

Katmai National Park and Preserve

National Park Service
U.S. Department of the Interior



Katmai Junior Ranger Adventures



Become a Junior Ranger!

Follow these steps:

Step 1: If you are younger than 7 years old, complete 3 activities. If you are 7-10, complete 5. If you are over 10 years old, complete 10 activities.

Step 2: Attend one ranger-led program. If you can't attend a program, complete 3 additional activities.

Step 3: Have an adult sign your certificate saying you completed your activities, and either show it to a ranger or mail it in.

Step 4: Take the Junior Ranger Oath and receive your Junior Ranger Badge.







BLA-LOOM!!!

On June 6, 1912, Novarupta EXPLODED in the biggest volcanic eruption of the 20th Century. The roar of the explosion could be heard in Juneau, which is 750 miles away. Ash burst 20 miles into the sky and blew across the world. Superheated gas, dust, and ash flowed out of the volcano with great speed and force in what is known as a pyroclastic flow. Volcanic eruptions have all sorts of rocks in them. Circle the rocks on this page that are found in the Valley of Ten Thousand Smokes. Ask a park ranger or visit go.nps.gov/VTTS for more information.

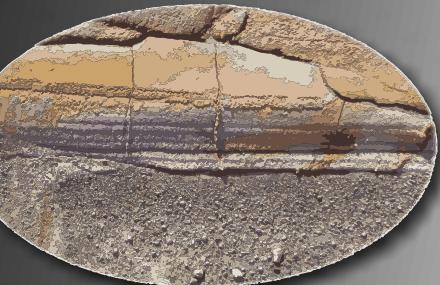
1. Breadcrust Bomb
2. Almond Bomb
3. Ash



1



2



3



5



4

The Valley of Ten Thousand Smokes

During the 1912 eruption, as much as 700 feet of ash fell in an isolated valley. A steaming, moon-like landscape was created. When explorer Robert F. Griggs first saw the valley, it was covered with thousands of volcanic gas vents called fumaroles. He named the incredible landscape "The Valley of Ten Thousand Smokes."



Robert Griggs and other explorers in his group used hot fumaroles for cooking and keeping warm. Here Mr. Griggs waits with others for supper to cook.

Take a look at the map on the next page. Write the names for the mountains in the blanks. Identify the volcanoes by marking them with "V". Use a park brochure or go online at go.nps.gov/katm_pano to find the answers. Hint: There are six volcanoes on the map.



The Return of Life

How long does it take for life to return after an eruption? Sometimes it can take hundreds or thousands of years. In the Valley of Ten thousand Smokes, life is slowly returning. This is called ecological succession. It is the process by which communities of plants and animals change over time. This occurs after a major change like an eruption, fire, or flood. Look at the pictures below. How has the landscape in the Valley changed over time? Write the differences in the space below.

1916



2004



Put these statements in the correct order of ecological succession.

Place the stages of succession in order. Number them one through six in the purple boxes. (Hint: Volcanic eruptions often start succession.)



Fungus and algae begin to grow and eventually form a living crust on top of the ash.



Small grasses and mosses grow on thin soil.



A complex ecosystem returns including spruce trees, brown bears, moose, and salmon.



The volcano erupts. The ash smothers and kills most life in the area.



Woody shrubs appear. Some animals like arctic ground squirrels and bears return.



A forest begins to grow. Birds that nest in trees reappear.

Pumice

As you walk along the beach at Brooks Camp, you might notice a lot of rocks that look like they have bubbles in them. These rocks are called pumice. Pumice is created during explosive volcanic eruptions. During a volcanic eruption, water and carbon dioxide explode out of magma. Air pockets form in pumice when magma cools around escaping steam and other gases.

REMEMBER, although pumice is really cool, you can't take a rock home with you. Leave it so others can see how interesting pumice can be!

Let's experiment

Go to the beach at Brooks Camp and find a pumice rock. Examine it, then toss it into the lake. If you can't find pumice, then watch a video about it at <https://youtu.be/6zETwhIyJIE>. Record your observations on this page.

Pumice Observations

Was it lighter or heavier than you expected?

What happens to the rock when it hits the water?

How would you define pumice?

Do You Dig Archaeology?

Do you like to solve puzzles and tell stories? That's what archaeologists do. Archaeologists piece together the mysteries of human past. Artifacts are items made by humans and are great clues that help archaeologists piece together human stories.

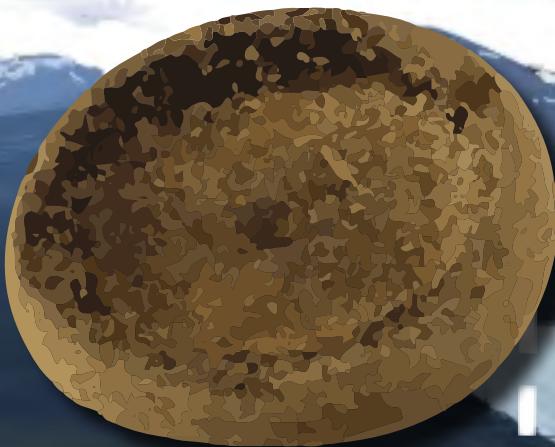
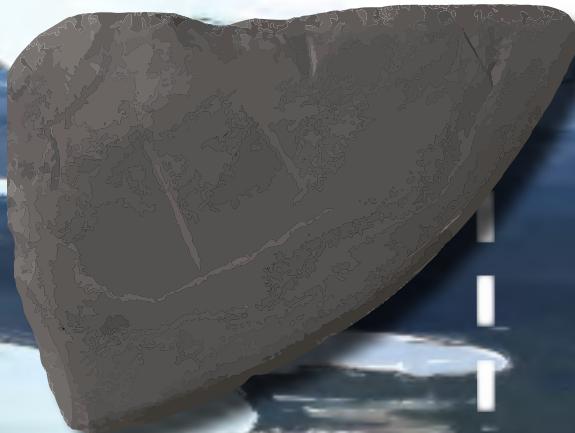
The pebbles with strange markings carved on them are artifacts found in Katmai. They are several hundred years old. No two pebbles are exactly the same and no one knows what the markings mean. They could represent faces, clothing, jewelry, a way of counting, or even mythical or magical creatures.

What do you think? Draw your own carving on the blank pebble to the right and explain what it means in the space below.



Solve the Puzzle!

Can you identify these artifacts? Write what they are and what they were used for in the space next to each item. You can find the answers at the Cultural Site at Brooks Camp or online at go.nps.gov/BR_cultural_site.



Clues:

- Curved piece of stone
- Sharpened like a blade
- Still used today

What is it?

What was it used for?

Clues:

- A small circle
- Looks like a dish
- Held oil or fat to burn

What is it?

What was it used for?

Clues:

- A well-formed-blade
- Very small
- Made of slate

What is it?

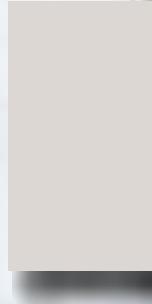
What was it used for?

Old as Dirt!

In Katmai, volcanic ash can be used to estimate the age of artifacts in the soil. Although animals and people can shift and move artifacts from their original resting place, typically older artifacts in Katmai are buried more deeply.

How old are the objects and artifacts in the picture below? Write your answers in the space next to each object. Find clues to their age by using the key to the right.

Novarupta Ash:
100 Years Old



Volcanic Ash:
700 Years Old



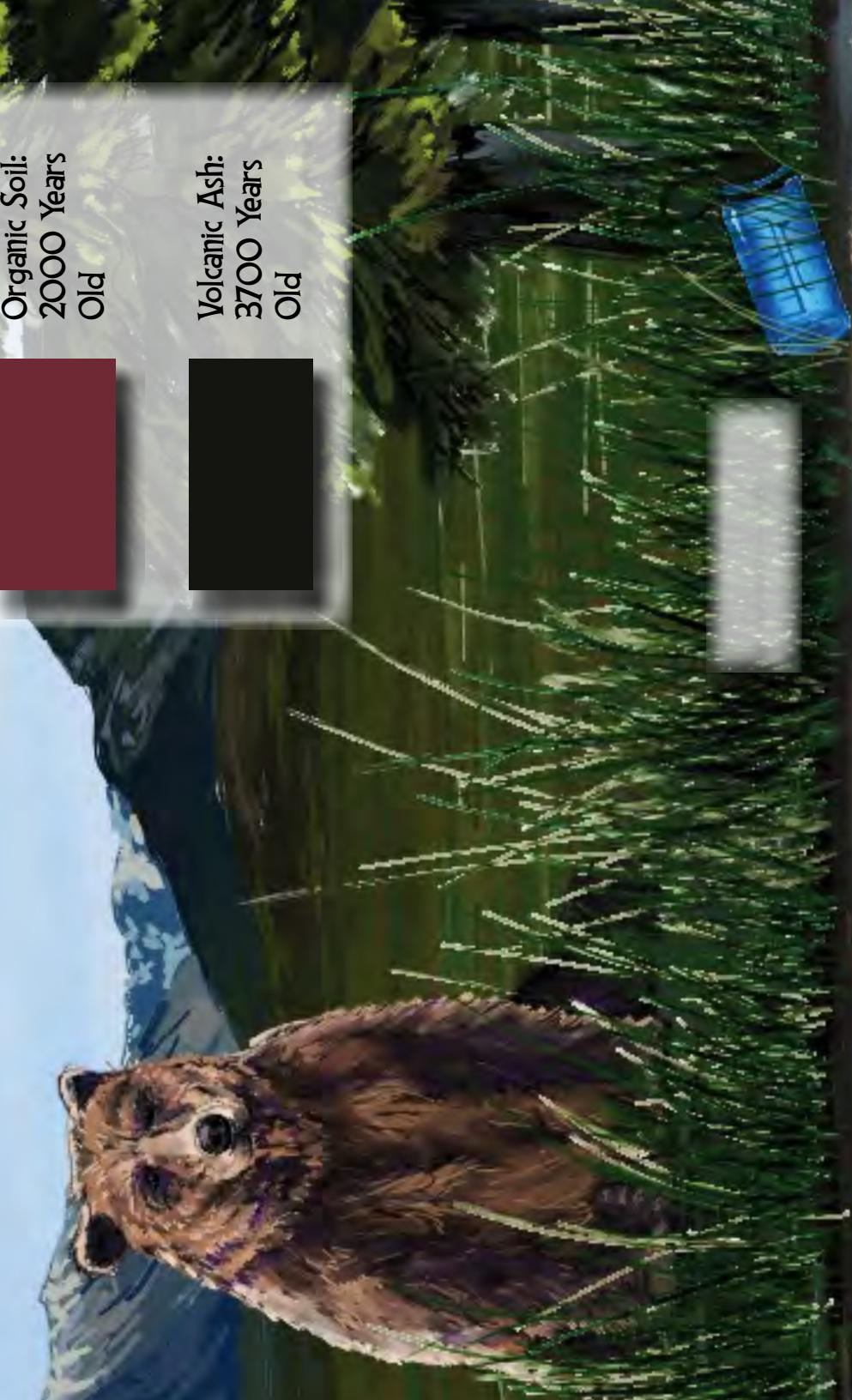
Organic Soil:
1000 Years
Old



Organic Soil:
2000 Years
Old



Volcanic Ash:
3700 Years
Old





Home at Brooks River

People have lived in Katmai for at least 9,000 years. For much of this time, they lived in houses like the one illustrated below. Imagine living in one big warm room with your entire family, including your pets. This one room contained living, sleeping, and cooking areas. Draw your family living in this house.

How many people live in your house? How many people would have lived in this house? Find the answer at the Cultural Site at Brooks Camp or online at go.nps.gov/BR_cultural_site.



Life with Salmon

Salmon are one of the most important foods for people in Katmai. Along Brooks River, people have fished for thousands of years. Fish were harvested and cleaned then dried on a rack. People then stored the fish in their homes or clay pits.

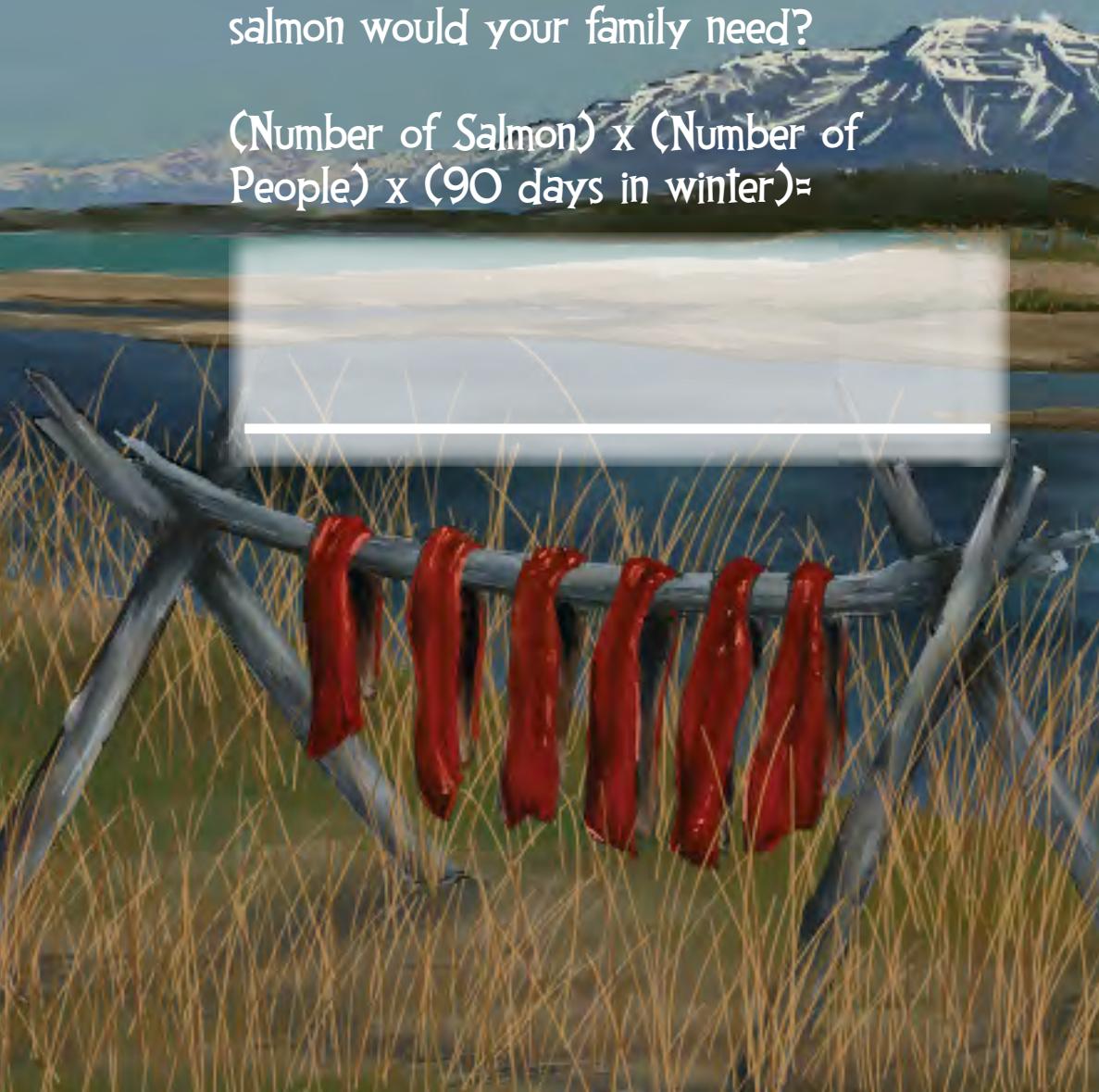
Smoked Salmon Recipe

Fresh salmon fillets
50% salt brine
Molasses
Brown sugar
Honey

Make the brine solution and mix it with the molasses, brown sugar, and honey. Add the salmon and let it soak for three hours. Hang in the smokehouse overnight to drip dry. Then smoke for 7-10 days depending on taste. Yummy!

400 years ago, archaeologists estimate that a family of four needed four salmon per day to survive the winter. How many salmon would your family need?

(Number of Salmon) x (Number of People) x (90 days in winter)=



A detailed illustration of a brown bear and her four cubs. The mother bear is on the left, looking towards the right. Her four cubs are nestled in the grass in front of her, with one cub looking directly at the viewer. The background shows a body of water and distant hills.

Track Match

This is the hind footprint of a brown bear. Brown bears walk flat-footed on their heels like we do, unlike animals like caribou that walk on their toes. Bears have 5 toes on each foot, with the front track wider and shorter than the hind print. Bears, like people, love to use trails. They make trails by placing their feet in the same footsteps year after year. Can you find any of these trails in Katmai?

Bear Feet

Trace your foot inside the bear's foot. What size shoe do you wear? What size shoe would this bear wear?



Bear Safety



Bear Facts

Female bears can have cubs as early as 5-7 years old. Mother bears can weigh 500 pounds or more. Cubs stay with their moms for 2-3 years.

The biggest bears are male bears. They are the most dominant bears and typically get the best fishing spots. Male bears can stand 6-8 feet tall on their hind legs and weigh 800-1100 pounds.

Brown bears are magnificent and powerful creatures. We have to act appropriately around them to help bears survive and keep ourselves safe. Attend the Bear Safety Orientation at Brooks Camp or read the Brooks Camp Bear Safety brochure at go.nps.gov/katmaibrochures. Then, complete the word scramble below.

Always stay at least YIFFT YRSAD _____ away from bears. Travel in OPRUSG _____ and avoid surprising bears.

During close encounters with bears, VEERN URN _____. Back away LYOLSW _____ until you are at a safe distance.

At Brooks Camp, only eat food in CICINP ARASE _____. Store food in the designated ODOF AHECC _____.

Never leave gear or equipment TTAENNNUDDE _____ so bears don't get a hold of and damage it.

Bear Years



A life span of a Katmai bear averages 20 years. People in the United States usually live to be around 80 years old. Bears, just like us, go through many amazing changes as they mature. In this activity, read about the different life stages of brown bears. Then, find your bear age and life stage.

Subadult

These are bears between 2.5 and 6 years old. They no longer stay with their mother, but aren't fully mature. Subadult bears face a lot of competition from older, larger bears.

Adult

These are bears older than 6 years. They are the biggest of all bears, but they usually don't reach their full size until they are 10-12 years old.



Calculate Your Bear Age

$$(\text{Your Age}) \div 4 = \text{Bear Years}$$

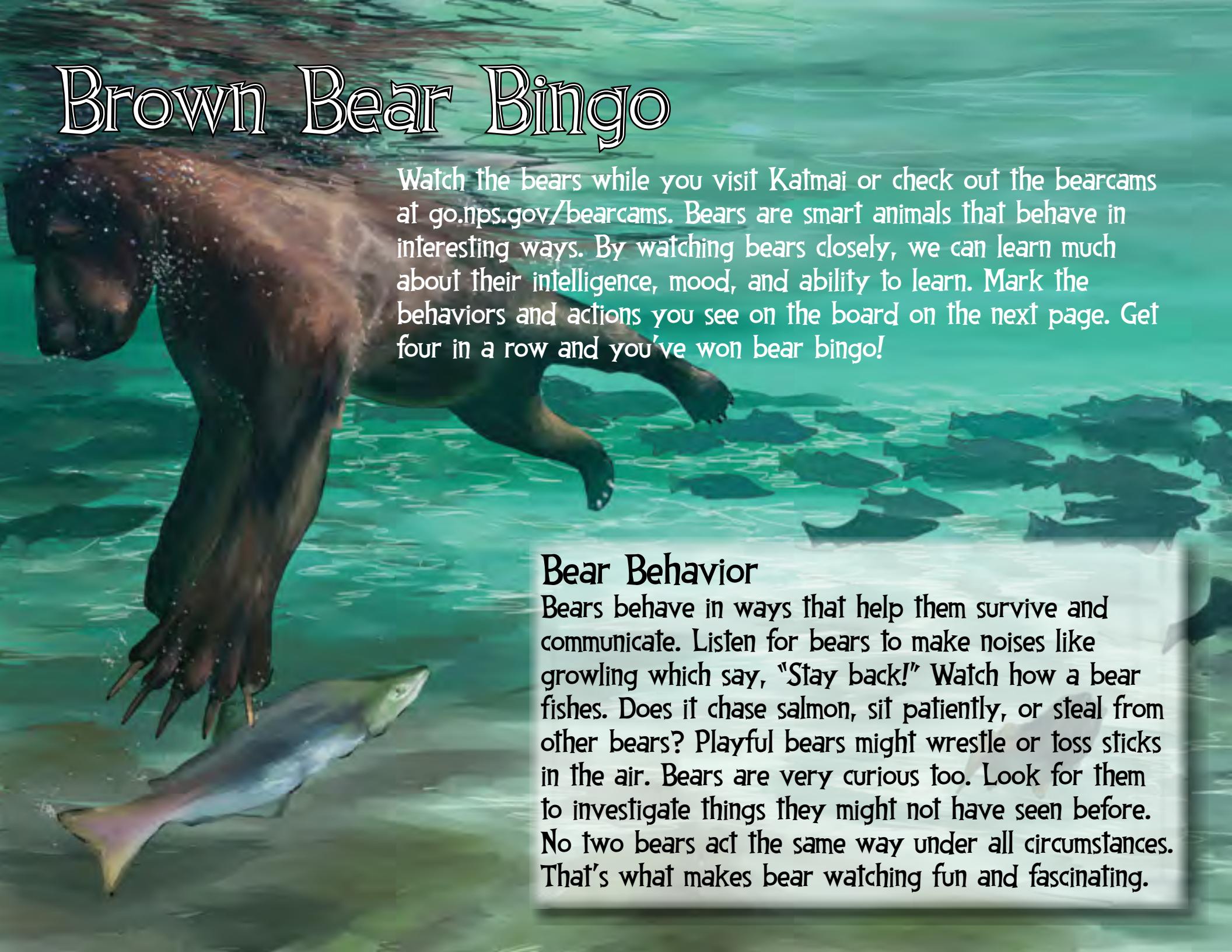
Are you a cub, subadult, or adult?

Cubs

Cubs are young bears dependent on their mother. They are usually younger than 2.5 years old. When cubs are born, they weigh less than one pound, are blind, and are completely hairless and toothless.



Brown Bear Bingo

A large brown bear is shown from the side, its dark brown fur glistening in the water. It is leaning forward, its front paws submerged in the teal-colored water. A single salmon is captured in mid-air by its front paws. In the background, many more salmon are swimming in the water, creating a sense of a rich, natural environment.

Watch the bears while you visit Katmai or check out the bearcams at go.nps.gov/bearcams. Bears are smart animals that behave in interesting ways. By watching bears closely, we can learn much about their intelligence, mood, and ability to learn. Mark the behaviors and actions you see on the board on the next page. Get four in a row and you've won bear bingo!

Bear Behavior

Bears behave in ways that help them survive and communicate. Listen for bears to make noises like growling which say, "Stay back!" Watch how a bear fishes. Does it chase salmon, sit patiently, or steal from other bears? Playful bears might wrestle or toss sticks in the air. Bears are very curious too. Look for them to investigate things they might not have seen before. No two bears act the same way under all circumstances. That's what makes bear watching fun and fascinating.



Rubbing
on Tree

Snorkeling

Running

Standing
and
Fishing

Growling

Sitting
and
Fishing

Standing
on
Hind Legs

Dominant
Behavior

Fighting

Eating

Defensive
Behavior

Sleeping

Playing

Swimming

Being
Curious

Stealing
Fish

Story of Sockeye

The sockeye story is an epic adventure. These amazing fish journey thousands of miles during their lives and eventually return to spawn at the same place where they were born. Read about the salmon life cycle and use the information you learn in the next few activities.

Spawning Adult

Sockeye salmon are usually 3-5 years old when they spawn. Almost all salmon spawn in the same stream where they were born. They must avoid many predators, like people and bears, to get there. Sockeye salmon turn red when they are ready to spawn. After salmon lay their eggs they die. Their bodies add nutrients to the water that help young salmon grow.



Ocean Adult

Sockeye usually spend 2-3 years in the North Pacific Ocean. There, they feed on invertebrates and travel thousands of miles. They absorb reddish pigments called carotenoids from the invertebrates in their diet. Carotenoids turn their flesh dark pink.

Alevin

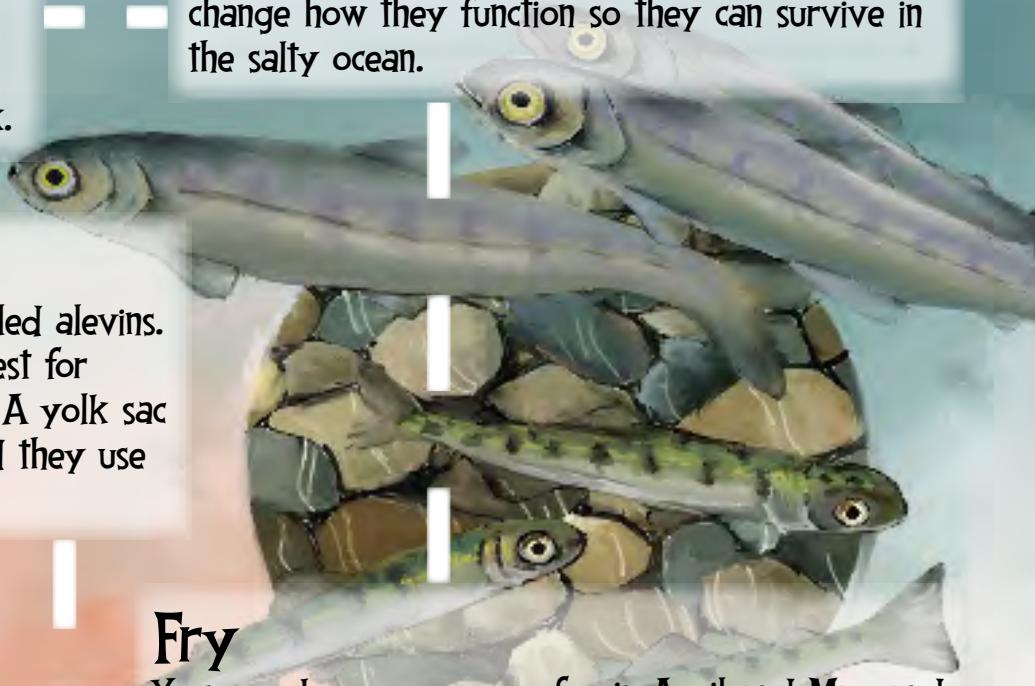
Newly hatched salmon are called alevins. Alevins hide in their gravel nest for another month after hatching. A yolk sac is attached to their bellies and they use it for food during this time.

Eggs

A female sockeye may lay 2000-5000 eggs in shallow nests, which she digs with her tail. The male fertilizes the eggs with milt and then the female buries the eggs in gravel to protect them from predators. The eggs hatch in mid to late winter.

Smolt

When salmon become smolt and run to sea, they become silver in color. Their gills and kidneys change how they function so they can survive in the salty ocean.



Fry

Young sockeye emerge as fry in April and May and begin to swim and feed themselves. The first part of their journey is challenging and dangerous. Tiny fry are hunted by predators such as birds, insects, and trout. They are camouflaged by spots called parr marks.

Searching for Sockeye

Are you ready to search for salmon? Find the words below in the word search. Underline which words are used in "The Story of the Salmon" on the previous page.

ADVENTURE
ALEVIN
ANGLERS
BRISTOL BAY
BROOKS CAMP
BROOKS RIVER
BROWN BEAR
EAGLE
EGGS
FISHING
FRESH WATER
FRY
GILLS
GRAVEL
HATCH
JOURNEY
JUNIOR RANGER

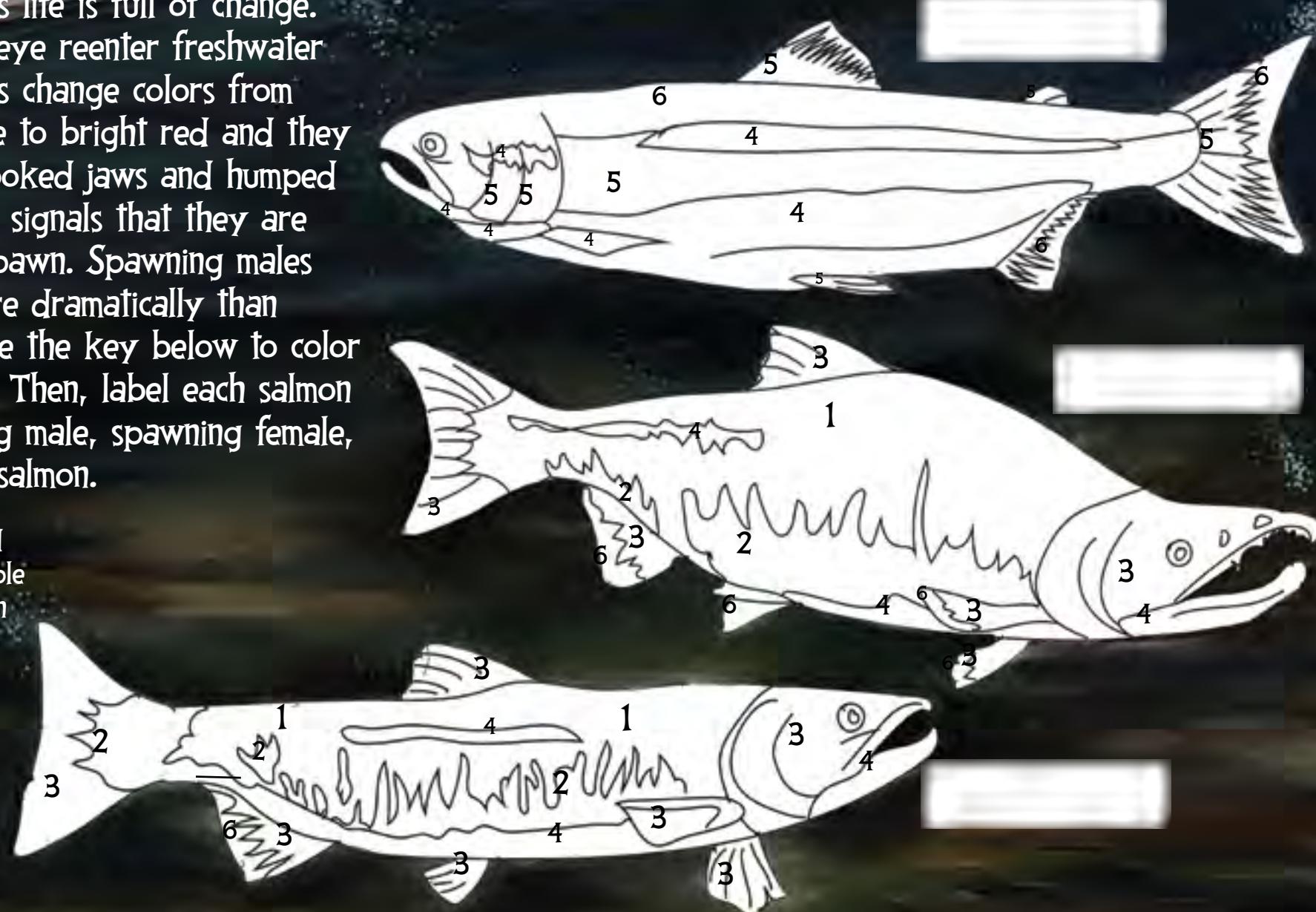
KATMAI NATIONAL PARK
LAKE
LIFE CYCLE
NAKNEK LAKE
OCEAN
REDD
RIVER
SALMON
SALT WATER
SMOLT
SOCKEYE
SPAWN
SURVIVAL
SWIM
THOUSANDS
YOLK SAC

K	S	L	I	A	S	D	T	B	T	E	Y	X	D	L	Y	V	G	E	C
P	A	R	L	T	N	L	B	H	F	Y	Y	N	D	N	E	O	W	A	F
I	W	T	Y	A	O	G	O	J	H	E	A	W	E	F	M	V	S	Q	W
T	P	E	M	M	V	U	L	A	Z	K	B	A	U	Y	K	A	B	L	
P	B	E	S	A	S	I	T	E	K	C	L	P	T	Q	L	J	H	R	X
C	M	C	S	A	I	C	V	M	R	O	O	S	Q	O	A	U	H	K	G
Q	Y	A	N	A	H	N	M	R	E	S	T	D	Y	I	Y	N	G	V	R
X	L	D	C	E	L	I	A	K	U	B	S	S	P	J	I	I	C	C	Z
Q	S	A	K	S	W	T	A	T	G	S	I	Q	Z	O	B	O	R	V	I
F	O	R	C	S	K	L	W	W	I	B	R	D	M	U	R	R	I	K	I
D	R	C	X	E	K	O	Y	A	R	O	B	H	G	R	O	R	V	R	C
L	P	Y	E	E	S	S	O	O	T	S	N	X	L	N	W	A	E	L	Y
I	E	N	N	A	B	Z	O	R	I	E	G	A	C	E	N	N	R	N	L
R	E	K	L	F	N	K	U	L	B	H	R	G	L	Y	B	G	Q	M	D
J	A	M	F	I	S	H	I	N	G	L	A	K	E	P	E	E	C	B	K
N	O	U	P	R	A	D	V	E	N	T	U	R	E	T	A	R	F	V	F
N	V	L	I	E	L	C	Y	C	E	F	I	L	I	P	R	R	H	J	N
A	C	V	G	I	L	L	S	N	I	V	E	L	A	X	H	C	K	H	N
R	E	T	A	W	H	S	E	R	F	E	L	G	A	E	I	N	L	W	B
R	G	Q	K	J	T	G	L	S	O	L	G	Q	G	L	M	H	G	N	B

Spawning into Color

A sockeye's life is full of change. When sockeye reenter freshwater their bodies change colors from silvery-blue to bright red and they develop hooked jaws and humped backs. This signals that they are ready to spawn. Spawning males change more dramatically than females. Use the key below to color the salmon. Then, label each salmon as spawning male, spawning female, and ocean salmon.

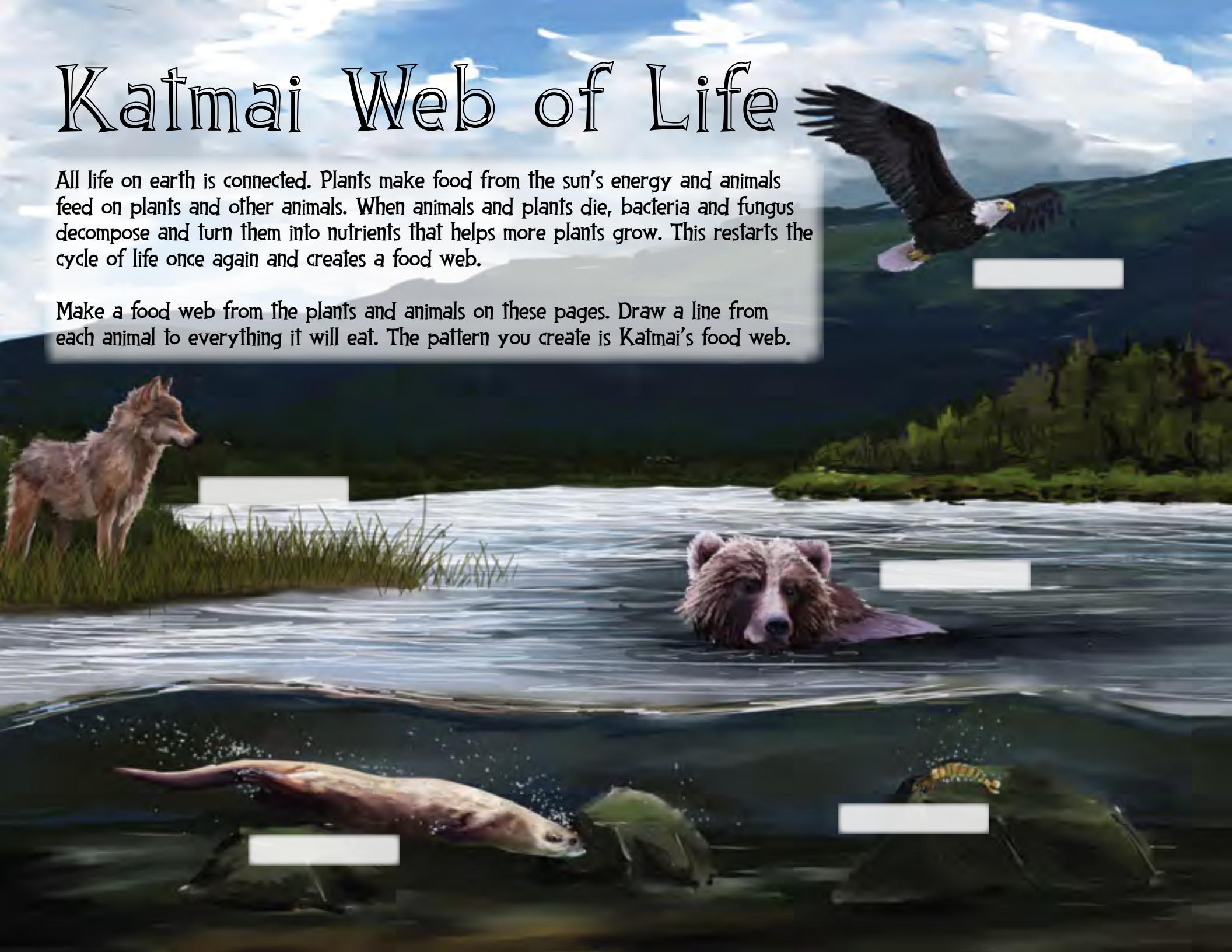
- 1 = Bright Red
- 2 = Dark Purple
- 3 = Pine Green
- 4 = White
- 5 = Silver
- 6 = Black



Katmai Web of Life

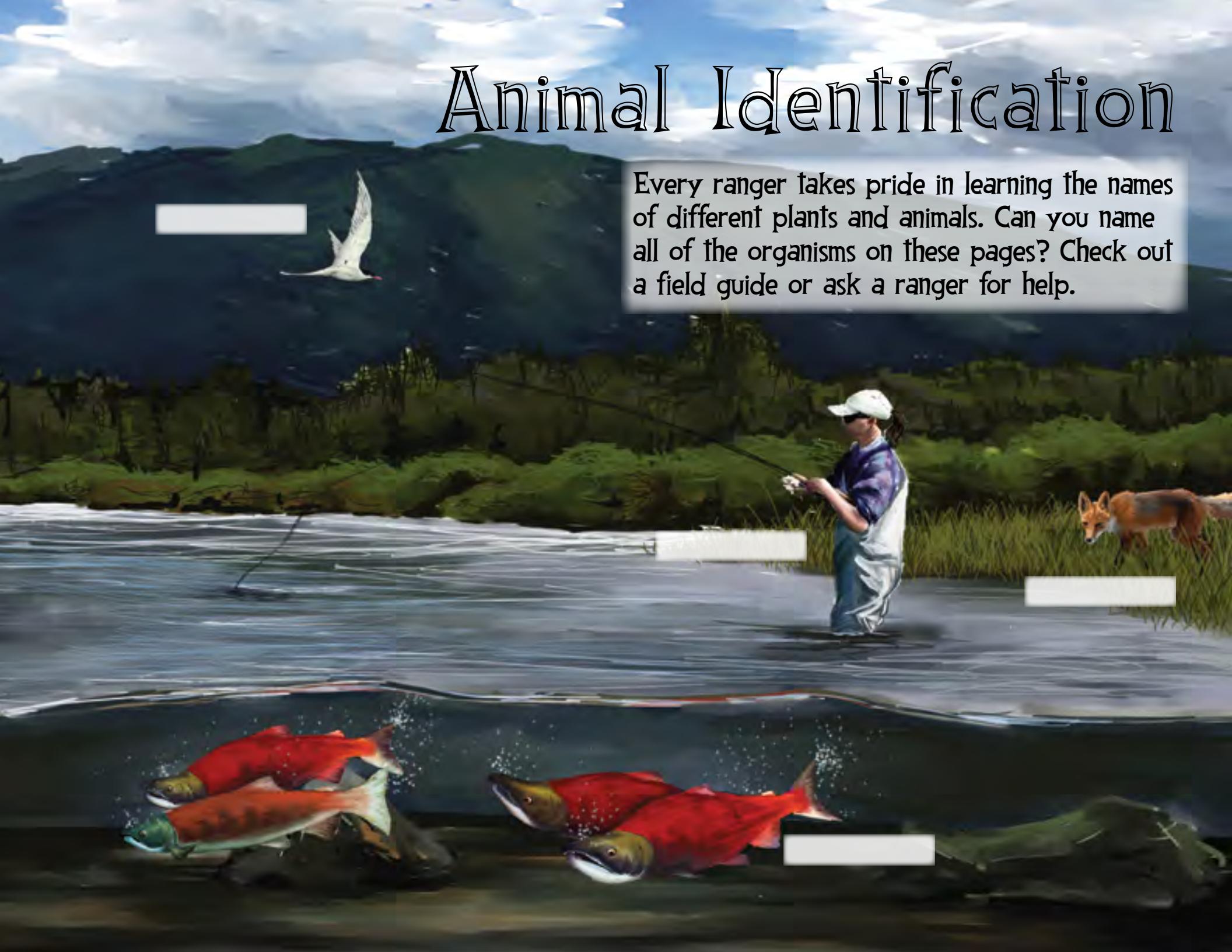
All life on earth is connected. Plants make food from the sun's energy and animals feed on plants and other animals. When animals and plants die, bacteria and fungus decompose and turn them into nutrients that helps more plants grow. This restarts the cycle of life once again and creates a food web.

Make a food web from the plants and animals on these pages. Draw a line from each animal to everything it will eat. The pattern you create is Katmai's food web.

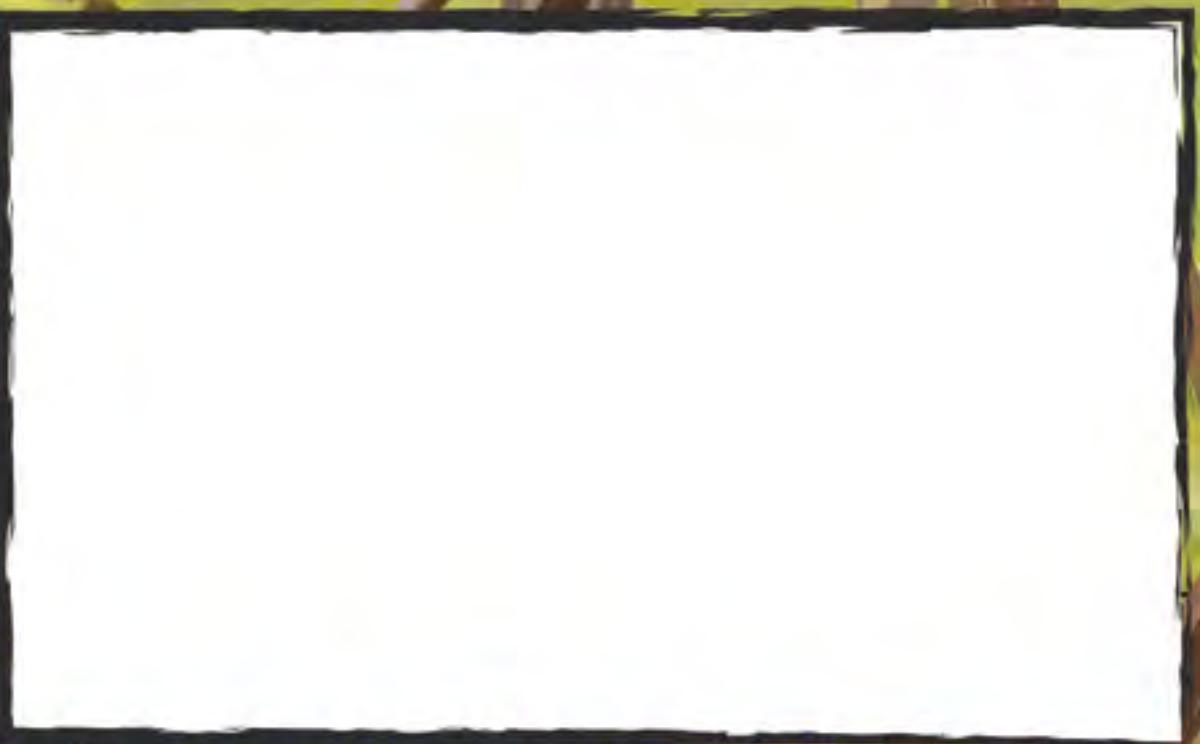


Animal Identification

Every ranger takes pride in learning the names of different plants and animals. Can you name all of the organisms on these pages? Check out a field guide or ask a ranger for help.



What's Eating the Trees?



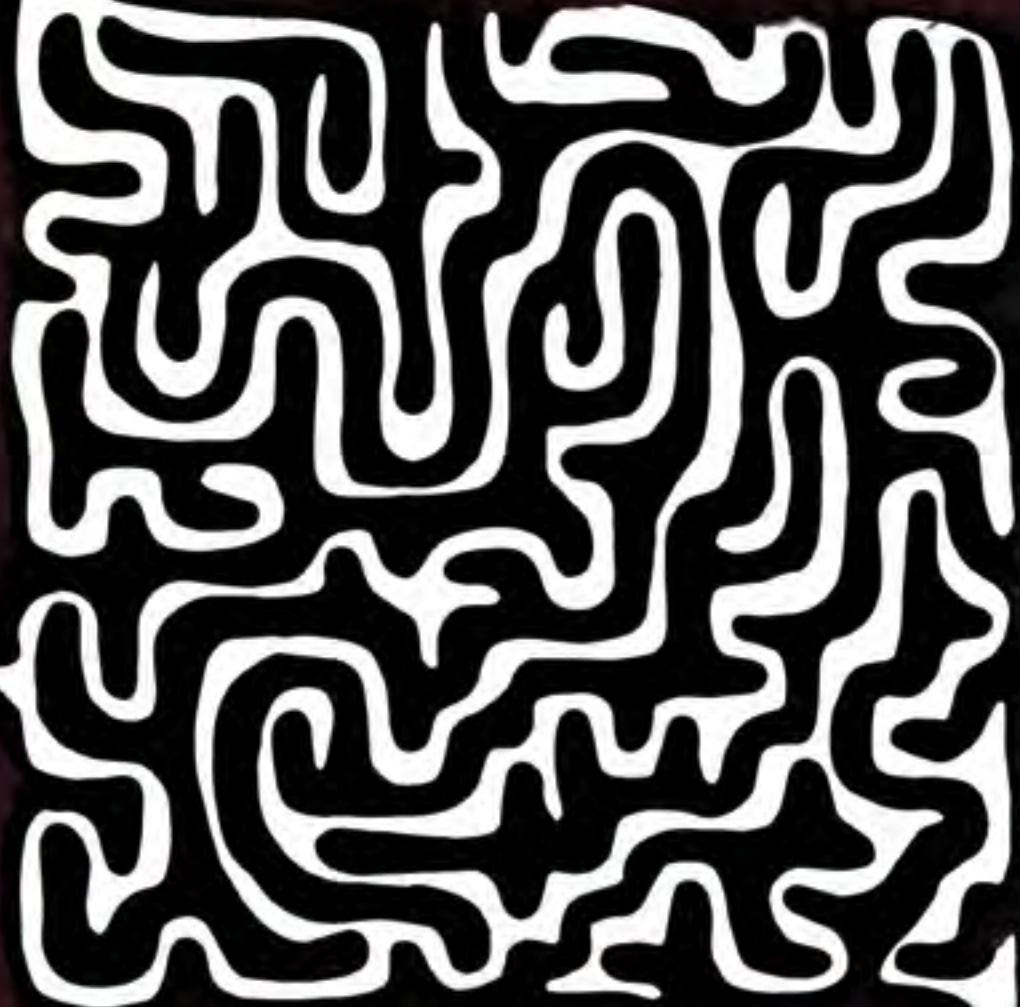
Spruce bark beetles live and reproduce in spruce trees. Adult beetles bore into the inner bark of spruce trees and lay eggs. When the eggs hatch, beetle grubs feed on the sugary inner bark of the tree. If enough beetle grubs feed on a tree, they can destroy the tree's ability to move water and food, eventually killing it.

Walk along a trail or look at the trees you might see on the bearcam (go.nps.gov/bearcams). Draw or take notes on any signs of beetles you see in the box above.

Be the Beetle!

Follow the gallery of a spruce bark beetle grub. Eat your way through the inner bark of a spruce tree. Watch out for the downy woodpecker, a dangerous predator.

Start

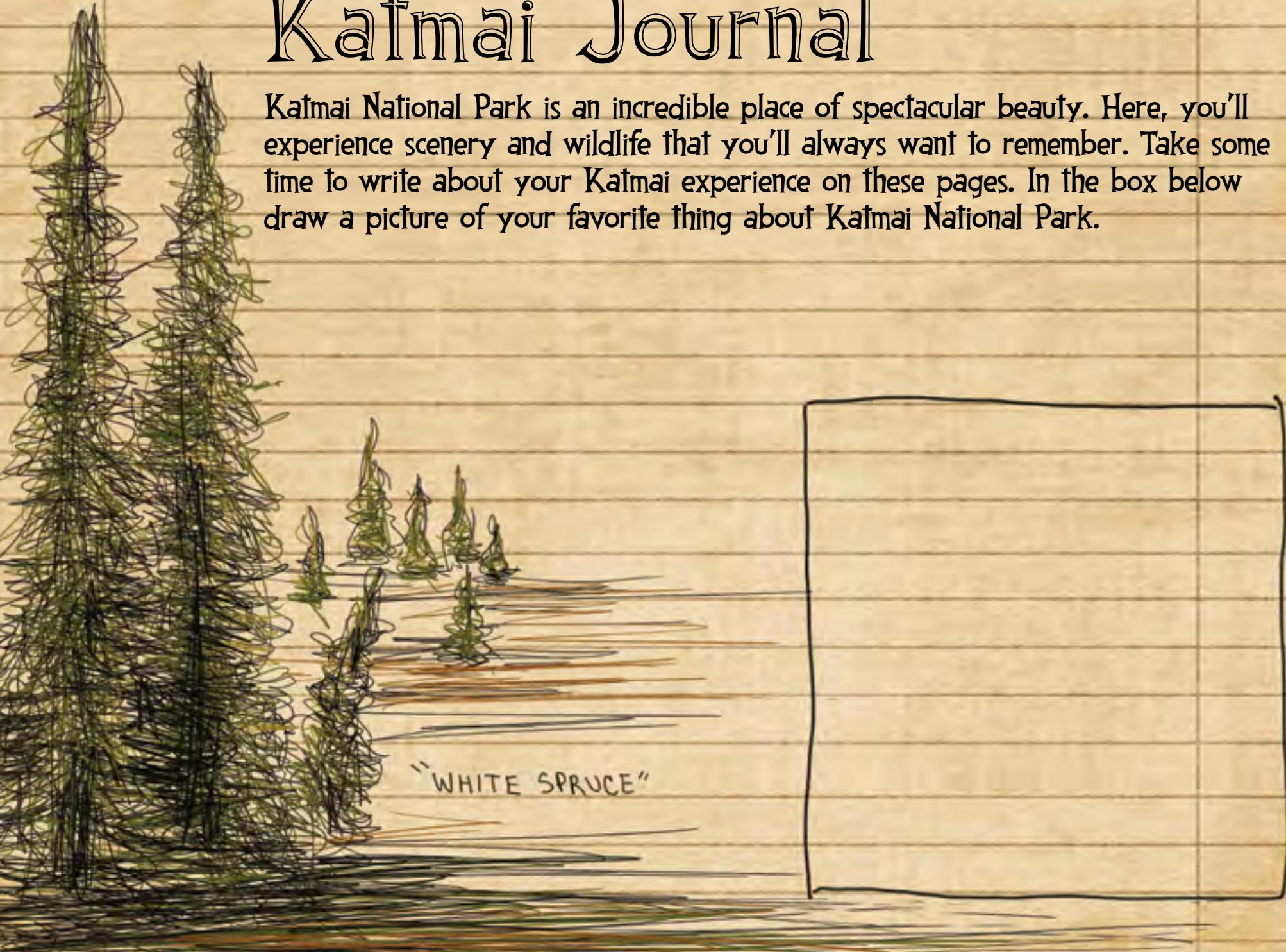


When beetles kill trees they create opportunities for other organisms, like woodpeckers, to thrive. After spruce trees die, more sunlight reaches the forest floor allowing younger trees to grow.

Finish

Katmai Journal

Katmai National Park is an incredible place of spectacular beauty. Here, you'll experience scenery and wildlife that you'll always want to remember. Take some time to write about your Katmai experience on these pages. In the box below draw a picture of your favorite thing about Katmai National Park.





"DIVING BEAR"

"FIREWEED"

IN EVERY WALK WITH NATURE ONE RECEIVES
FAR MORE THAN HE SEEKS — JOHN MUIR

Congratulations!

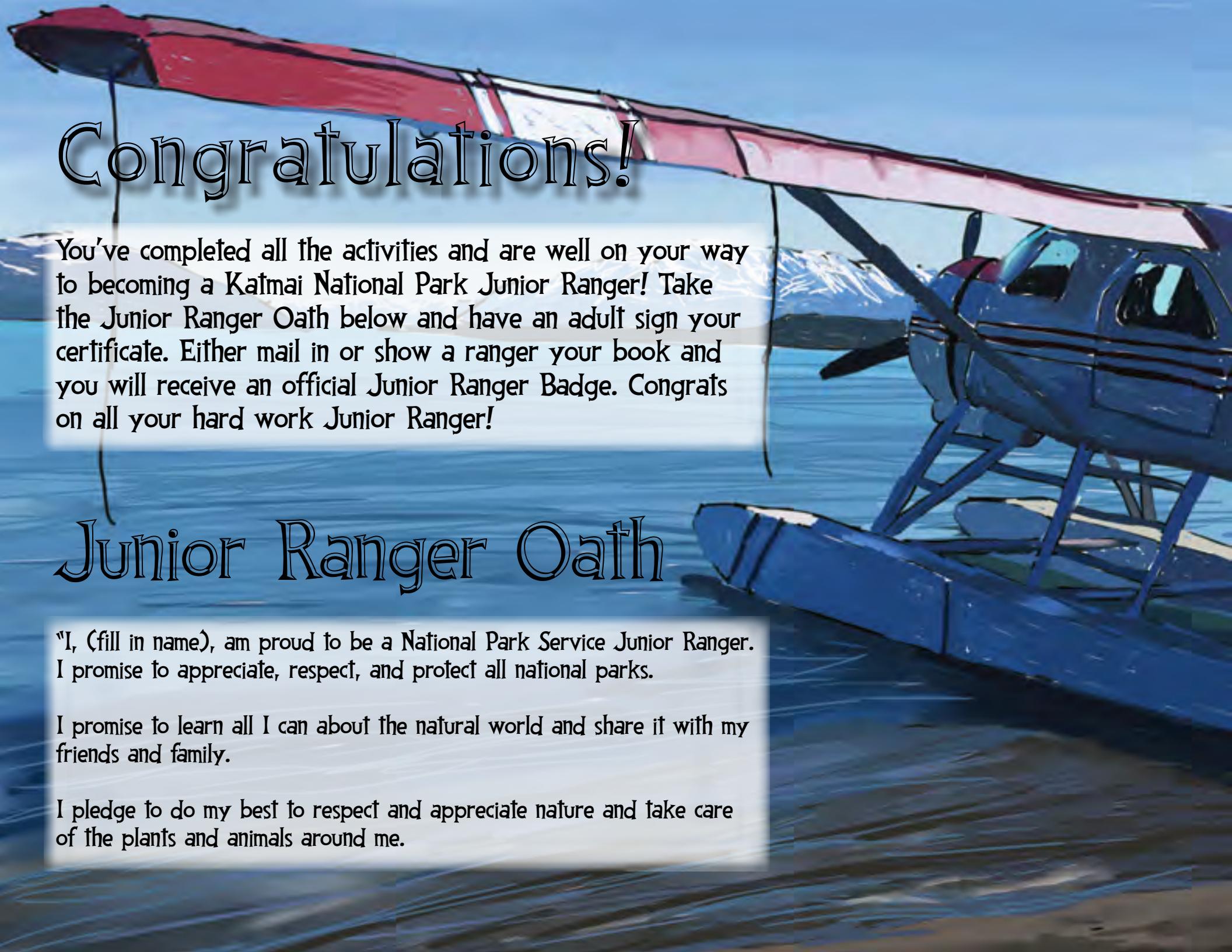
You've completed all the activities and are well on your way to becoming a Katmai National Park Junior Ranger! Take the Junior Ranger Oath below and have an adult sign your certificate. Either mail in or show a ranger your book and you will receive an official Junior Ranger Badge. Congrats on all your hard work Junior Ranger!

Junior Ranger Oath

"I, (fill in name), am proud to be a National Park Service Junior Ranger. I promise to appreciate, respect, and protect all national parks.

I promise to learn all I can about the natural world and share it with my friends and family.

I pledge to do my best to respect and appreciate nature and take care of the plants and animals around me.



This certifies that

has been presented with the title of

Junior Ranger

at

Katmai National Park and Preserve

Signature of adult

Date

Signature of Ranger

Date



Katmai National Park and Preserve
P.O. Box 7
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