WARNING!
This quest will require adventure, time travel, and imagination.

Forest Explorer's JOURNAL

_____

_____

Open to begin your Forest Discovery Quest!

OSU Research Forest,
Peavy Arboretum
541-737-4452

Oregon State University


Learn. Explore. Discover!
DR. WILLIAM FERRELL
FOREST DISCOVERY TRAIL

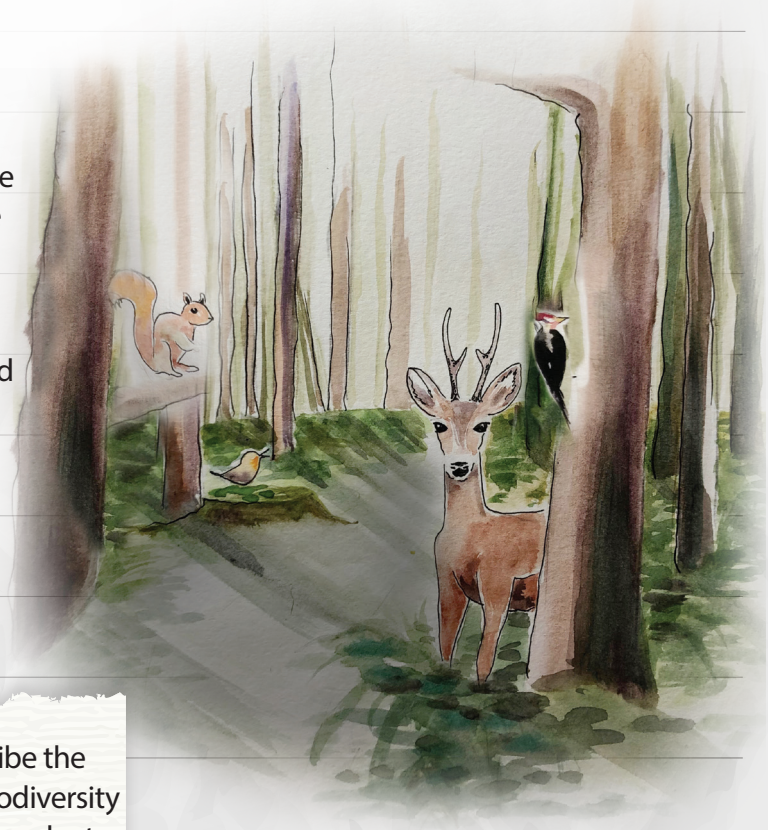
Welcome Forest Explorers!
Are you ready to begin your quest?

By choosing to go on this quest, you are stepping into and exploring a very special forest. Countless stories have played out on this land over generations. This is the land of the Luckiamute band of the Kalapuya People and has been since time immemorial. Many species of animals, plants, and organisms make this forest their home, some of whom you may not yet know exist.

Much has been learned about this forest and much is left to be discovered. This is the Oregon State University (OSU) College of Forestry's first forest classroom. Ninety years of ground-breaking scientific research began right here. This forest has helped scientists and students understand the many ways the forest sustains itself and supports humans. This research has also helped humans understand how they can support forests.

Over 7 billion humans depend on the world's forests. Humans need wood for their houses, buildings, paper, and so much more. Forests not only provide food and shelter for much of the world's biodiversity, they also recycle and clean the earth's water and air, as well as help regulate the earth's temperatures. The forests are working hard, but they also need your help.

You are about to begin a quest to discover how you can help forests. There will be challenges along the way, but there are clues to help guide you. Everyone's quest will be unique because everyone sees the forest differently. This is important! Forests need help from many different people to figure out how humans and forests can best live together.



Turn the page to begin.

Biodiversity is a term used to describe the enormous variety of life on Earth. Biodiversity refers to every living thing, including plants, bacteria, fungi, animals, and humans.

Follow These Steps to Complete Your Quest!

You can choose to embark on the whole quest using the full Forest Explorer's Journal or take on the quest in three shorter journeys: the Journey of the Time Traveler, Forest Investigator, and Forest Discoverer. Use this checklist to help you keep track of your achievements.

Journey of the Time Traveler

Complete the Time Traveler Challenges to learn how and why this forest has changed through time. Use the Forest Explorer's Map to find your way.

- ☐ Time Travel Challenge #1: Nature Survival Guide
- ☐ Time Travel Challenge #2: How Much Money Are Trees Worth?
- ☐ Time Travel Challenge #3: Forest Explorer Species List
- ☐ Time Travel Challenge #4: Forest Snapshot
- ☐ Time Travel Challenge #5: (A) The Other Side of the Fence & (B) Animals on the Edge
- ☐ Time Travel Challenge #6: Explore All Four Forest Discovery Time Capsules

Journey of the Forest Investigator

Complete the Forest Mystery Challenges to become a Forest Investigator. Use your Forest Explorer's Map to find your way.

- ☐ Forest Mystery Challenge #1: Holey Stump!
- ☐ Forest Mystery Challenge #2: Stairway to the Sky
- ☐ Forest Mystery Challenge #3: The Case of the Curious Stump
- ☐ Forest Mystery Challenge #4: Highs and Lows in the Rainforest
- ☐ Forest Mystery Challenge #5: Seeing the Forest for the Trees
- ☐ Forest Mystery Challenge #6: A Tree After Life
- ☐ Forest Mystery Challenge #7: Explore All Six Science Boxes

Journey of the Forest Discoverer

Use these final challenges to complete your quest and discover what you can do to help forests.

- ☐ Forest Discovery Challenge #1: Draw Your Own Forest Explorer's Map
- ☐ Forest Discovery Challenge #2: Forest Explorers Give Back
- ☐ Forest Discovery Challenge #3: Make Your Own Forest Discovery
- ☐ Forest Discovery Challenge #4: Letter to Forest Researchers

Rewards await!

Join the Forest Discovery Club to meet other explorers and share your discoveries with forest experts.

www.facebook.com/groups/forestdiscoveryclub

Forest Explorer's Map

An explorer keeps track of their travels. Use this map to keep track of the paths you take during your adventures. Mark the locations of your important discoveries.

LEGEND

- FOREST DISCOVERY TRAIL - **JOURNEY OF THE TIME TRAVELER**
- FOREST DISCOVERY TRAIL - **JOURNEY OF THE FOREST INVESTIGATOR**
- FOREST ROAD
- ACCESS ROAD
- OTHER TRAILS
- STREAMS
- PARKING
- INFORMATION KIOSK
- TOILET

NORTH

W E S

Forest Discovery Trail STOPS Along the Way

JOURNEY OF THE TIME TRAVELER

STOP 1 - At The Root of the Camas

STOP 2 - Searching for Douglas

STOP 3 - Life on the Edge

STOP 4 - Classroom Escapes to the Forest

JOURNEY OF THE FOREST INVESTIGATOR

STOP 5 - Holey Stump!

STOP 6 - Stairway to the Sky

STOP 7 - The Case of the Curious Stump

STOP 8 - Highs and Lows in the Rainforest

STOP 9 - Seeing the Forest for the Trees

STOP 10 - A Tree After Life

Journey of the Time Traveler

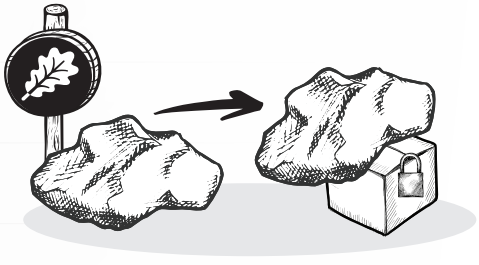
Follow These Steps to Complete Your Quest!

Complete the Time Traveler Challenges to learn how and why this forest has changed through time. Use your Forest Explorers Map to find your way. Travel back in time by opening and exploring the four time capsules.

- ☐ Time Travel Challenge #1: Nature Survival Guide
- ☐ Time Travel Challenge #2: How Much Money are Trees Worth?
- ☐ Time Travel Challenge #3: Forest Explorer Species List
- ☐ Time Travel Challenge #4: Forest Snapshot
- ☐ Time Travel Challenge #5: (A) The Other Side of the Fence & (B) Animals on the Edge
- ☐ Time Travel Challenge #6: Explore All Four Forest Discovery Time Capsules

Journey of the Time Traveler follows the BLUE path on the Explorer's Map.

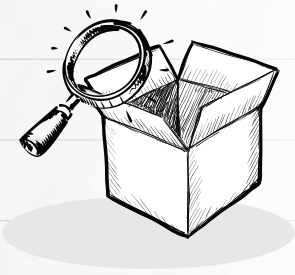
How to Use the Time Capsules



Step 1.
Find the "secret rock" located near the activity stop. The time capsule box is located under the rock.

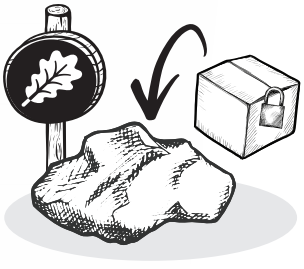
Step 2.
Enter the 4-digit time travel code (found here in your journal) to unlock the time capsule.

Step 3.
Explore time capsule contents.



Step 4.
Stamp your journal with the nature stamp inside.

Step 5.
Please return all the contents, lock the time capsule, and cover with the secret rock for the next quester.



STOP 1 At the Root of the Camas

Can a flower tell us about history?

Your quest begins in this field. Right now, in the soil under your feet, a major food crop is growing, and has been for hundreds, if not thousands, of years. The bulbs of the camas flower (which bloom right here every April and May) is a traditional food of the Kalapuya people who have lived in the Willamette Valley since time immemorial. Through thousands of years of research and adaptation, the Kalapuyans learned how to use natural materials found in the Willamette Valley to meet their needs. They also traded specialty products they made (like their famously prepared camas bulbs) with tribes living in different regions (dried salmon or obsidian for tool making).

Before there were stores, cars, cell phones, and plastics, humans found most of the things they needed from the local forests and natural environments.

Camas flower and root bulb. Camas bulbs were roasted in earth ovens for 2-3 days to preserve the bulbs and bring out their sweet flavor.

Watch these videos to learn more about the Kalapuya people of the Willamette Valley

Videos about the Kalapuya people

Video of camas flowers

Landscape artist and forest scientist, Howard Bruner, imagines how Peavy Arboretum would have looked in the year 1700 when the Kalapuya people managed the land by lighting annual controlled fires to maintain the oak savanna.

Time immemorial is a phrase meaning timeextendingbeyondthereachofmemory, record, or tradition, indefinitely ancient.

Time Travel Challenge #1

Can you imagine finding everything you need to survive in nature?

See if you can find answers to the following questions. (Hint: Look for clues in the time capsule!)

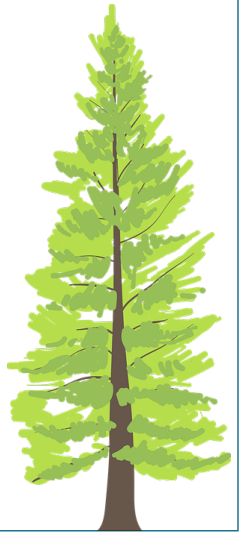
What could you find to eat? List three things you could find to eat in the forest.

1.

2.

3.

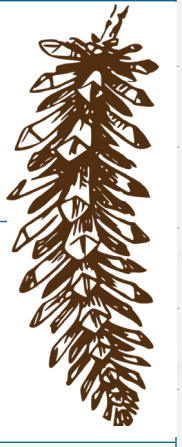
What tools do you think you would need? Draw or describe a tool you think you could build from natural materials (sticks, rocks, bones, plants) found from this forest.



What materials could you use from this forest to make a shelter? Draw or describe a plan for your shelter.

Bonus Questions

What could you use to carry water?



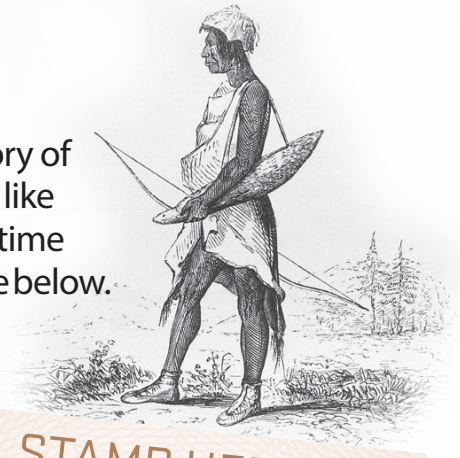
How could you start a fire?

How could you make clothing?

Can you think of anything else you might need to survive?

LEARN MORE about the first people of the Willamette Valley.

Travel back in time to discover more about the history of the Kalapuyans and what the Willamette Valley was like 300 years ago. Follow the time travel symbol to the time capsule and open by using the secret time-travel code below.



Enter the time-travel code:

1700

Time Capsule Explored?

Stamp here using the nature stamp

STAMP HERE

Artwork by Susan Applegate

Artwork by Susan Applegate

Watch the videos in these links to learn more about the Kalapuyans living in the Willamette Valley today.

Movie: Standing Strong: The Tribal Nations of Western Oregon

"Fermenting Ideas," lecture and slides by David Lewis

STOP 2

The Quest Continues

Searching for Douglas

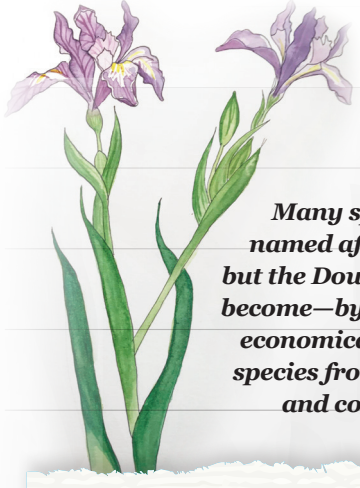
What can we learn from a name?

Two hundred years ago, the plants and animals of the Pacific Northwest were mostly unknown to Western science. In 1825, David Douglas arrived by tall ship to Fort George (formally known as Fort Astoria, located in the Northwest corner of what would later become the State of Oregon). He had been sent from England by the Royal Horticultural Society to record the plants and animals of the Pacific Northwest. This trip made Douglas one of the first European scientists to study the plants and animals in Oregon and the Pacific Northwest.

Douglas-fir

Many Indigenous people shared their knowledge with Douglas and introduced him to ecosystems housing thousands of species of plants and animals. While these species were new to Douglas, they were very familiar to the Indigenous people who had learned to rely on many of these species for their survival, culture, and way of life. During Douglas' travels through the Willamette Valley, he was welcomed into homes to eat camas stew with the Kalapuyans.

Documenting the world's biodiversity was a big business during Douglas' lifetime. His findings supplied the British Empire with potentially valuable resources including beautiful flowering plants for English gardens and tree species for the lumber trade. Naturalists like David Douglas risked their lives exploring the world to discover new species to provide new medicines and products to Europe. Finding a new, useful species in nature can be of great value.



Douglas Iris

Many species are named after Douglas but the Douglas-fir would become—by far—the most economically valuable species from his reports and collections.

David Douglas' reports of the Douglas-fir and other important species had a major impact on what would become the State of Oregon. In the 1800s, people primarily used wooden ships to cross oceans. Lumber was also needed to build new cities across the rapidly expanding North America, and to rebuild cities in Europe after years of warfare. Can you imagine what Douglas thought when he first saw the seemingly endless ancient Pacific Northwest forests filled with these giant trees?

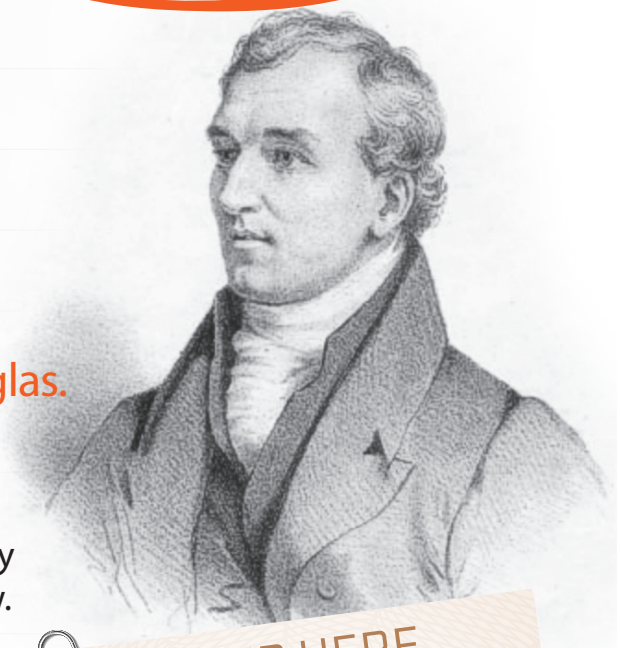
Douglas Squirrel

Ecosystems are geographic areas where plants, animals, and other organisms, as well as weather and landscape, work together to form a bubble of life. (National Geographic)

Meet Oregon's State Tree

The Douglas-fir, the third largest tree in the world, can live for over 800 years, grow up to 330 feet in height, and can be 12 feet wide at the base. These trees generally grow straight up, and the wood makes some of the finest lumber in the world. Douglas-fir can survive in the shade of other trees but prefer open, sunny areas even better. Douglas-fir often grow well after forest fires and timber harvests. Douglas-fir is the most common tree species in the OSU Research Forest.

Watch this documentary about Douglas' Pacific Northwest adventures!



LEARN MORE about David Douglas.

Travel back in time 200 years to learn more about David Douglas' discoveries and adventures. Follow the Time Travel symbol to the time capsule and open by using the secret time-travel code below.

Enter the time-travel code:

1825

Time Capsule Explored?

Stamp here using the nature stamp

Time Travel Challenge #2

How Much Money is a Tree Worth?

Have you ever wondered how much money a tree in this forest is worth? On average, a Douglas-fir tree in this forest is worth about $285.

Take a moment to count all the trees you can see around you. How many trees can you count from where you are standing?

How much would they be worth altogether? (Hint: multiply the number of trees you counted by $285.)

What could you buy with that much money?

It takes approximately 44 trees to build a house. How many houses could you build with the number of trees you just counted?

What other costs do you think are involved with getting a tree from the forest to the mill to the lumber store?

In what other ways do you think trees are valuable?

In what other ways are trees valuable to YOU?

Time Travel Challenge #3

Forest Explorer Species List

Forest exploration is not something that only happened long ago in history! New and important things are still being discovered in forests today, and you could discover something no one else has ever noticed! Use this table to keep track of the species you discover while you explore.

Forest Explorer Species List

If you know the name of the organism, write it in the space. If you are not sure of the name, draw a picture and give the organism a name based on the characteristics you observe. Check whether you think it is a plant, animal, fungus, or lichen.

Organism: Description, Name, Drawing	Plant	Animal	Fungus

Want help identifying the cool species you are finding?

Download the iNaturalist app or the Seek app (iNaturalist's app for kids). These apps can help identify photos of the species you discover. You can also add your observations to the Forest Discovery Trail iNaturalist Project: www.inaturalist.org/projects/forest-discovery-trail

Time Travel Challenge #4

Forest Snapshot

David Douglas' nature journals give us one of the best written records of Oregon life from a European explorer between the years of 1825-1835. He spent ten years searching for, drawing, and writing about the plants and animals of the Pacific Northwest.

The forest is very different today than it was 200 years ago. Imagine how much it might change in another 200 years! Help us make a record of the present-day forest. Find a spot that you would like to capture and make a record of what you see. Your record could help people in the future understand what the forest was like during your lifetime.

You choose the method that you think is best!

a) Draw or write about what you see and experience in the forest. This can help you focus on details and make careful observations.

b) Use a phone to take pictures or make a video. You can record things quickly, and you can capture both images and sounds. You may choose to share your captures with others on our Forest Discovery Club Facebook page: www.facebook.com/groups/forestdiscoveryclub

Record a snapshot of this forest

STOP 3

The Quest Continues
Life on the Edge

How do fences change the land?

The fence beside you marks the boundary between the OSU Research Forest and a neighbor's property. These two areas look different, even though they are side by side. People use forests for many different reasons, and this can change how a forest looks. Forests may be used for wildlife habitat, clean water and air resources, and growing timber. Forests can also be used for recreation and/or research. You can probably think of other ways you would use the forest. Maybe you would build a really fun forest playground with swings, tree forts, slides, and rope bridges. That would change what the forest looks like!

The first European American settlers to arrive in Oregon in the 1840s had received reports from earlier explorers that the oak savanna would make excellent farmland. Livestock could graze on the tall native grasses, the soil was fertile, and there were few trees to clear. Throughout the 1840s and 50s, settlers arrived by the thousands in covered wagons to begin farming the valley for wheat, fruits, vegetables, and to raise farm animals. The same land that had been used by the Kalapuyans for thousands of years started to change rapidly.

Plant and animal species can also be settlers. The Kalapuyans used fire each year to maintain the grasslands of the oak savanna, but these regular fires were ended in the 1840s with the arrival of the European American settlers and the beginning of wide spread agriculture. The Kalapuyans began working on the farms, but by 1850, many Kalapuyans were starving. Pigs rooted out many of the wild bulbs that had sustained the Kalapuya for thousands of years, and fences greatly limited land access for hunting. In 1856, the Kalapuyans were forcibly removed from their ancestral lands to the Grand Ronde and Siletz reservations by the new U.S. Government.

An early homestead near Bald Hill

Many of these early farms were later abandoned. Without the annual fires, there was nothing to slow the growth of sun-loving Douglas-fir and other trees and shrubs. Year by year, Douglas-fir began to seed in and grow, changing the warm, sunny oak savanna landscape to a shadier forest.

Let's take a moment to look at the forest on both sides of this fence and see what is the same and what is different on each side.

Time Travel Challenge #5(A)

The Other Side of the Fence

Find evidence to answer the following questions:

Which side has more trees? McDonald Forest or Neighbor Property (circle your answer)
Which side receives more sunlight? McDonald Forest or Neighbor Property (circle your answer)
Do you see any evidence that there were once more trees on the other side of the fence?
What do you think the land is being used for on each side of the fence?

Time Travel Challenge #5(B)

Animals on the Edge

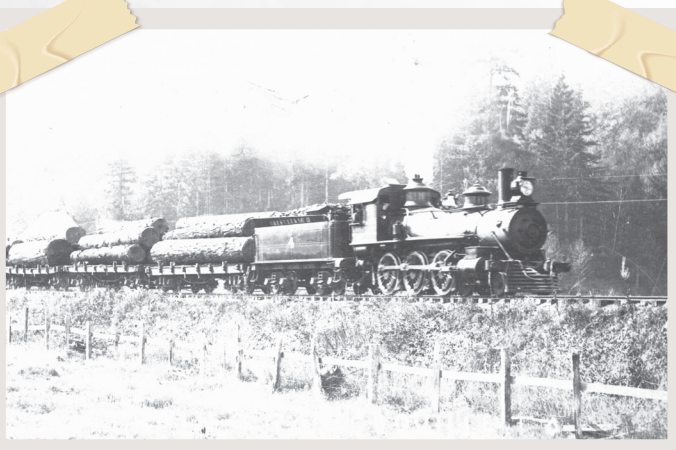
Have you ever wondered what happens to animals when people change the land? Take a moment to imagine what it would be like to be an animal arriving at this fence. Pick an animal that lives in the OSU Research Forest and answer the following questions:

Forest Animal Examples:
Bobcat, Cougar, Douglas Squirrel, Rough-skinned Newt, Snail, Banana Slug, Woodpecker, Deer, Red-tailed Hawk

What animal did you choose?
Are you a predator or prey?
Do you like to hide or hunt in the forest or the sunny open area? Why?
Do you eat plants, animals, or both?
What can you find to eat in the open area? In the forest?
How do you feel when you come up to the edge of open area or the forest?

LEARN MORE about how the Willamette Valley has changed.

Travel back in time to discover how life changed in the Willamette Valley shortly after David Douglas' explorations. Follow the time traveler symbol to the time capsule and open by using the secret time-travel code below.



Visit the Chachalu Museum and Cultural Center to learn more about the Kalapuya People

Enter the time-travel code:

1840

Time Capsule Explored?

Stamp here using the nature stamp

STAMP HERE

STOP 4

The Quest Continues

The Classroom Escapes to the Forest

What is a Forest Classroom?

Forestry professor and college dean Dr. George Peavy had a dream. He knew that forestry students needed to learn about the forests by spending time there! But first, he needed to find and buy land for the School of Forestry. In 1926, George Peavy's dream came true. A large donation from Mary McDonald made it possible to purchase the land for Peavy Arboretum, and Dr. Peavy's first group of forestry students began exploring OSU's new forest classroom.

Today, the OSU College of Forestry owns thousands of acres of forests all over Oregon for students and researchers to study—and for you to enjoy! As luck would have it, you are also now standing in the College of Forestry's very first living laboratory. Now, you too are a student of the forest!

George Peavy (Dean of the School of Forestry, President of OSU, and Mayor of Corvallis) sits under a tree reading a book, enjoying his forest classroom.

LEARN MORE about this forest and its beginnings.

Use the final time capsule to learn about the young forest that began growing after the annual fires ended in the oak savanna. Enter the time-travel code, 1926, the year that the Peavy Arboretum was dedicated. Inside you will find your first clue to one of the forest mysteries!

Enter the time-travel code:

1926

Time Capsule Explored?

Stamp here using the nature stamp

STAMP HERE

Congratulations!

You have completed the Journey of the Time Traveler!

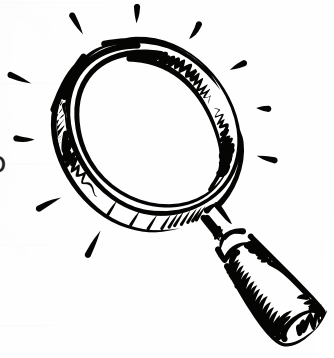
Are you ready to begin the Journey of the Forest Investigator?

Journey of the Forest Investigator

Follow These Steps to Complete Your Quest!

Become a Forest Investigator by solving the Forest Mystery Challenges. As you walk the second half of this trail, you will find six different forest mysteries that need investigating. Try solving each mystery using the Forest Mystery questions in this journal and your own careful observations. Clues are in the Science Boxes at each mystery stop. Inside each box, you will discover what other investigators have learned about each topic and how they figured it out!

Your investigations will begin at the Holey Stump.



- ☐ Forest Mystery Challenge #1: Holey Stump!
- ☐ Forest Mystery Challenge #2: Stairway to the Sky
- ☐ Forest Mystery Challenge #3: The Case of the Mysterious Stump
- ☐ Forest Mystery Challenge #4: Highs and Lows of the Rainforest
- ☐ Forest Mystery Challenge #5: Seeing the Forest for the Trees
- ☐ Forest Mystery Challenge #6: A Tree After Life
- ☐ Forest Mystery Challenge #7: Explore All Six Science Boxes

Journey of Forest Investigator follows the ORANGE path on the Explorers Map. Your journey begins at Stop 5.

How to use the Science Boxes

Try to solve the mysteries using your own nature observations. Then open the science box to learn more. Read as much as you want to help solve each forest mystery, and visit the Forest Discovery Trail as many times as you would like. Explore and investigate at your own pace.

Use these tools to help solve each forest mystery!

Step 1. Find the secret rock located near the activity stop. The science box will be hidden under a rock or disguised to look like the land around it!

Step 2. Enter the four-letter code (found in the journal) to unlock the science box.

Step 3. Explore science box contents.

Step 4. Stamp your journal with the nature stamp inside.

Step 5. Please return all the contents, lock the science box, and hide it again for the next quester.

Forest Investigator Tips

Forest scientists use the following process to help with their investigations:

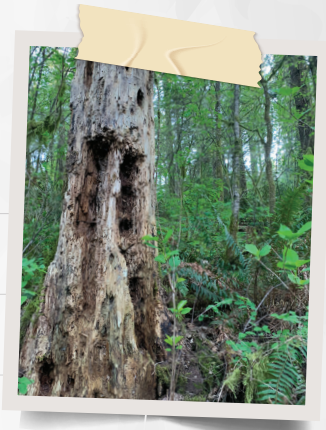
1. ***Test ideas by experiments and observations.***
2. ***Build on the ideas that pass the tests.***
3. ***Reject the ideas that fail.***
4. ***Follow the evidence wherever it leads.***
5. ***Question everything.***

A hypothesis is an educated guess about the way the world works. After you make a hypothesis, then comes the really fun part: doing the science experiment or make careful observations to see what happens! This lets you discover if your hypothesis was correct or incorrect.

STOP 5

Forest Mystery Challenge #1

Holey Stump!



What Makes Holes in Wood?

Take a few minutes to look carefully at the stump beside you.

Please remember this stump is a fragile home to many animals. Please do not climb up to it. We want it to last to see many more forest explorers!

Do you see the holes in this stump? Yes No

How do you think these holes are made in this stump?

Use the following questions to help you with the investigation.

What shape are these holes?

Where is the wood that came out of the holes?

Can you think of anything living in the forest that can makes holes in wood?
Draw and/or describe how you think holes are made in wood in the space below.

Helpful Hints

Ask other people in your group what they know about the mystery topic. Does anyone think they know what made these holes?

You can draw a picture or take a photo of the holes so you can remember what they look like. Perhaps you could use the internet to further your investigation.

Extra Challenge

As you continue your walk, see if you can find other holes in wood. Look for dead trees, standing or on the ground. Do you see holes in those trees? Are they all the same size and shape? Are some of them different? How are they different? Can you find any patterns? What else might make holes in wood?

LEARN MORE about these mysterious holes.

If you would like to find out what other forest investigators have discovered about these mystery holes, find the Science Box and open by using the secret code below.

Enter the secret code: PECK

Science Box Explored?

Stamp here using the nature stamp

You can also watch a video about this mystery topic!

STOP 6

Forest Mystery Challenge #2

Stairway to the Sky

What can we learn from bird song and behavior?

You probably know what a bird song sounds like. But have you ever listened carefully to bird songs before? Have you ever wondered if birds are talking to one another? What do you think they are singing about? Can we learn to understand bird songs? What can we learn from watching birds' movement?

Do you know that every bird species has its own unique song? Male birds sing their song to attract their mate and defend their nesting site (or territory) from other male birds of the same species. Forest scientists have learned to listen carefully to bird songs to learn more about their behavior and discover what type of habitats different bird species prefer.

Scientists also watch birds carefully to observe their behavior. As you climb this staircase, notice how you can see the different layers of the forest, from the forest floor at the bottom of the staircase, all the way up to the forest canopy at the top. This stairway offers a great view of the forest and provides a good opportunity to see forest birds and mammals.

Take a seat on a stair that gives you a good view of the forest. Listen very carefully to all the sounds in the forest and watch carefully for bird movement.

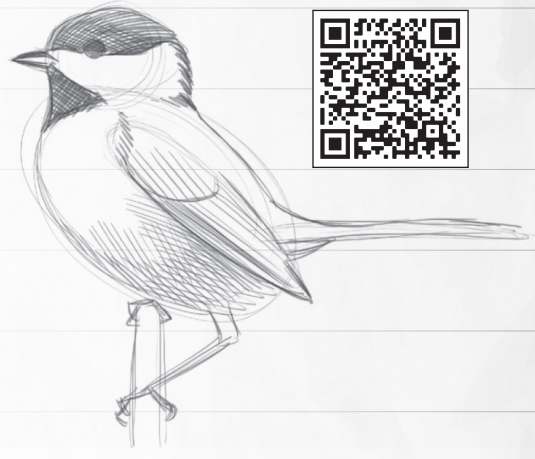
Today, you can become an ornithologist, a scientist who studies birds. Ornithologists learn a lot about birds by listening carefully to their songs and observing their behavior.

Listening (list and/or draw)	Observing (List and/or draw)
What sounds can you hear?	Do you see any birds in the area?
Can you hear any birds singing?	Where are they in the forest?
Can you make the sound yourself?	What do they appear to be doing?
Can you hear sounds from other animals, wind, water, or humans?	What are their movements like?

Would you like to try an amazing app to help you identify birds? Try the Merlin app: https://merlin.allaboutbirds.org

Are you already really into birds? Would you like to help scientists collect bird data and learn more about birds in your area and all over the world? Check out eBird.org and the eBird app.

Do you love drawing?
Learn to draw birds like David Sibley, author of The Sibley Guide to Birds through his own tutorial series!



A Sound and Movement Map

Use this space below to map the sounds that you hear and/or the animals you see in the forest. You are the circle in the middle of the map.

1. Set a timer for 2-5 minutes and be really quiet and still.

2. Listen to the sounds around you. Look for any signs of animal movement.

3. Mark the location of the different sounds you hear or animals you see using pictures, words or symbols.

4. You can include seeing or hearing animals, birds, humans, wind, or water. You can use arrows to show the sound or movement of these different elements.

LEARN MORE by listening to the sounds around you.

If you would like to learn more about what scientists have learned by listening to bird songs, find the Science Box and open by using the secret code below.

Enter the secret code: BIRD

Science Box Explored?

Stamp here using the nature stamp

STAMP HERE

STOP 7

Forest Mystery Challenge #3

The Case of the Mysterious Stump

What Makes this Stump so Strange?

Take a careful look at this stump.

Do you notice anything strange about it? Yes No

What is covering the cut surface of this stump?

Did you notice that bark grew over the cut surface of the tree? If you did, excellent job. If not, take a moment to observe this stump again. Wait a minute, how does the stump of a tree grow bark after its trunk, branches, and leaves have been removed? How is this stump getting the water and nutrients it needs to grow bark without leaves?

HINT: What parts of a tree supply water and nutrients? How could this stump still be connected to the water and nutrient supply of the forest?

Draw and/or write what you think could be happening in the case of the mysterious stump.

Watch this short video to learn more about this mystery topic.

BONUS: Can you think of a way you could check to see if your guess is correct?

LEARN MORE about this curious stump.

If you would like to learn more about how a stump can continue to grow bark, find the Science Box and open by using the secret code below.

Enter the secret code: ROOT

Science Box Explored?

Stamp here using the nature stamp

STAMP HERE

STOP 8

Forest Mystery Challenge #4

Highs and Lows in the Rainforest

Where does the rain go?

Take a moment to stop on this bridge.

Why do you think this bridge is here?
Would it be hard for you to cross this section of trail without the bridge? Yes No
What if you came back in a different season? It is pretty amazing that water can carve a path through the forest!
Oregon receives a lot of rainfall in the winter months. Where does all that water go?
In the summer it gets very dry here. How do trees find enough water to survive Oregon's long, dry summers?

Understanding how water flows through the forest is important for a number of reasons. Forest streams, rivers and ponds provide habitat for many organisms. Trees help reduce the risk of flooding and soil erosion by absorbing tons of water, and they clean and filter water.

Forests are so effective at cleaning water that many communities maintain large forest areas to protect their water supplies. Corvallis, Salem, and Portland all use forested watersheds to supply clean water to their cities. Cleaning water and regulating water flow is a major ecosystem service that forests provide.

A watershed is an area of land where all the surface water drains into the same place, whether it's a creek, a stream, a river, or an ocean.

Forest ecosystem services are the benefits to life on earth provided by healthy ecosystems within the forest environment. Here are some of the vital ecosystem services that forests provide:

- Wildlife habitat
- Soil production and conservation
- Carbon storage
- Reducing the effects of climate change
- Flood regulation
- Filtering and cleaning water and air

Today, you can become a forest hydrologist, a person who studies water in the forest. It is time to take a closer look at this stream and record some stream data.

Today's Date	Today's Season & Weather	Water Level	Water Flow (how long it takes for a leaf/stick to travel under the bridge)	Water Color (muddy or clear?)	Observer (your name)

A note: documenting "no water" is also important! Knowing when a stream is or is not running can tell us a lot about how forests and water interact. You can record data on multiple trips to the Forest Discovery Trail to see how water levels change in this forest over time.

Try to answer the following questions based on your findings.

YES, I found water in the stream today.	NO, I didn't find water in the stream today.
Where do you think this water is traveling to? How could you find out?	Where do you think the water went that used to flow through this stream bed?
What do you think might happen to the water levels in this stream if there were no trees here?	Where do you think the trees and animals are getting the water they need to survive this time of year?

LEARN MORE about forest water.

If you would like to learn more about water and the forest, find the Science Box and open by using the secret code below.

Enter the secret code: DROP

Science Box Explored?

Stamp here using the nature stamp

STAMP HERE

STOP 9

Forest Mystery Challenge #5

Seeing the Forest for the Tree

What is different about this forest?

Do you think all forests look the same? Or do you think forests can look different from one another? Have you ever been in a forest where all the trees are really young and small, perhaps growing back after a fire or a timber harvest? What about a forest where all the trees were really big and old? Now that you are a Forest Investigator, see if you can notice how forests change from one area to another.

Today, you can become a forest silviculturist. Pronounced sil-va-cul-cher-ist, a person who studies how to grow trees and forests sustainably.

Observe and Discuss:

Take a close look at the forest surrounding you right now. What do you notice about this forest? Walk back along the trail to see if you can notice where a change occurs.

How would you describe the forest here? How many tree species do you see growing in this section of forest? Are these trees mostly the same size? Are these trees growing in rows? Describe or draw what you see.

Compare this forest stand with the others parts of the forest along the Forest Discovery Trail and other forests you have visited.

Are trees usually all the same size in a forest? Do trees normally grow in straight rows in other forests? Do you think most forests are made up of one tree species or several different tree species? Draw and describe the forest along other parts of the Forest Discovery Trail.

Do you think this forest grew here naturally or do you think people planted these trees? Circle and explain your answer.

Clue #1: The origin of this particular forest stand was mentioned in the final time capsule (code: 1926) and is also revealed in this science box.

Clue #2: The young trees in small patches in this forest stand have naturally regenerated from the larger trees. You can try using iNaturalist to identify this species.

Foresters and forest scientists use the term forest stand when an area of forest shares similar characteristics such as tree species and tree size. Describing different stands in the forest can help people understand where different species of wildlife might live or where different forest products are growing.

LEARN MORE about this forest stand.

If you would like to learn more about this forest stand and why it is different from other stands along the Forest Discovery Trail, find the Science Box and open by using the secret code below.

Enter the secret code: TREE

Science Box Explored?

Stamp here using the nature stamp

STAMP HERE

STOP 10

Forest Mystery Challenge #6

A Tree After Life

This tree has fallen over and now lies on the forest floor, with much of its root system upended. Look at the size of the hole made when this tree fell over. It takes a lot of roots to hold a tree upright! This is now an example of what scientists call "downed woody debris" (pronounced da-bree) or "coarse woody debris."

Do you think this tree is dead?

Today, you can become a forest ecologist, a person who studies how organisms use the forest.

For many decades, forest managers primarily grew trees for harvesting. Trees that died before harvest were seen as a loss of both money and timber. Until quite recently (the 1990's), Euro-American forest managers tried to reduce dead wood in the forest by cutting old forests and replacing them with young, planted stands.

But growing evidence tells us that downed woody debris brings more life to the forest than previously understood!

Can you name any animals that use dead wood as habitat? (Think back to the Mystery of the Holey Stump.)
Can you see any organisms living in and around this downed woody debris?
What other species might use dead wood? Draw or describe what you see.

This tree was a victim of root rot, a fungus that eats and weakens the roots of trees and plants, causing them to fall over. This may seem like a bad organism to have in the forest, but it's not! It's one of many decomposers, or organisms that break down dead material into soil and nutrients for plants.

Some other decomposers you might see here are slugs, snails, worms, mushrooms, and moss! Even bacteria can decompose. Decomposing organisms aren't always the prettiest or most exciting, but they have some of the most important jobs in the forest.

Carbon – "The Currency of Life"

One of the most important nutrients that organisms get from trees is carbon. You may know carbon dioxide is in the air, but did you know plants use it to make food? They do this through photosynthesis, using energy from the sun to transform carbon dioxide into sugar and oxygen. The oxygen goes back into the air, and the sugar becomes new leaves, stems, and wood.

Because trees and forests absorb carbon from the atmosphere, many scientists study how forests can be used to slow climate change. Some of this research began right here at OSU College of Forestry with Dr. William Ferrell and Dr. Mark Harmon, who helped answer a very important question:

Which forest absorbs more carbon from the atmosphere: young, quick-growing forests with small trees, or old, slow-growing forests with big trees?

What do you think?

LEARN MORE about the lifespan of the forest.

If you would like to learn more about life and death in the forest, find the Science Box

Enter the secret code: ROTS

Science Box Explored?

Stamp here using the nature stamp

Congratulations!

You have completed the Journey of the Forest Investigator!

Are you ready to begin the Journey of the Forest Discoverer?

Journey of the Forest Discoverer

Follow These Steps to Complete Your Quest!

You are ready to embark on the most important part of your Forest Explorer's Quest – The Journey of the Forest Discoverer. This section is dedicated to your discoveries. Good luck on this final journey. We can't wait to find out what you have discovered during your quest!

Use these final challenges to complete your quest and discover what you can do to help forests.

- ☐ Forest Discovery Challenge #1: Forest Explorer's Map
- ☐ Forest Discovery Challenge #2: Forest Explorers Give Back
- ☐ Forest Discovery Challenge #3: Make Your Own Forest Discovery
- ☐ Forest Discovery Challenge #4: Letter to Forest Researchers

Join the Forest Discovery Club to meet other explorers and share your discoveries with forest experts.

www.facebook.com/groups/forestdiscoveryclub

Forest Discovery Challenge #1

Forest Explorer's Map

Every quester needs a map to find their way during their explorations. How would you draw your very own Forest Explorer's Map? What would you include in your map that you would want other forest visitors and questers to notice?

Forest Discovery Challenge #2

Forest Explorers Give Back

Volunteer with us, or share your experience as a forest explorer!

Did you volunteer with the OSU Research Forest, or take time to help care for another natural space somewhere else? Or, did you share your experience with someone else, like your friend, your class, or another group of people? Use this space to tell us about your experience or paste a picture or photo what you did here!

Forest Discovery Challenge #3

Make your own forest discovery

You have now reached one of the most important stages of this quest. What discovery did you make during your Forest Discovery Quest? Perhaps you learned about a new species to you or learned something new from your time travels or forest investigations. You may have discovered something no one else has ever noticed or identified a new question that no one has yet investigated! Sharing your discoveries may lead to further discoveries and help fellow explorers think differently and more deeply.

Record your discovery here.

Feel free to use pictures, words and numbers to share your discoveries.

Forest Discovery Challenge #4

Letter to the Forest Researchers

What can you do to help the forest?

What do you think you could do to help the forest continue to support life on our planet? Do you need help from anyone else to make that happen? What do you wish you could tell grown-ups who are making decisions about the forest right now? What do you hope to see happen to the forest in the future?

Send us your Letter and Discovery Challenge and we will write back, return your page and send a reward. Use an envelope and stamp to send your letter to: Attn: Forest Discovery Program, 8692 NW Peavy Arboretum Rd Corvallis, OR 97330. Or take a photo of your discovery and letter and email us at: forestdiscoveryprogram@oregonstate.edu

Dear Forest Researchers,

Congratulations!

You have completed your Forest Discovery Quest!

YOU DID IT!

You've come to the end of the Forest Discovery Quest!

...or maybe you have discovered this page by accident and are actually reading it, which to be honest, I find pretty promising. There is no time limit to complete this journal. Forests take a long time to grow, and you can take all the time you need to complete this journal. If you just completed this journal, thank you for giving this forest your time and attention.

Now that you are here, reading this page, I want to leave you with two things: a thought and a question.

First, my thought...

Time and forests share a deep relationship. Forests can be ancient. A forest can be much older than your grandparents and can live beyond the time of your grandchildren. Forests help us keep track of time. They show us what season we are experiencing in the present moment. They record events from the past. To care for our forests is to care for future generations and to honor the generations of our past.

My parents love forests. They helped me see the many values forests provided our family—shelter, heat, food, wildlife, solitude. This journal was created with the help of many people who have devoted their lives to learning and discovering amazing things about the forest. Though we come from many different backgrounds and fields of study, we all share in the hope that we have passed our "forest philia" to you.

Now here is my question, just for you...

What do YOU wish everyone knew about the forest? Your parents, friends, teachers? Perhaps your own children someday? How will you share your knowledge with them?

I sincerely hope that someday, I get to find out what your answer is.

May the forest be with you always.

Karen DeWolfe
Forest Discovery Program Coordinator (2018-2021)

Thank you to the forest-philes who brought this journal into being!

Forest Science Team

Dr. William Ferrell - OSU College of Forestry's (CoF) first forest ecologist. The Forest Discovery Program was developed in memory of Dr. Ferrell's love of teaching and learning.

Dr. Mark Harmon - OSU CoF Forest Ecologist. Dr. Harmon worked with Dr. Ferrell and shared decades of forest research with this program.

Dr. David Lewis - OSU Anthropology and Ethnic studies

Dr. Dana Warren - OSU CoF Forest Ecologist (hydrology)

Dr. Matt Betts - OSU CoF Forest Ecologist (ornithology)

Dr. Dan Luoma - OSU CoF Forest Ecology (mycorrhiza ecology)

Dr. Susan Dunham - College of Agricultural Studies Forest Ecology (mycorrhiza ecology)

Dr. Bob Zybach - Assisted greatly with local forest history research

Dr. David Lewis - Anthropologist at OSU

M.Sc. Amy Barry - Studied Pileated Woodpeckers in the OSU Research Forest

Hankyu Kim - Studied Forest Bird Migration

Writing, Design and Media Team

Deann Garcia - Film director and OSU Instructor of Graphic Design

Julia Jacobs - Two Tables Workshop. Graphic Designer for the Forest Discovery Program

Susan Applegate - Kalapuya Art

Dr. Howard Bruner - Oil Landscape Paintings

Caitlyn Reilley - "Dark forest" and douglas-fir cone watercolor painting

Dennis Bennett - Graduate Writing Center Director

Current and Former Staff at the OSU Research Forest

Karen DeWolfe - Forest Discovery Program Coordinator (2018-2021)

Jenna Baker - Recreation and Engagement Program Manager

Ryan Brown - Former Recreation and Engagement Program Manager

Matt McPharlin - Recreation Field and Volunteer Coordinator

Steve Fitzgerald - Director of College of Forestry Research Forests

Carol Carlson - Research Forest Business Manager

Carli Morgan - Forest Inventory, GIS & Reforestation Manager

Brent Klumph - Forest Manager of OSU Research Forests

Steve Pilkerton - Forest Engineer & Operations Manager

Maya Hanson - Recreation Student Employee

Josh Turner Fix (Forester Josh) - Recreation Student Employee

Allison Sutcliffe - Recreation Student Employee

Education Team

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Dave Stemper - CoF Natural Resources Outdoor Education Senior Instructor

Jill Stein - OSU STEM Research Center

Mercedes Jones - Education coordinator of the Grande Ronde Tribe

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Donations to the Forest Discovery Program can be made to the OSU Agricultural Research Foundation.

Learn. Explore. Discover!
DR. WILLIAM FERRELL
FOREST DISCOVERY TRAIL


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