BURKE FROM HOME

FISH

ALL AGES! BEST FOR GRADES 1 - 5

LAND ACKNOWLEDGEMENT

The Burke Museum stands on the lands of the Coast Salish peoples, whose ancestors resided here since time immemorial. Many Indigenous peoples thrive in this place—alive and strong.

WHAT'S INSIDE

- Reel in some information about three species of fish—salmon, lamprey and halibut—that are important to Native American peoples of the Pacific Northwest.
- Learn about traditional and contemporary fishing techniques, then craft your own fishing tools and school of fish and go "fishing" at home!
- Play the game "Run Salmon, Run!" to learn about salmon life cycles and migration.

INTRODUCTION

Fish are an integral part of Northwest Native American cultures. Many tribes in Washington have treaties with the United States Government that uphold their rights to fish in their traditional homelands. Fish are important as a food source for people and are an important part of ecosystems—both fresh and saltwater. For example, when salmon return at the end of their lives to inland rivers to spawn, they provide food for many different animals, including humans. As their bodies decay, they enrich freshwater streams with new nutrients that help plants and animals in these ecosystems thrive.

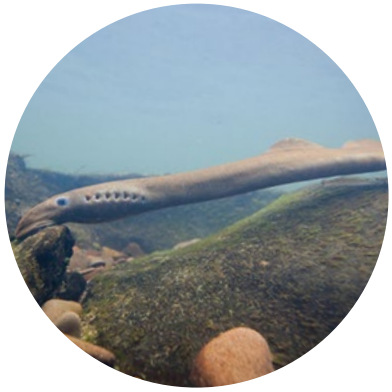
Tribes throughout the Pacific Northwest have shared knowledge and stories about fishing with the Burke Museum. In this packet we will be sharing some with you and will name the Tribes they come from. We encourage you to continue your learning of Native American cultures by reaching out to your local Tribe for more resources. Learn More

Yakama youth help pull in a gill net on the Columbia River.

Fish live and swim in many different water environments—from to deep ocean waters to shallow streams. Different types of tools must be used to catch a fish, depending on what kind of fish it is and where it lives.

Have you seen fish in person or in pictures? Have you been fishing?

Let's look at three fish that are native to the Pacific Northwest. Where does each fish live?



SALMON

There are five species of salmon native to the Pacific Northwest, which vary in size and color. They are anadromous, which means that they live part of their life in freshwater and part of it in saltwater. When salmon spawn (lay/fertilize eggs), they navigate back to their home streams using their sharp sense of smell.

PACIFIC LAMPREY

Entosphenus tridentatus

Lampreys are a jawless fish who live in the ocean as adults and return to rivers to spawn. They use their suction-cup mouth to hold on to rocks. They can even climb up waterfalls using their powerful mouths.

HALIBUT

Hippoglossus stenolepis

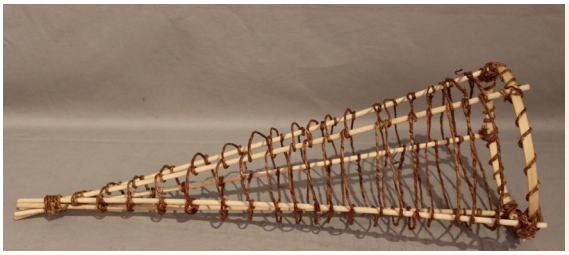
Halibut are a large, ocean-dwelling flatfish who have both eyes on one side of their face, as they swim flat rather than upright. This allows them to hide in sand on the seafloor, which is also where they find their food.

TRADITIONAL WAYS OF FISHING

Today, Native fisherpeople use a variety of techniques to fish, some traditional and some contemporary. Traditional ways of fishing have been passed down for many generations. Contemporary (modern day) techniques include store-bought tools like metal hooks and gill nets. Which traditional tool or technique below would be best for catching each species of fish (salmon, Pacific lamprey and halibut)?

SOUTHERN HALIBUT HOOK & HEMP FISHING LINE

This hook is made of cedar which is steam-bent into a c-shape. It is used to catch fish who live in deep ocean waters. The flared tip makes sure that the right sized fish is caught. It was made by Sven Haakanson (Alutiiq) using information from the Makah Tribe. Fishing line is the rope or string used to cast a hook. Traditional fishing line is made from twisted plant fibers like nettle stems or cedar bark.



FISH TRAP MODEL

Basket traps are one of many ways to traditionally catch fish. The open end of the trap is set facing upstream. People waiting upstream of the trap, urge the fish to swim back downstream into the mouth of the trap. The fish are then pulled from the trap. Fish traps can also be used with fences built in the river, called weirs, that help lead fish into the mouth of the traps.

HANDHELD NETS

Nets can be used to collect fish that need to be caught by hand. Some fisherpeople will search around the base of waterfalls, or even along a waterfall, looking for fish to pry from the rocks. This way of fishing has been shared with the Burke by the Columbia River Inter-Tribal Fish Commission (Yakama, Umatilla, Warm Springs and Nez Perce Tribes).

Where would you want to go fishing? Ocean, river or lake? What kind of fish would you want to catch? Fishing today can involve traditional techniques, like the ones we learned about, or contemporary store-bought tools. Fishing today also requires a license or tribal rights, but we can all practice our fishing skills by making a model!

HERE FISHY, FISHY

Recommended for ages 3-8

Using only the things you can find around your home, craft yourself a school of fish, and design your own tool to catch them! Try out several different fishing game variations, think about your process in comparison to how Native communities have designed fish-catching tools over time, and dive a little deeper by considering our role in pollution and conservation.

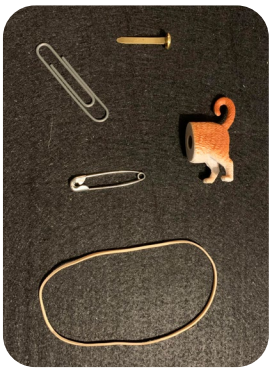
MATERIALS

- ☐ 5-20 crafted fish (see "Make Your Fish" step for more details!)
- ☐ 5-20 crafted trash pieces (optional - see "Take a Deeper Dive" section)
- ☐ Enough small household items (paperclips, brads, fridge magnets, safety pins, etc.) for making hooks and fish attachment points
- ☐ Yarn or thread
- ☐ Scissors
- ☐ A long and lightweight "pole" (a twig, pencil, paper towel tube, yardstick, etc.)
- ☐ Tape

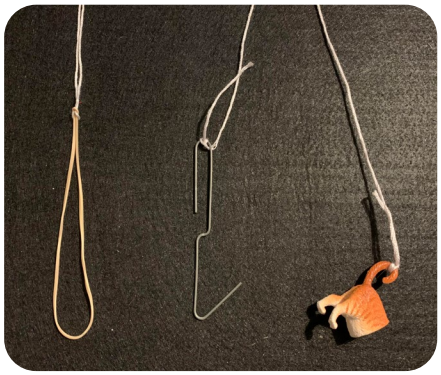
Step 1: MAKE YOUR FISH

Get crafty and make some fish! Your fish could be collaged, printed, painted, or hand-drawn. Don't forget to make your fish "catchable" by attaching the same type of small household item to each fish. For example, if you attach a paper clip to your fish, you might use a curved or magnetic hook to capture your fish. For an added challenge, use multiple kinds of attachments, and design multiple styles of fishing poles to catch them.

Make your fish catchable. Try these possible attachments.



Crafted fish with attachments.



Some possible fish hook designs. Your hook should match whatever fish you are trying to catch!

Step 2: DESIGN & BUILD YOUR FISHING POLE

Attach yarn or string to your pole. This is your fishing line. Next, attach a "hook" to the end of your line. Just like fishing in real life, the type of hook you need will be determined by the fish you're trying to catch! Can you design a hook that can catch each style of attachment on your fish?

Step 3: WORK THOSE FINE MOTOR SKILLS

Spread your school of fish out on the floor and test out your fishing pole and hook. Make observations and adjustments to your pole and hook as needed.

- ☐ Does the length of the string change how you use your pole? What happens if you shorten it? What if you lengthen it?
- ☐ Does the style and placement of the attachments on the fish change how easy it is to catch them?
- ☐ If you're using fridge magnets as hooks or attachments, do different magnets change how easy it is to catch fish?

Step 4: TURN IT INTO A GAME

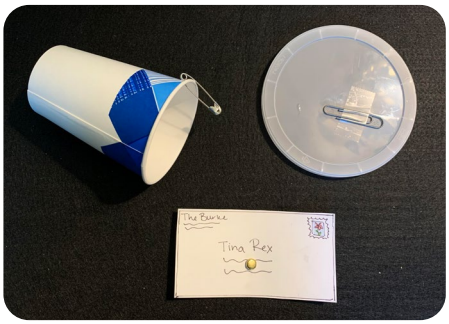
Now that you've honed your fishing pole, turn fishing into a game! Here are some options:

- ☐ Make quick flash cards that categorize your fish by size, color, species, diet or another category of your choosing. Draw a card at random from the pile to identify which fish you need to catch next. Be sure to take turns if you are playing with others.
- ☐ See how many fish you can capture in one minute!
- ☐ How many fish can you capture if you use your opposite hand to hold your pole?

TAKE A DEEPER DIVE

Salmon and lamprey, like many other marine species, are strongly affected by climate change, loss of habitat and human impact.

- Take a moment to learn more about ocean pollution and the Great Pacific Garbage Patch
- Craft yourself some trash pieces to mix in with your fish. Find clean recyclable items like paper cups, cardboard pieces and plastic around your home, or draw your own pieces of trash. Remember to add attachments like you did to the fish so that they are catchable.
- Pretend you are now a marine conservationist trying to keep trash in estuaries and tidal flats from entering the ocean! Fish out all the trash, but don't catch any fish!



Craft some trash pieces to fish out of the ocean

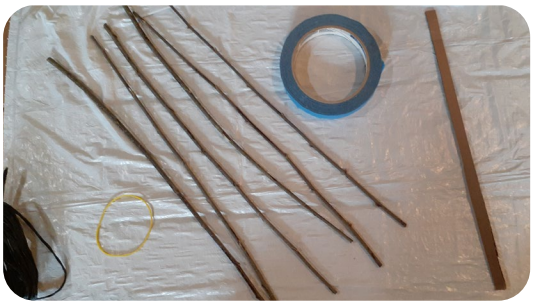
REFLECTION TIME!

- ☐ Reflect on the process of building your fishing pole. What worked well? What needed to be changed?
- ☐ How did the design of your fish affect the type of pole you built? Why do you think traditional halibut hooks look and function differently than salmon traps? Would a halibut hook or salmon trap have worked to capture your fish in this game?
- ☐ Why is it important to reduce the amount of trash in aquatic environments? What if the oceans became too polluted for fish to survive in? How would that impact you?

BUILD A MODEL FISH TRAP

Recommended for ages 8 +

Make your own model of a traditional basket fish trap!



Gather your materials.

MATERIALS

- ☐ Thin cardboard strip (about 1 foot long)
- ☐ A Rubber band
- ☐ Scissors
- ☐ Tape
- ☐ Six equal-length sticks or pencils
- ☐ Piece of cord, ribbon, string, yarn or raffia—3 feet or so.

If you run out of cord, you can always tie on a new piece when it's needed!

Step 1: PREPARE THE FRAME OF THE TRAP

A. Take the thin cardboard strip and bend it into a circle, with the ends meeting, and tape the ends together.

B. Tape or tie the ends of each stick to the outside of the cardboard ring, spacing them out as evenly as possible.

C. Gather all the other ends of the sticks and use a rubber band to band them together. You should have a cone-shaped structure at this point.

Make a cardboard ring.

Tape your sticks evenly around.

Step 2: ATTACH THE CORD TO THE FRAME

Attaching the cord.

A. Grab your cord and tie one end of it to one of the sticks—as close to the cardboard base as you can make it.

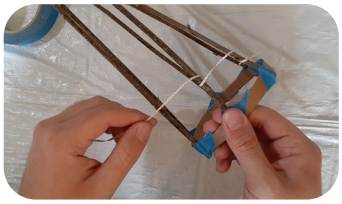
B. Make sure this knot is tight, since it will need to stay secure for the rest of the weaving!

Optional: For extra security, wrap the cord in an "x" shape around each stick, strengthening its connection to the cardboard base.

Step 3: WEAVE THE FISH TRAP

A. Weaving has 3 steps: (1) Wrap the cord **over the top** of the stick. (2) Next, wrap the cord **around the back** of the stick. (3) Pull the cord back to the front—**up and snug**

B. Then move on to the next stick! Careful not to pull too tightly - just make sure the cord is snug, but not tight. Otherwise, the sticks will bend together too quickly.



Spiral up as you weave.

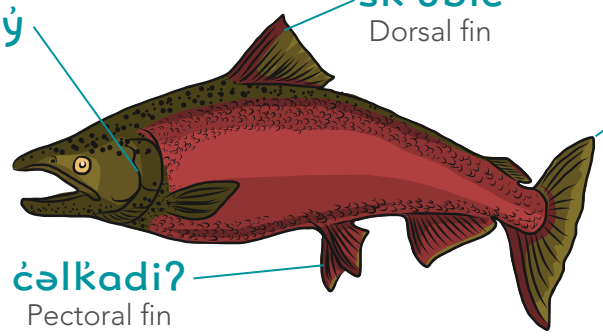
C. Continue to wrap your cord around each stick, slowly spiraling up and away from the cardboard ring. As you spiral up, try to leave about a thumb-width of space on each stick between wraps. This leaves space for the water to flow through!

The finished basket trap model.

D. When you reach your rubber band, you're done weaving!

E. Loop the loose end of your cord through some of the existing wrapped pieces, and then tie a knot to secure the cord in place. Cut off any excess cord. You're finished!

We've learned about salmon and one traditional way to catch them. Now let's look more closely at their life cycle—how they grow from a tiny egg into a big adult. The salmon species below is a Chinook, and its body parts are labeled in the Northern dialect of Lushootseed. Lushootseed is the regional language of the Coast Salish Tribes and has two main dialects: Northern and Southern. These translations were provided by the Tulalip Tribes.

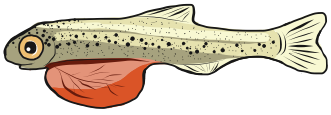


SPAWNING ADULT

Travel back to where they were born to spawn (lay or fertilize eggs). After spawning, they die.

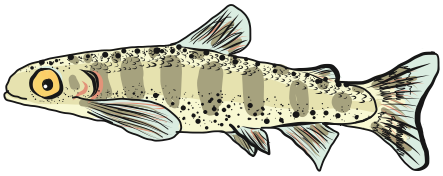
EGG

Eggs hatch in freshwater.



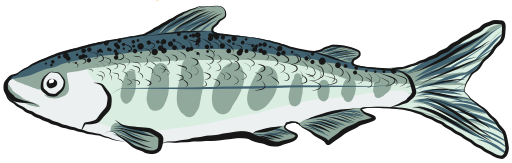
ALEVIN

Newly hatched salmon have a yolk sac to feed them as they grow.



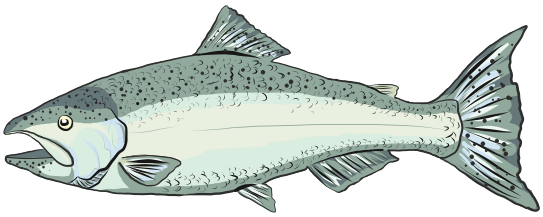
FRY

At this stage, the baby salmon begins swimming downstream towards the ocean.



SMOLT

Body changes in preparation for life in saltwater.



ADULT

Live in the ocean for 1-8 years until they journey back to freshwater.

yubəč

CHINOOK SALMON

Oncorhynchus tshawytscha

Juvenile Chinook salmon

Did you know?

At the Burke Museum in the Ichthyology (pronounced: ik·thee·aa·luh·jee) collection (fish collection), we preserve fish and eggs in a liquid chemical called ethanol so that people can study them for many years.

Now that you've learned the basics about salmon life cycles, it's time to play a game!

When salmon spawn they lay thousands of eggs because only some of their young will survive the journey from the freshwater stream where they were born, to the Pacific Ocean. There are many hazards along the way for a young salmon, and just as many for adult salmon on their return journey from the ocean to their home stream to spawn. In this game, you will play as a female Chinook salmon and start out as an egg. Your goal: to hatch, swim to the ocean, grow to an adult and then return to the stream where you were born to lay eggs and spawn the next generation. Will your salmon survive?

NUMBER OF PLAYERS: 2-4 recommended, but can also be played solo. If you are playing by yourself, you can choose to play as three different salmon.

TO PLAY THE GAME YOU WILL NEED…

- ☐ Game board - print out the game board from this packet (see page 8), or draw your own version on a piece of paper
- ☐ Pawns, game pieces or coins - one for each player/salmon
- ☐ One six-sided die
- ☐ Life Step Tables on pages 9 - 11

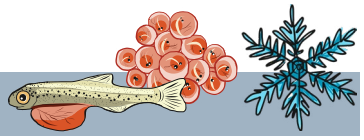
HOW TO PLAY:

1. Every player should place their pawn (or game piece) at the starting place on the game board labeled "Home Stream: Wind River." If you are playing by yourself as a single player, place three game pieces on the start to represent the three different salmon you will be playing as.
2. Have each player roll the die to see who will go first. The player that rolls the highest number goes first. If you have more than two players, play order should proceed clockwise from the first player around the table.
3. At the beginning of a turn, roll the die. Locate the Life Step Tables on pages 9 - 11 that matches the space you are currently at on the game board. Find the number you rolled on that table, and follow the instructions beside it. It may tell you to…
    - **MOVE FORWARD to the next space.** = You survived! Move your game piece forward to the next space on the game board. Follow the arrows.
    - **SKIP YOUR TURN.** = You're delayed. Leave your game piece where it is on the game board. You will get a chance to roll again on your next turn.
    - **GO BACK to home stream and start over.** = You died. Move your game piece back to the starting place ("Home Stream: Wind River"). You will get to start over as a new salmon on your next turn.
4. After you've followed the Life Step Table instructions, your turn ends, and it's the next player's turn.
5. Continue to take turns. The first player to reach the "Next Generation" space on the game board wins!
6. Take some time to reflect on what happened in the game and extend the learning with the post-game reflection on page 11.

Start Here!
HOME STREAM
Wind River
FRY
Bonneville Dam
SMOLT
Columbia River Estuary
SALTWATER ADULT
Pacific Ocean
WASHINGTON
COLUMBIA RIVER
OREGON
PACIFIC OCEAN
1-8 years go by...
FRESHWATER ADULT
Columbia River Estuary
SPAWNING ADULT
Bonneville Dam
SPAWNING STREAM
Wind River
You made it to the NEXT GENERATION

HOME STREAM

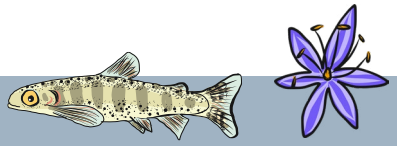
Location: Wind River; **Season:** Winter - Early Spring



IF YOU ROLLED A...	
1	You hatched and grew into an alevin, or a tiny baby salmon, but then you became an otter's lunch! **GO BACK to home stream and start over.**
2, 4 or 5	You hatched and you survived! You were able to eat enough while avoiding predators and have successfully grown into a fry. **MOVE FORWARD to the next space.**
3	Water levels in your homestream were so low that your egg dried out and you were not able to hatch. **GO BACK to home stream and start over.**
6	Oh no! Your egg was not buried well enough in the gravel and you were eaten by an eel before you could hatch. **GO BACK to home stream and start over.**

FRY

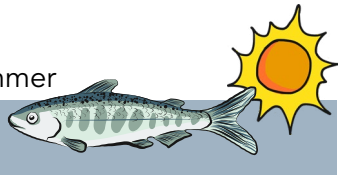
Location: Bonneville Dam; **Season:** Spring



IF YOU ROLLED A...	
1 or 5	You were able to ride the spillway, which sends water over the dam. You are one step closer to the ocean! **MOVE FORWARD to the next space.**
2	The slow-moving water caused by the dam made making it down the Columbia River take longer than it normally would. **SKIP YOUR TURN.**
3	There are a lot of animals in the reservoir near the dam and you got eaten by a blue heron! **GO BACK to home stream and start over.**
4	This water is too hot! Because of climate change and slow-moving water, the water was too hot and you did not survive. **GO BACK to home stream and start over.**
6	While riding the spillway over the dam, you got dizzy from being thrown around in the water and did not see the kingfisher coming before it ate you. **GO BACK to home stream and start over.**

SMOLT

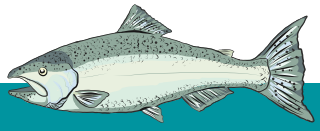
Location: Columbia River Estuary; **Season:** Late Spring - Summer



IF YOU ROLLED A...	
1	When you were focused on eating as much as you can and smolting (changing your body to live in saltwater), a seagull came and ate you! **GO BACK to home stream and start over.**
2 or 5	You were able to eat enough and go through the smoltification process. Now you are ready for the saltwater in the ocean! **MOVE FORWARD to the next space.**
3	There is a lot of competition for food in the estuary and you are going to need more time to eat and grow before heading to the ocean. **SKIP YOUR TURN.**
4	Unfortunately, the other young salmon were faster than you and you were not able to get enough food to survive. **GO BACK to home stream and start over.**
6	A lot of salmon come into the estuary at the same time. One salmon had an infection and spread it to a lot of other fish, including you. You do not survive. **GO BACK to home stream and start over.**

SALTWATER ADULT

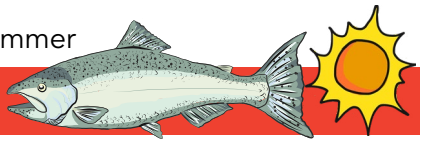
Location: Pacific Ocean; **Season:** Many, 1-8 years



IF YOU ROLLED A...	
1, 3 or 6	You stayed with the school of salmon and were able to remain safe from the predators of the ocean! **MOVE FORWARD to the next space.**
2	You still have more growing and eating to do before you are ready to return to your home stream to spawn. **SKIP YOUR TURN.**
4	While swimming with your school of salmon, an orca whale finds you using echolocation and eats you and some of your schoolmates. **GO BACK to home stream and start over.**
5	When you were busy eating shrimp in the ocean, a large fishing net caught you and most of the salmon in your school. You are eaten by a human. **GO BACK to home stream and start over.**

FRESHWATER ADULT

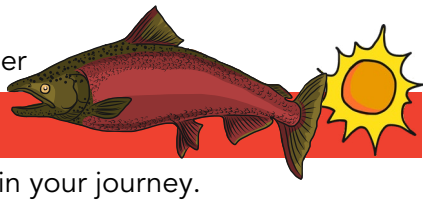
Location: Columbia River Estuary; **Season:** Mid-Summer



IF YOU ROLLED A...	
1 or 3	While swimming in the estuary and preparing yourself for your freshwater journey, you got caught in a fishing net. You are eaten by a human. **GO BACK to home stream and start over.**
2 or 6	Sea lions have been overcrowding the Columbia River Estuary and have been hunting salmon. Unfortunately, you became a sea lion's lunch. **GO BACK to home stream and start over.**
4 or 5	You have successfully made the transition from a saltwater fish to a freshwater fish! **MOVE FORWARD to the next space.**

SPAWNING ADULT

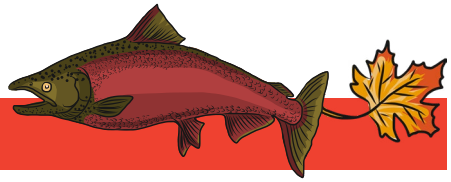
Location: Bonneville Dam; **Season:** Late Summer



IF YOU ROLLED A...	
1	You couldn't find the entrance to the fish ladder, and are delayed in your journey. **SKIP YOUR TURN.**
2, 4 or 6	You were able to use the fish ladder to get to the other side of the dam! **MOVE FORWARD to the next space.**
3	A dam turbine, which is used to create electricity, swept you up and you did not survive crossing the dam. **GO BACK to home stream and start over.**
5	You were caught by a hungry bear before you could make it to the dam. **GO BACK to home stream and start over.**

SPAWNING STREAM

Location: Wind River; **Season:** Fall



IF YOU ROLLED A...	
1, 3 or 4	You did it! You successfully laid eggs, and they were fertilized. **MOVE TO THE NEXT GENERATION SPACE. You just won the game!**
2	You were able to lay eggs in your home stream but they were never fertilized. You die without producing any offspring. **GO BACK to home stream and start over.**
5	As you were laying your eggs, a predator started eating them before you could bury and protect them. You die without producing any offspring. **GO BACK to home stream and start over.**
6	Unfortunately, you were eaten by a bear before you could make it to your home stream to spawn. **GO BACK to home stream and start over.**

POST-GAME REFLECTION

☐ Think about what happened during the game and discuss the following questions:

- How far did your salmon make it—part of the way or all the way to the end?
- What obstacles did your fish encounter along its journey?
- Was there anything that helped the salmon along the way to overcome these obstacles?
- How was the journey towards the ocean for a young salmon different from the return journey made by the adult? What was similar?

☐ Feeling inspired by your salmon's migration? Try writing a short story about it or drawing a cartoon to illustrate what happened to your salmon along the way.

☐ Pacific Northwest salmon are threatened by dams that block salmon migration and loss of habitats that protect eggs and juvenile salmon. Check out some of the additional resources on the last page of this packet to learn more about salmon restoration efforts in Washington state and how you can help!

COMMUNITY CONNECTION

Salmon is highly honored by the Tribes in Washington and this is demonstrated through a ceremony that takes place every spring. This cultural practice varies from Tribe to Tribe, however, the reason for the ceremony remains the same: to honor the first arrival of the salmon and to bless those who fish. It is the respect and hope of the Tribes that by honoring the salmon, they will return each year.

- Have you ever attended a salmon ceremony?
- What is something that you celebrate in the spring with your community?
- What role do fish play in your own life? Can you think of a food that you eat, a game or even a book that involves fish?

Bonus! Ask a friend or family member these same questions! Do they have any answers that surprise you?

DON'T WANT THE FISHY FUN TO STOP?

See below for some additional activity ideas and other resources for you to use at home.

FISH FOOTAGE

- Watch the underwater salmon live cam and brown bears catching migrating salmon live cam at the Alaskan Katmai National Park
- Join a Burke ichthyologist (fish scientist) to investigate what we can learn from baby fish.
- Find out about Tribal fishing and fisheries conservation from Northwest Treaty Tribes.
- Learn about restoring the Elwha from NOAA Fisheries

OTHER FABULOUS FISH RESOURCES

- Pacific Lamprey: A Cultural Resource from Columbia River Inter-Tribal Fish Commission
- The Pacific Lamprey Experience by US Fish & Wildlife Service
- Learn more about the best time to see the salmon run at the Chittenden Locks in Seattle.
- Learn more about Pacific halibut with this student resource packet from the National Park Service.
- More halibut information from NOAA Fisheries.
- Another activity for older learners: Jamestown Fish Curriculum
- Lushootseed names for common Pacific fishes from the Tulalip Tribes.
- Northwest Indian Fisheries Commission
- Read about the 10 weirdest fishes in the Burke's ichthyology collection.

Jeanie Thompson (Makah) uses a traditional Čibud hook as part of a study with the Makah Fisheries Department on the Washington Coast.

PROUD OF YOUR FISH TRAP MODEL? DID YOU SURVIVE RUN SALMON, RUN?

WE'D LOVE TO SEE YOUR CREATIONS AND HOW YOU'VE USED THIS PACKET!

SHARE ON SOCIAL MEDIA WITH #BURKEFROMHOME

LOOKING FOR MORE TO DO? Continue to Burke from Home with weekly activities

INTRO (p. 1)
Photo: Yakama youth help pull in a gill net on the Columbia River, Daisy Begay (Yakama)

PACIFIC NORTHWEST FISH (p. 2)
Photo: Chinook salmon, Image by Ricardo Rossi is licensed under CC BY-SA 2.0
Photo: Pacific lamprey, Image by Jeremy Monroe, Freshwaters Illustrated is licensed under CC BY-NC 2.0
Photo: Halibut, Image from NOAA Fishwatch, public domain

TRADITIONAL WAYS OF FISHING (p. 2)
Photos: Halibut hook, cedar fishing line, fish trap model by Burke Museum
Photo: Catching lamprey at Willamette Falls, Daisy Begay (Yakama)

LET'S GO FISHING!
Here Fishy, Fishy (p. 3-4)
All photos by Burke Museum
Build a Model Fish Trap (p. 5)
All photos by Burke Museum

HOLY SMOLTS! (p. 6)
All illustrations same as ones from salmon life cycle diagram (Holy Smolts!), see above
Photo: Juvenile salmon in jar by Burke Museum

RUN SALMON, RUN!
Game Board & Life Step Tables (p. 8 - 11)
All Chinook salmon life cycle illustrations by Katharine Canning/Burke Museum

DON'T WANT THE FISHY FUN TO STOP? (p. 12)
Photo: Jeanie Thompson (Makah) uses a traditional čibud hook as part of a study with the Makah Fisheries Department on the Washington Coast, Polly McCarty (Makah)