STEEC Program – Children's Forest

Program Name: Defensible Space
Grade Level(s): 4th Grade
Length of Program: 30-35 minutes

Program Overview:
Students will learn about the history of Tahoe's forests, forest health, and forest management. Students will learn about defensible space zones and participate in a Yes/No game format to test their understanding.

Next Generation Science Standards: complete list of standards in bullet form

- 4-ESS3-2 - Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
- 4-LS1-1 - Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Objectives: complete list of objectives in bullet form
Upon completion of this program:

- Students will know about the history of Tahoe forests and the adaptations trees have made for wildfires
- Students will know what defensible space is and how it helps reduce the threat of wildfires to their homes
- Students will know what work is necessary for each of the three zones

Materials: complete list of materials used in bullet form

- 2 traffic cones
- Yes and No signs, laminated
- Strong tape
- Defensible space poster
- Whiteboard
- Tarp for students
- Defensible space diorama from Kim/SLTFR
- Laminated pictures of:
    - Jeffrey pine
    - Sugar pine
    - Ponderosa pine
    - White fir

Vocabulary: complete list of vocabulary covered in bullet form

- **Adaptation**: a change in a plant or animal that makes it better able to live in a particular place or situation

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- **Defensible space**: the buffer between your house and the surrounding area
- **Fire triangle**: the three things necessary to start a fire: fuel, heat, and oxygen
- **Embers**: a small piece of burning or glowing matter in a fire; can travel miles ahead of wildfires and ignite smaller spot fires
- **Prescribed fires**: controlled fires that mimic the low-intensity fires that occurred here in the past used to help clean up the forest
- **Combustible fuels**: fuels that are able to catch fire or burn easily

<u>Preparation:</u> complete list of necessary preparation steps in bullet form

- Tape laminated Yes and No signs to traffic cones and place opposite each other, with enough room for students to run back and forth
- Tape defensible space poster to whiteboard and display it/hold it up while walking through the different zone requirements
- Set up tarp for students to sit on
- Find specific trees (Jeffrey, ponderosa) to take students to during the historical context section, or pass around laminated photos

<u>Procedure:</u> complete list of procedures in detail

1. **Introduction:** (0-0:02)
   Introduce yourself, your organization, and the activity: learning about Tahoe's forests and defensible space.

   "Hello everyone! I'm ___ from ____ and today we get to learn about the history of forests and fire in the Lake Tahoe Basin, forest health, and adaptations that plants and animals in the area have to fires. It is important to know the history of fire in the Lake Tahoe Basin and that humans have a responsibility in maintaining a healthy forest."

   "Now, we all want to learn and listen today so let's not yell out answers – only raised hands will be called on to answer questions."

2. **Historical Context** (0:02-0:10)
   Explain the history of Tahoe's forests, the Washoe tribe's land management practices, and the adaptations vegetation has made for fire.

   "Forests looked very different 150 years ago from the current forest we are in now. *Ask students if they know what was happening around this area and in California about 150 years ago.* During the Comstock era (1860's-1890's), gold and silver mining caused massive cutting down of trees and the timber was used for mining and building of structures. When the timber was gone and the loggers moved on, the growth that followed was not the growth of a natural, healthy forest because all the trees were cut

at once. Now, Lake Tahoe Basin's trees are about 2 to 6 times denser (or thicker) than a healthy forest should be, meaning trees are closer together and more abundant or overcrowded."

"Here at Tallac Historic Site and the surrounding forest, trees are much older because they were not harvested for timber. Many of the Founding Families of Tahoe lived here, and before that, the Washoe Indigenous tribe. Do you think that this forest we are standing in now is healthy?" Have students look around. It is, less fuel and is not overcrowded.

"Healthy forests are fire tolerant, disease and insect resistant, and contain a sustainable population of native plants and wildlife. Naturally occurring fires in the past were mostly low-intensity. These fires would prevent the buildup of forest litter and remove brush, small trees, and dead and weak trees from the forest. The Washoe Tribe understood the important role of fires on the land. They mimicked low-intensity fires in their territories to help keep the forest healthy and used it as a management tool. Low-intensity fires kept areas open for wildlife that they relied on, and provided food for wildlife by giving nutrients back into the soil and creating space for plants to grow."

"*Ask students: are there fires in Lake Tahoe Basin's forest today?* There are, some naturally caused and some unnatural. *Ask students: what are ways that fire is natural in the forest ecosystem?* Lightning from thunderstorms. What about unnatural? Human caused, like illegal campfires, matches, cigarettes."

"One of the reasons we know that fires are a natural part of most forest ecosystems is because many plants and animals have adaptations to fires. *Ask students: what is an adaptation?* An adaptation is a change in a plant or animal that makes it better able to live in a particular place or situation."

Ask students: what does the bark do for a tree? "The bark is like our skin and protects the tree from insects, diseases, and fires. Will it be better to have a thin or thick bark? The thicker the bark the better! Trees in Tahoe with a thick bark are ponderosa pine, Jeffrey pine, and sugar pine." *Pass around laminated photos of Jeffrey, ponderosa, and sugar pines.*

"*Ask students: what do branches and leaves do for a plant?* The branches of a tree are like our arms-they help the tree stretch so that its leaves can get enough sunlight to make food. If there was a fire in the forest, which tree would most likely catch on fire: a tree with branches touching the ground?" (show a picture of a fir tree or point to one if present at location) "Or a tree with branches far from the ground?" (point to a Jeffrey

pine or ponderosa pine) "Having branches farther from the ground and therefore farther from a surface fire or ground fire reduces the chances of a fire from climbing up the tree. Examples of trees that lose their lower branches are: Jeffrey pine, ponderosa pine, and sugar pine."

3. **Defensible Space Intro + Mapping Activity** (0:10-0:17)
   "We know we live in a fire-prone area which means we have to do our part to prepare our houses, properties, and land for fire. Organizations like the Forest Service work with our local fire departments to have prescribed fires – controlled fires that mimic the low-intensity fires that occurred here in the past used to help clean up the forest – and we all have the opportunity to help out on a smaller scale. Who here has heard of defensible space? Do any of you want to try to explain what it is?"

   "Defensible space is the buffer or space between your house and the surrounding area, like a little bubble that you've cleaned up and trimmed. Defensible space can help reduce the risk of wildfires to your house so it's really important to make sure your house meets the requirements. Now, we're going to go over the different zones and then we'll get to play a fun game!"

   "To understand defensible space, we need to first remember the fire triangle. For a fire to continue burning, it relies on 3 things: who here can tell me what those three things are? Yes! Fire needs oxygen, heat, and fuel to ignite and continue burning."

   "Now, when a wildfire is nearby, these things called embers spit out from the flames. Have any of you ever roasted marshmallows over a campfire or lit one in a fireplace at home and noticed those bright orange dots that rose out of the flames? Those are embers! During wildfires, those embers can travel miles ahead of the fire and ignite smaller fires, especially if they touch super dry and dead vegetation like fallen pine needles. So, when we talk about defensible space, we're really talking about how to better prepare your house against these embers and nearby flames by removing a lot of that flammable, dead vegetation that we call combustible fuel."

   "Defensible space is made up of 3 different zones. Zone 0 is 0 to 5 feet away from your house, deck, etc. Zone 1 extends from 5 to 30 feet away from your house, and Zone 2 extends 30-100 ft away from your house. Now, we're going to act as mappers and try measuring these distances ourselves. One of my big steps is about 3 feet, so 2 steps is about 6 feet. With this in mind, let's measure out the zones."

   Begin mapping out the different zones as a group. Set the house diorama in the middle of the tarp and measure out from there. Stop after each zone and have students notice

how far they are from the house at each stop. When you reach the end of Zone 2, have all the students run back to the tarp and take a seat.

4. **Defensible Space Poster** (0:17-0:25)
   "Let's go over the different zones – make sure to pay attention because this information will be needed for our game we'll play after this!"

   "As we can see on this poster, this zone nearest to the structure is called Zone 0. It's 0-5ft away from your house. We like to call it the Ember Resistant zone because we don't want there to be anything flammable for embers to catch on during fires. In Zone 0, we should remove all combustible fuels like pine needles, leaves, and other debris. We also want to keep vegetation in this zone small and well irrigated– that means all the vegetation should have regular access to water through hoses or sprinklers. We don't want highly flammable plants like juniper or manzanita around our decks or houses. Juniper and manzanita have a lot of oil in them which burns quickly and hotly, so we don't want those near our house. We want to use hardscaping like cement or rocks instead of wood mulch around our house. We want to trim back any overhanging tree limbs around our chimney or roof. Who here has a woodpile at home? *(Have students turn to their elbow partner to discuss the following questions)* Where do you keep your woodpile? Is wood in a woodpile a fire hazard? (Yes, it is, embers can catch in between the dried wood) What do you think you should do with your woodpile? If we have a woodpile, we want to move it at least 30 feet away from our house or cover it with a fire resistant tarp."

   "In Zone 1, we can see that it's 5 to 30ft away from your house and we like to call it the 'Lean, Green, and Clean' Zone. What do we think each of those words mean for this zone? Turn to your elbow partner and discuss. *(Give students a minute to discuss their ideas with their elbow partner)* In this zone, we want to separate vegetation so we create little islands. That way, if one island catches fires, it won't travel to the next one as quickly (or at all). We want to let tree trunks breathe so we want to remove bushes and little trees/saplings from underneath the tree. By removing the vegetation underneath the trees, there's less of a chance for fire to climb up into the tree. And, like in Zone 0, we want to keep this zone free of dead pine needles, leaves, and debris."

   "In Zone 2, we can see that it's 30 to 100 ft away from your house and in this zone, we want to reduce potential fuel. So, continue separating trees and other vegetation, they want space to breathe and grow just like we want!"

5. **Activity: Yes/No Question Runaround** (0:25-0:30)

"Now let's see what we can remember from all of the zones. For our game, I will be asking questions and you need to move to the YES cone, on the right side, or the NO cone, on the left side, depending on what you think the correct answer is. Make sense? Perfect, let's try an easy question: are you 4th graders? (Everyone should move to the YES cone). Nice job! You all are pros. Alright onto the real questions."

From here, ask each of the below questions (the current order randomizes the YESes and NOs) and after students have decided on a side, ask for a raised hand to explain their choice, asking both sides if students are split. Once students have a chance to explain, give the correct answer and make sure all students understand the answer. Then, move onto the next question.

Cut questions as needed for time, but always end with question 10.

Questions:

1. Is defensible space the buffer between your house and the surrounding area? YES
2. Is Zone 0 the zone that's 0 to 5 feet away from your house? YES
3. Should we keep huge piles of pine needles close to our house in Zone 0? NO
4. Should we trim tree branches that are overhanging our chimneys and roofs? YES
5. Is Zone 2 200ft away from your house and beyond? NO (30-100 ft)
6. Should we let little trees or saplings grow underneath our older trees? NO
7. Should we replace flammable wood mulch with rocks or cement hardscaping around our house? YES
8. Should we keep uncovered woodpiles right next to our house? NO
9. Should we have tall bushes like juniper or manzanita right next to our house? NO
10. Are we all going to help improve our defensible space around our houses? YES!

6. **Conclusion:** (0:30-0:35)
   After the last question, wrangle the kids back nearby the poster.

"Now, we're all pros in defensible space right? Like we talked about earlier, defensible space helps reduce the risk of wildfires to your house. You can help by raking pine needles, clearing vegetation, and moving woodpiles! We live in a fire-prone area so we each need to do our part, and improving our defensible space is one thing we can all do. On your paper, let's take a minute or two to write down what you will do when you get home to improve your defensible space."

"Before we leave, does anyone have any questions? Thank you so much for listening and learning with us!"

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Resources & References: complete list of any resources (books /websites used to help compile this lesson)

- Cal Fire Defensible Space