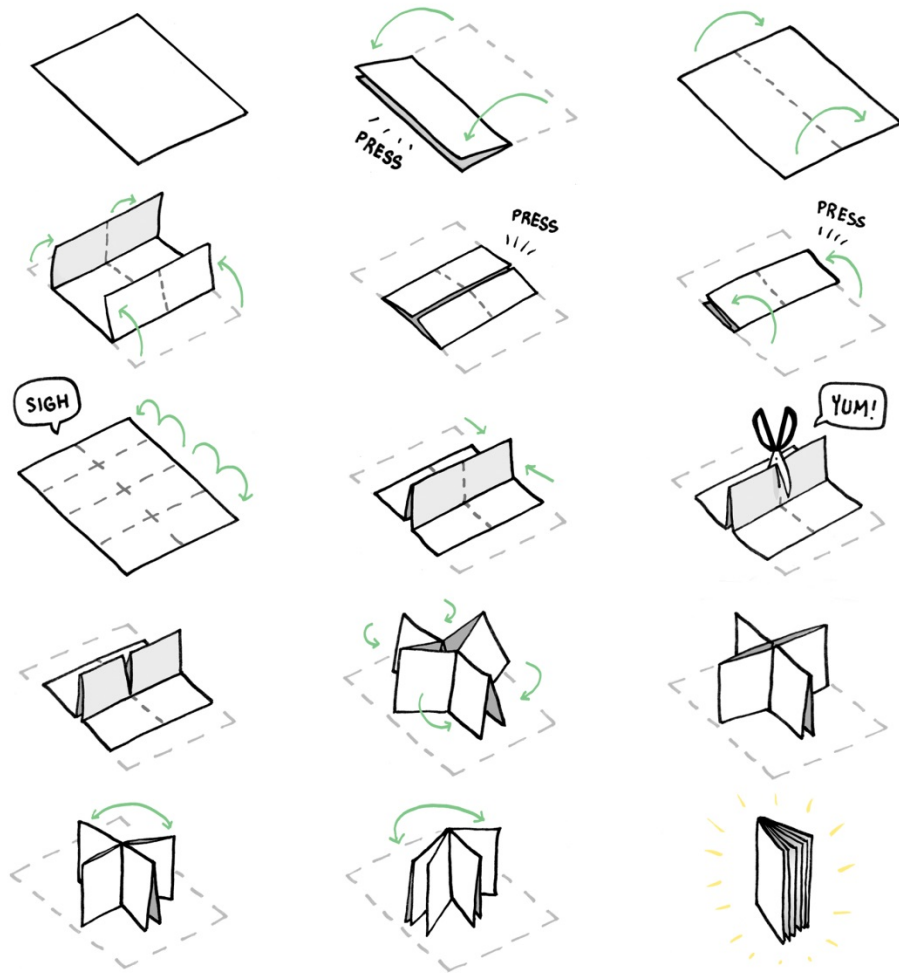
Where did you lose the most salmon?

What kinds of predators did your salmon encounter?

Was there anything that humans did to hurt the salmon?

Thank you to Umami design for these easy-to-follow instructions! If you print out this page with the following one and make double-sided copies, then you have the complete activity handout!

HOW TO FOLD A SHEET-O-PAPER INTO A 8-PAGE ZINE



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My life began as an **egg** in the gravel. See how round and red I am! Soon I'll hatch into a tiny **alevin** with a yolk sac full of food on my tummy. Yum! The stream is very big for a little fish like me, and I'll stay safe in the gravel until all my yolk sac food is gone.

Now I've grown into a **fry** and I'm ready to leave my gravel nest and explore. I'm too little to go far from my home yet, but I like it here in the stream! There are lots of tasty bugs around to eat (yum!) and I have good camouflage so I can hide really well.

I'm getting bigger and want to find more food. I'll swim to the ocean, where there's lots of food. To prepare, I become a shiny silver **smolt** and start migrating (moving) downstream. Where the river meets the ocean, that's called an estuary, and I'll stay there while I learn to live in salty water.

Wow, the ocean is great! I've grown into a big **adult salmon**. There are lots of predators here that want to eat me, but luckily I'm a fast swimmer and good at hiding!

Time for me to become a **spawning adult** and have babies of my own! I'll migrate thousands and thousands of miles to return to my home in the freshwater stream. My sense of smell will lead me all the way back to where I hatched! When I get there I'll dig a **redd** (nest) to lay my eggs in.

Draw a picture of all the things you saw while you were a salmon! Did you see birds? Bears? Orcas?



The Story of

the Salmon

(Your first name)

The Life Story of the Salmon booklet

The previous page (page 6) is a single-page handout that can be folded into a small booklet. Participants can illustrate each page to reflect the life experience they just had during the game. You may want to fold the paper into booklets ahead of time, or you may want to teach the participants how to do it. In either case, it is not hard to do. When printed, pages 5 & 6 of this guide can be used as a complete handout for your booth—with instructions on the back—just make double-sided copies! (See previous two pages).

Acknowledgements

Many thanks to TU Chapter 383, North Kitsap Bainbridge Island, for requesting this activity in the first place, and for piloting it at a spring fly fishing expo on Bainbridge Island.

Gratitude to TU Chapter 146, Tacoma, for continuing to work with the activity, and to Friends of the Issaquah Salmon Hatchery and Pierce County Conservation District for their interest in the game.

Thanks, also, to Long Live the Kings for their illustrations, scientific consultation, and other assistance in creating this final version of the game.

Follow-up

Stream Explorers magazine

Trout Unlimited publishes a children's magazine that you are welcome to print and distribute free of charge. We only ask that you do not make any alterations to the publication, with the exception of adding your logo or contact information to the space on the back. The three most relevant issues are:

Steelhead – Journey to the Ocean

<http://www.streamexplorers.org/sites/www.streamexplorers.org/files/documents/V2i1Anadromy.pdf>

Steelhead—Journey Back Upstream

<http://www.streamexplorers.org/sites/www.streamexplorers.org/files/documents/V2i2Anadromy.pdf>

Pacific Salmon

<http://www.streamexplorers.org/sites/www.streamexplorers.org/files/documents/v2i3%20Pacific%20Salmon.pdf>

You can see all our issues at:

www.streamexplorers.org/magazine

If you would like to purchase back issues or receive the high-resolution file to print locally, please contact streamexplorers@tu.org.

Station Life Cycle Labels

This page and the following have the nine station labels. They are color-coded for you, and they match the dice on the pages that follow. Big thanks to Long Live the Kings for the photos and illustrations of salmon at every life cycle stage.



Stage 1

You are a salmon egg, just laid in a redd (nest) of gravel (small rocks).

Thanks to WDFW for this great photo!



Stage 2

You have developed (grown) into an eyed egg. Your eye can be seen through your egg shell.

Thanks to WDFW for this great photo!



Stage 3

You've hatched into an alevin with a big yolk sac (belly full of food).

Thanks to WDFW for this great photo!



Stage 4

Now you're a little fry with good camouflage. You eat little insects and hide a lot.

Thanks to USFWS for this great photo!



Thanks to USFWS for this great photo!

Stage 5

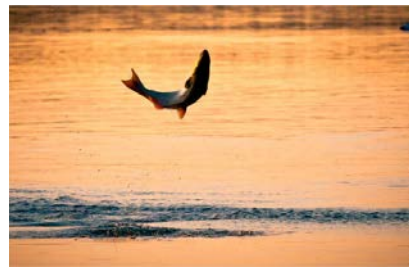
When you become a smolt, your body changes so that you can live in salt water. You look all silvery (shiny) now.



Stage 6

You spend years in the Pacific Ocean, growing to become a HUGE adult salmon. The ocean is full of good food.

Thanks to NOAA for this great photo!



Stage 7

As a fully grown adult salmon, you start heading back from the ocean to the river you came from.

Thanks to LLTK for this great photo!



Stage 8

You follow your sense of smell farther and farther up, looking for the stream where you hatched.

Thanks to NOAA for this great photo!



Stage 9

Finally, you reach the stream where you hatched. You're so close! If you can get all the way home, you will spawn (lay eggs).

Thanks to USFWS for this great photo!

Survival Dice

On these 9 pages you will find the dice needed for each station. They are color-coded. Simply cut them out and tape them together, or affix the six squares to the sides of a block.

**1/2 are
suffocated by
sediment
from a road**

**2/3 are
smothered by
dirt from a
building site**

**1/3 are eaten
by a big fish
(and roll again
at this station)**

**2/3 are
stepped on by
a careless
person**

**1/2 are eaten
by a big fish**

**2/3 are
suffocated by
soil from a
clear-cut
forest**

Survival Dice

On these 9 pages you will find the dice needed for each station. They are color-coded. Simply cut them out and tape them together, or affix the six squares to the sides of a block.

**1/2 are
stepped on by
a careless
person**

**2/3 are eaten
by a big fish**

**1/2 are
washed away
during heavy
rains**

**1/2 are eaten
by a big fish
(and roll again
at this station)**

**1/3 are
smothered by
dirt from a
road**

**2/3 are
washed out
by a flood**

Survival Dice

On these 9 pages you will find the dice needed for each station. They are color-coded. Simply cut them out and tape them together, or affix the six squares to the sides of a block.

**1/2 get
stepped on by
a careless
person**

**1/3 get too
warm and
suffocate (and
roll again at
this station)**

**1/2 get caught
up in a flood**

**1/2 get
smothered by
soil from a
clear-cut**

**2/3 get eaten
by big fish**

**1/2 get
stepped on by
a careless
person**

Survival Dice

On these 9 pages you will find the dice needed for each station. They are color-coded. Simply cut them out and tape them together, or affix the six squares to the sides of a block.

**2/3 get eaten
by bigger fish**

**1/3 get eaten
by river otter**

**1/2 get eaten
by merganser
(a type of
bird)**

**1/2 get eaten
by river otter**

**1/2 get eaten
by bigger fish
(and roll again
at this station)**

**1/2 can't find
enough food
and starve**

Survival Dice

On these 9 pages you will find the dice needed for each station. They are color-coded. Simply cut them out and tape them together, or affix the six squares to the sides of a block.

**2/3 are eaten
by seals**

**1/3 lose their
way
downstream
at a dam**

**1/2 die from
city pollution**

**2/3 get eaten
by an otter**

**1/2 get eaten
by bigger fish**

**1/2 get eaten
by sea birds
(and roll again
at this station)**

Survival Dice

On these 9 pages you will find the dice needed for each station. They are color-coded. Simply cut them out and tape them together, or affix the six squares to the sides of a block.

**2/3 are eaten
by seals**

**1/3 are eaten
by orcas (and
roll again at
this station**

**2/3 are caught
by people in a
fishing boat**

**1/2 are eaten
by an orca**

**1/2 are eaten
by sharks**

**1/3 are eaten
by porpoises**

Survival Dice

On these 9 pages you will find the dice needed for each station. They are color-coded. Simply cut them out and tape them together, or affix the six squares to the sides of a block.

**2/3 are caught
by people in
fishing boats**

**1/3 are eaten
by seals (and
roll again at
this station)**

**1/2 are eaten
by osprey**

**2/3 are eaten
by orcas**

**1/3 are caught
by seals**

**1/2 get caught
by people in
fishing boats**

Survival Dice

On these 9 pages you will find the dice needed for each station. They are color-coded. Simply cut them out and tape them together, or affix the six squares to the sides of a block.

**3/4 get eaten
by eagles**

**1/2 cannot
find their way
over a dam**

**1/2 are caught
by bear**

**2/3 are eaten
by bear**

**2/3 cannot
swim up a
waterfall**

**1/2 get lost at
the dam (and
roll again at
this station)**

Survival Dice

On these 9 pages you will find the dice needed for each station. They are color-coded. Simply cut them out and tape them together, or affix the six squares to the sides of a block.

**1/2 are so
tired they
stop**

**3/4 get eaten
by eagles**

**2/3 get eaten
by bear**

**2/3 cannot
jump over the
waterfall**

**1/2 get eaten
by raccoons**

**1/2 get eaten
by bear (and
roll again at
this station)**