



# **Outdoor School at Home**

Calapooia Watershed Council

**Title:** Fire Ecology

**Grade:** 6

**Duration:** 45 minutes

**Location:** Home/Backyard/Park

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## **Materials:**

- Visuals
- Story
- 12 Clues
- Paper
- Markers
- Grass
- Twigs
- Sticks
- Branches
- Logs
- Colored Pencils
- Pencils

## **Lesson Preparation:**

- Print out or have the Red Huckleberry Story available to read on a computer/tablet
- Print and cut out clues. Hide them in the area of the lesson.
- Collect grass, different sized sticks/branches, logs (if available) for lesson use
  - If these are not available please print and cut out the fuel images
- Make sure that paper and writing materials are available for the students

## **Objectives: Students will**

- Identify the pros and cons of wildfires by sharing their knowledge of fire and discussing the messages in a short story about fire.
- Define the three methods of heat transfer in a wildfire by presenting clues they found in the forest in small groups.
- Categorize natural fuels based on the amount of heat energy required for combustion by arranging fuel examples in small groups.
- Predict what a fire would look like at different habitats and its effects by recording or sketching their ideas in their field journals.



<b>Introduction</b> (10 minutes)	<p><b>Hook:</b> Share with students you found this story in the woods. And you wanted to read it to them. Read the tale of the two red huckleberries.</p> <ul style="list-style-type: none"> <li>• Ask students what they thought the lesson of the story was</li> <li>• Discuss pros, cons, and importance of fire in the Willamette Valley</li> <li>• Share that fire is a management tool used today and in the past</li> </ul>
<b>Body</b> (30 minutes)	<ul style="list-style-type: none"> <li>• Share with students that this story left you with more questions about fire and ask for their help <ul style="list-style-type: none"> <li>◦ Display questions on a white board or sheet of paper</li> </ul> </li> <li>• <u>First question:</u> Ask students what is needed to start a fire? <ul style="list-style-type: none"> <li>◦ Show a visual of a triangle with blank spaces at each corner</li> <li>◦ Heat, Oxygen, and Fuel</li> <li>◦ Have students sketch the fire triangle in their journal</li> </ul> </li> <li>• <u>Second question:</u> How does fire work? How does it travel? <ul style="list-style-type: none"> <li>◦ Have students share their own ideas</li> <li>◦ Share with students that clues have been hidden that can reveal this answer <ul style="list-style-type: none"> <li>■ Before students search for hidden clues, set designated boundaries</li> <li>■ Set Up clues before the lesson begins and that every student can access the hidden clues</li> </ul> </li> <li>◦ Once all of the clues have been collected share with students that clues must be matched up <ul style="list-style-type: none"> <li>■ There are 3 types of ways heat travels in a forest fire</li> <li>■ Each type has a name, definition, and 2 pictures</li> </ul> </li> <li>◦ After the clues have been matched, have the student share what they discovered or journal the answer they came up with</li> <li>◦ By the end, all groups should know the four methods of heat transfer in a forest fire: radiation, convection, and conduction</li> <li>◦ Optional: give each heat transfer mechanism a body movement to help students remember</li> </ul> </li> <li>• With this knowledge have each group categorize provided fuels in order from lowest energy needed to burn to highest <ul style="list-style-type: none"> <li>◦ Fuels can include: grass, leaves, sticks, branches, logs</li> <li>◦ Visit each group and ask about their thought process <ul style="list-style-type: none"> <li>■ Grass - fast to heat and ignite, short burning period</li> <li>■ Tree - slowest to heat and ignite (needs a high amount of heat to combust - very dense), long burning period</li> <li>■ After the sorting, share the correct answers</li> </ul> </li> </ul> </li> <li>• <u>Third question:</u> What would a fire look like in different habitats?</li> </ul>



	<ul style="list-style-type: none"> <li>○ Pass out habitat pictures to students</li> <li>○ Each student will sketch or write in their journal what they predict a fire would look like in each provided habitat</li> <li>○ Once finished, have a few students share their journal entries</li> <li>○ Ask students what they think it might look like after a fire? What would some of the pros/cons of a fire be?</li> </ul>
<b>Closing</b> (5 minutes)	<ul style="list-style-type: none"> <li>● Thank students for helping you answer your questions</li> <li>● Have students share one thing they would tell a friend about fires</li> </ul>

### Modifications:

- Inclement Weather: This lesson can be moved indoors. Pass out forest visuals for students to determine what a fire would look like.
- Mobility: Set up this station in an area that is fairly leveled or easily accessible. Make sure some of the clues are easy to reach.
- ELL: Provide Spanish translation for the fire triangle, clues, and other visuals. If students know the fire triangle in Spanish, have them share.

### Background Information:

The Kalapuyans originally occupied over a million acres in the Willamette and the Umpqua valleys. They have lived here for over 14,000 years and have endured enormous changes to their traditional life-ways during the past 200 years. The Kalapuyan peoples created the amazing fecundity of the Willamette Valley by practicing a form of land management or horticulture where they annually set fire to the valley, and in so doing cleared the land of excess vegetation, renewed food plants, and deposited nutrients in the soil, as well as other benefits. They were a stable society who harvested fruits and vegetables of the valley, and hunted and fished the terrestrial and aquatic animals to provide their primary food sources. The land along the Santiam River was inhabited and managed by the Santiam. Kalapuyans are still here today as part of the Confederated Tribes of Grand Ronde and the Confederated Tribes of the Siletz. (<https://ndnhistoryresearch.com/tribal-regions/kalapuyan-ethnohistory/>)

The Willamette Valley forests dominated by Douglas-Fir used to burn every 100 to 450 years. During the time of fire suppression, these fires were prevented. This caused the forest to become more dense and overgrown. Overgrown forests have much more fuel to burn which now increases the risk of high severity fires. Currently, the Willamette valley is at low to moderate risk for uncharacteristically severe fires. The dryer forests on eastern and southwestern Oregon are at much more risk for these high severity fires. Today, forest managers are working to decrease this risk by thinning forests, conducting prescribed burns and other mechanical treatments.

Fire Triangle: Oxygen, Heat, Fuel (without all 3, a fire cannot exist)



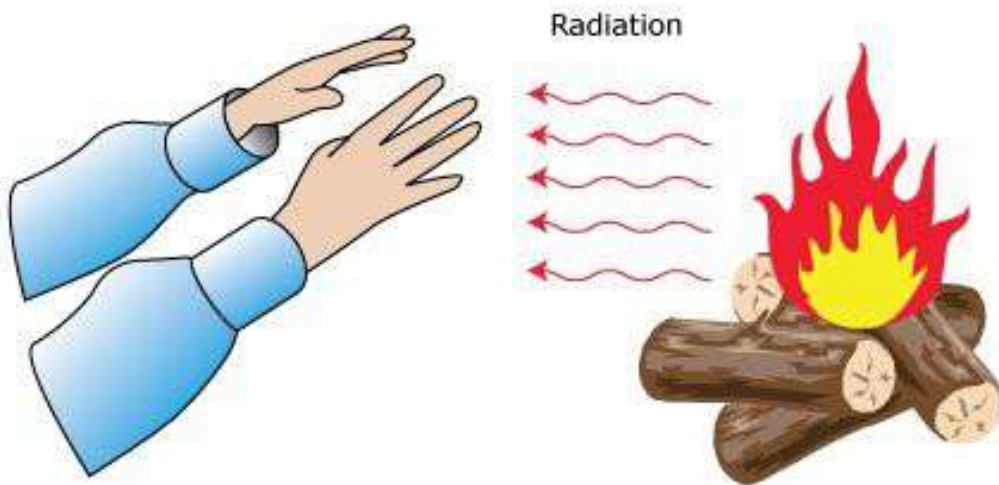
Radiation: heat or light that is transmitted in electromagnetic waves (solar, thermal)

Examples: Sun drying forest floor fuels, grasses, fire drying nearby fuel and materials

Conduction: the transfer of heat between solids, heat energy will move from hot to cold objects.

Convection: the transfer of heat through a liquid or gas

Examples: Rising hot air from a fire drying higher up leaves and branches, Smoke



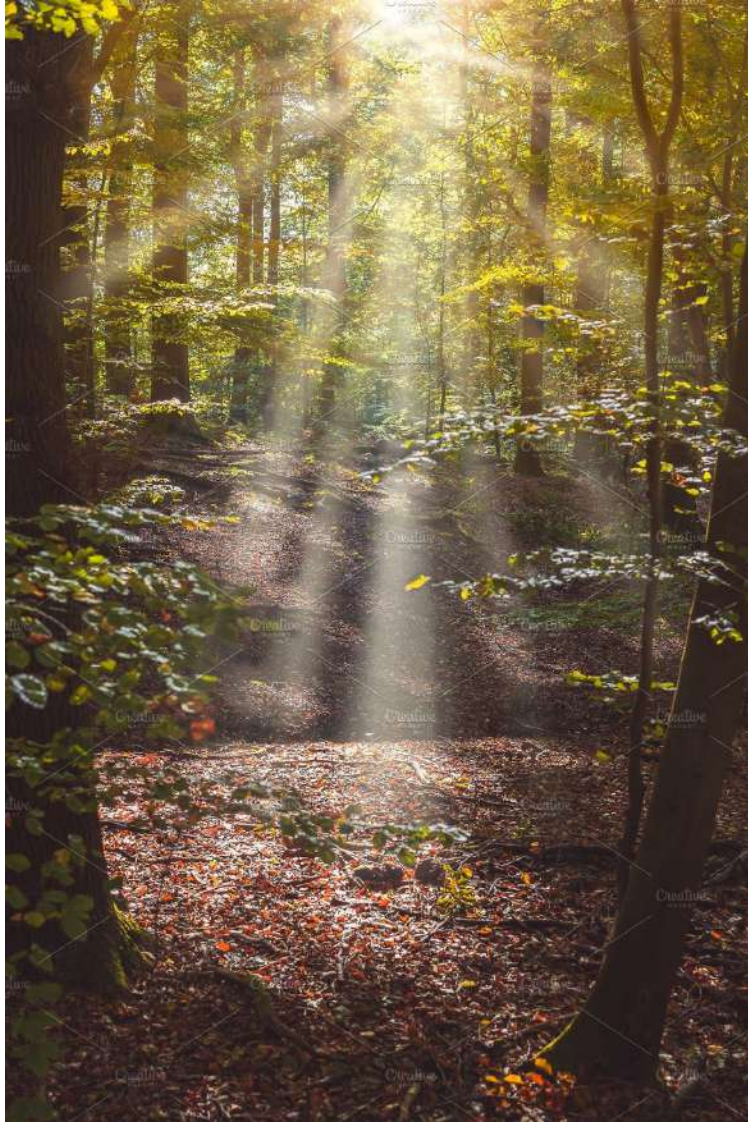


**Conduction**

**Convection**

**Radiation**

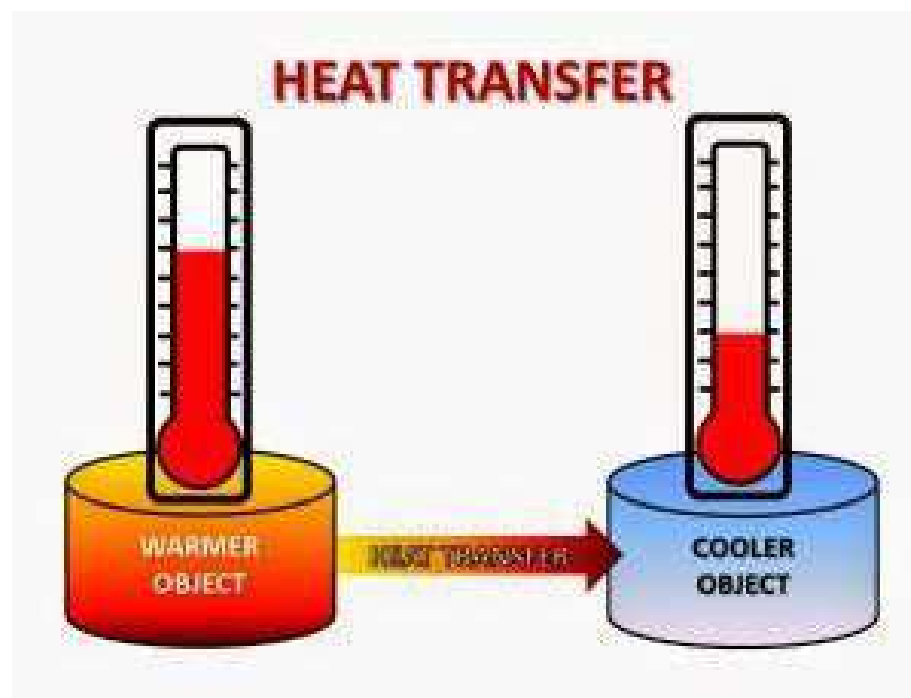
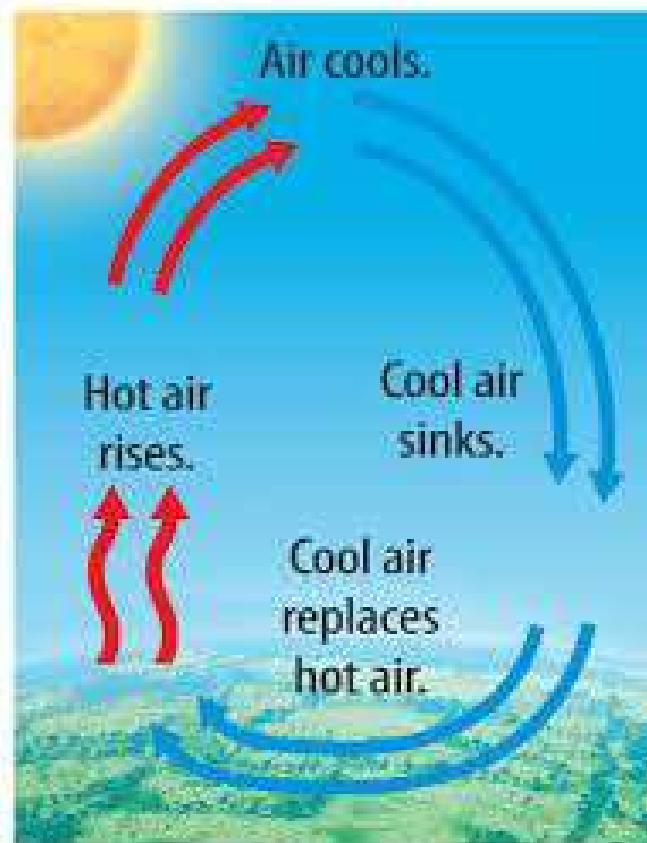




Heat energy is transferred between solid objects

Heat energy is transferred through liquids and gasses

Heat/Light energy is transferred through  
electromagnetic waves















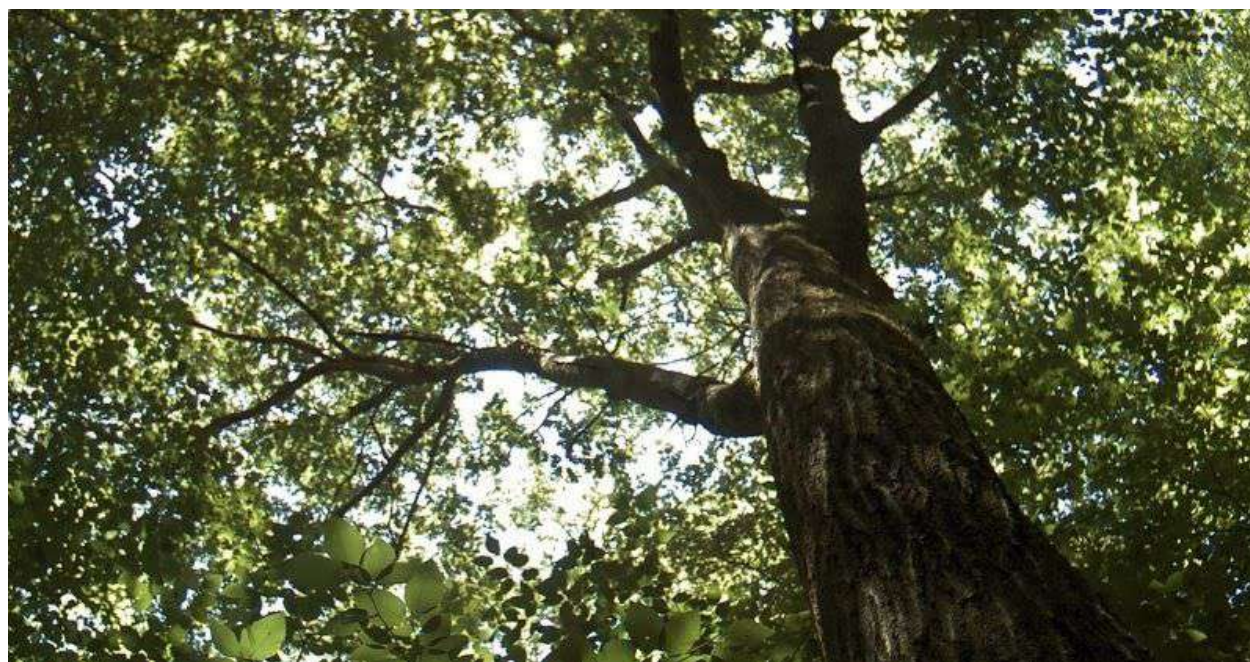


## Fuel Visuals (Alternative to actual fuels)











## Fire and the Red Huckleberries

By Sarah Norton



A thousand years ago in the forested hills of Oregon lived two red huckleberry shrubs separated by a clear rippling creek. On one side of the creek was a large red huckleberry surrounded by other large shrubs and ferns. Its berries had fed several generations of birds, bears, and humans. Its leaves and branches provided shelter for birds and rabbits. On the other side of the creek was a young sprouting red huckleberry. It had bright green new growth with leaves sprouting and new flowers that would become berries.

As the young huckleberry grew, the two huckleberry shrubs became good friends with the older shrub sharing tales of its life and what it has seen, and the younger shrub sharing its hopes and dreams. Through the seasons the shrubs remained friends until the young shrub was now providing shelter and food for all the animals of the forest as well. Feeling proud of its growth and the berries it provided, the young shrub spoke to its elder, "Look how strong I have become. I can now provide enough berries for humans



and bears to share. I have a family of rabbits that have made a home under my branches. The birds sing praises of my delicious berries.”

The elder huckleberry looked across the creek at the younger one and shook its leaves in agreement, “Indeed, you have become a strong provider for the forest. Alas, I have not fared as well. I no longer produce as many berries. My leaves are feeble, and I grow more tired each day.”

The young huckleberry was saddened by this, and its berry laden branches drooped, “Surely, there must be something you can do to become stronger. How can I help?”

The elder huckleberry shook its branches, losing a few leaves, “No, no young one. I must now wait for a fire.”

The young huckleberry became alarmed, “A fire!? But a fire could burn you, kill you.”

“Yes, but that is what I wait for now.” The elder huckleberry gave a tired sigh. Over the next few months, the young huckleberry tried to cheer up the elder, and listened closer to its stories until there was a calm fall morning. The Kalapuyan people had set fire to an area nearby that began to spread closer and closer towards the creek. Nearby grasses and plants began to set on fire. The animals and birds scattered as the fire spread. The young huckleberry watched helplessly as the fire began to burn the elder huckleberry. The elder huckleberry let out a sigh of relief, “At last a fire. Farewell, young huckleberry, and may you be a strong provider.”

The young huckleberry said farewell and over the coming months mourned its elder. It focused on growing thick beautiful berries and creating shelter under its branches for the family of rabbits. Over time, the grasses and flowers returned to the other side of the creek. Butterflies and bees danced around the field, pollinating flowers as they went. Ferns began to grow back, and on a beautiful spring day, a new huckleberry sprout emerged where the elder had grown. Excitedly, the huckleberry greeted the new sprout and shared its tales of the forest. Over the years, the sprout grew and the huckleberries became friends. However, as the sprout grew the

huckleberry had begun to feel more tired. More and more shrubs and plants were crowding the bank of the creek. The huckleberry's roots could not draw up as many nutrients as it used to. Its side of the creek had become darker from all of the taller plants. The huckleberry's leaves became feeble, and humans and bears could no longer rely on its berries.

Across the creek, the sprout had become beautiful, strong, and draped with berries. It called over to the tired huckleberry to share how strong it was now, and how everyone feasted on its berries. The tired huckleberry was proud of the sprout and shook its leaves in agreement. As a few of its leaves fell to the ground, the huckleberry finally understood the elder's wish for fire. Fire would bring fresh nutrients to the soil and new life to the forest. The day that the Kalapuyans lit the side of its creek, the huckleberry welcomed it with open branches.