15. Homes in the Forest: An Introduction to “Firewise” Practices

Overview: Students use their knowledge about vegetation, fuels, and fire behavior to develop some rules that can help people protect their homes from wildland fire. Then they apply their rules by assessing photos of wildland homes, asking how “firewise” they are, make recommendations to the home owners, and justify their recommendations.

Goal: Based on an understanding of wildland fire, students can assess how well homes are protected from fire and recommend ways to improve their protection.

Objectives: Given a list and/or images of things that homeowners can do to protect their homes from wildfire:

- Students can assess the hazards on and around homes in wildland settings.
- Students can recommend steps to improve their protection from wildland fire.
- Students can give reasons for their recommendations.

<table>
<thead>
<tr>
<th>Standards:</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
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<tbody>
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<td><strong>Common Core ELA</strong></td>
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<tr>
<td>Writing Standards</td>
<td>1,2,3</td>
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<td>Speaking and Listening</td>
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<td>ETS1.A,B,C</td>
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<td>ETS1.A,B,C</td>
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<td>Weather and Climate</td>
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<td>Strand 1</td>
<td>A,C,G</td>
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<td>Strand 2.4</td>
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<td>Strand 4</td>
<td>B,D</td>
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<td>B,D</td>
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</table>

Subjects: Science, Reading, Writing, Speaking and Listening, Health
Duration: one class period
Group Size: Whole class
Setting: Indoors
New Fireworks Vocabulary: firewise
Teacher background: All photos in this activity were provided on the homepage of Firewise, a product of the National Fire Protection Association: http://www.firewise.org/wildfire-preparedness/teaching-tools/photo-library.aspx
This activity is meant to challenge the students to apply their knowledge about fire science to a real-world problem. It is no substitute for a thorough assessment of a home’s protection from wildland fire. The Firewise website provides excellent materials for that purpose.

Here are the main Firewise questions and associated fire behavior principles for the photos used in this activity:

- Are there any ways that a surface fire could spread from the edge of the forest right up to the home? Why does it matter? (Surface fires need continuous fuels and spread especially well in dead, dry fuels.)
- Are there any places where an ember blown on the wind could land on or under something burnable and then start the home on fire? Why does it matter? (Fires need fuels... heat rises, so a smoldering ember under a deck or eave is dangerous.)
- Are there ladder fuels at the base of trees near the house? Why does it matter? (Surface fires can use ladder fuels to climb into tree crowns, and embers can fly from a burning tree crown)
- Do you think the road is wide enough and good enough for a fire engine to get to the house? (Not likely to emerge from their study of fire science, but worth bringing out in discussion)

Materials and Preparation

- Download and project E15-1_FirewiseHomes.pptx. OPTIONAL: If you want to go through additional photos with the class, download E15-2_MoreFirewiseHomes.pptx, which has another 8 photos.
- Make copies of Handout E15-1: Work to do on this home, for half of the class, and make copies of Handout E15-2: Work to do on this home, for the other half.

Procedure

1. Write on the left side of the board: “Ecosystems of the Sierra Nevada need wildland fire.” Write on the right side: “Wildland fire can hurt people and destroy homes.”

2. Ask: If you think the statement on the left is true (point to it!), stand up. Regardless of how many students stand up, have some discussion on this point. Ask for specific examples of organisms that need fire. Then have students sit down.

3. Ask: If you think the statement on the right is true, stand up. Have a short discussion about this point, if needed. Then have students sit down.

4. Explain: These two things may both be true, but they also create a problem about what to do with fire. Do we want it or not? There are no easy solutions to this problem. What do you suggest? Discussion. Have students explain why various approaches might work, based
on their understanding of fire and fuels. Try to get to the idea that people can take action to reduce the risk of injury or damage to their homes from wildland fire.

5. Let’s list some ways to protect a house and property from wildland fire. These are called firewise practices. In the middle of the board, write “Firewise Rules.” For each suggestion, get an explanation of why it should reduce risk. If the suggested rule is valid, list it on the board. You can use the table below to draw out some rules.

<table>
<thead>
<tr>
<th>What to do:</th>
<th>Why it works!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen in the porch and under the deck.</td>
<td>An ember could blow on the wind and land on or under the porch or deck, which is dangerous because fires need fuels...heat rises, so a smoldering ember could start the deck or porch on fire.</td>
</tr>
<tr>
<td>Safe driveway</td>
<td>The driveway needs to be wide and good enough for a fire engine to get to the house.</td>
</tr>
<tr>
<td>Limited surface fuels (vegetation)</td>
<td>Vegetation near the house create a greater opportunity for embers to catch and fire to spread.</td>
</tr>
<tr>
<td>No Trees overhanging house</td>
<td>Trees that overhand the house can easily spread fire to the house.</td>
</tr>
<tr>
<td>Green lawn</td>
<td>Green lawns are less likely to catch and spread fire.</td>
</tr>
</tbody>
</table>

6. Explain: Now let’s apply our rules and maybe add to them or change them. We’ll look at pictures of homes and decide what makes them firewise and what could be improved.

7. Replace the statements to left and right of your rules on the board with: “Good job!” and “Needs work.”

8. Explain: For each photo, we’ll list firewise practices under “Good job!” and things that the home owner should work on under “Needs work.”

9. Go through E15-1_FirewiseHomes.pptx. With each photo, ask students to apply their rules to decide firewise the home is. List their thoughts under “Good job!” and “Needs work”: 
How firewise are these homes?

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Good job! -- Screened in porch is good, screening under the deck might be good to keep embers out if it was metal screening (although this should not be done with wooden lattice. Also some experts now recommend NOT doing this because the screening can trap embers), wide driveway is good, green grass is good.

Needs work: Clean the roof, get the duff out from base of trees, remove some trees from back of house, make sure area under steps is free of burnables.

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Good job! Roof looks clean, there’s little vegetation next to house, only a little surface fuels, there are no trees overhanging the house.

Needs work: Replace wood shake roof, rake needles from under trees

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Good job! House has a clean roof, there’s little vegetation next to house, there are no trees overhanging house, there’s a green lawn.

Needs work: Water the lawn a little more. Could remove some of the trees behind the house.
Good job! House has a clean roof and a green lawn, there’s no vegetation close to house, house has shingle roof

Needs work: Get rid of the wood latticework below deck. Make sure there’s no flammable stuff under there. Replace bark chips below deck with rocks.

10. If you want to evaluate more photos, use E15-2_MoreFirewiseHomes.pptx. The slides and notes are listed at the end of this activity.

11. Ask: Now that we’ve looked at some real homes, can you think of anything that should be changed in our list of firewise rules or added to it. Discussion.

12. Work with the class to make a simple “Firewise checklist” – 5 or more questions that anyone can use to evaluate a home’s protection from wildland fire. Example questions:

   • Is the roof clean?
   • Is there a strip of un-burnable material separating vegetation from the house?
   • Are trees and shrubs close to the house? If so, are they short and far apart?
   • Are there low branches or other "ladder fuels" under the trees?
   • Is the lawn green?
   • Is there a screen or unburnable barrier to keep embers from landing under the deck and steps?
   • Is there a road wide enough for a fire engine to get in while people are getting out?

Assessment:

1. Give each student either Handout E15-1: Work to do on this home or E15-2: Work to do on this home.
2. Have them complete their individual handouts.

3. Then have them team up with someone who completed the other version, trade handouts, and try to improve both.

**Evaluation:**

Here are some points that the students should make about the two photos:

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Clean roof</td>
<td>Screen under the deck</td>
</tr>
<tr>
<td></td>
<td>Wide gravel driveway</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No vegetation right next to house</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Woods near house are open, airy</td>
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</tr>
<tr>
<td>Handout E15-2</td>
<td>Clean roof</td>
<td>Screen more under the steps and deck</td>
</tr>
<tr>
<td></td>
<td>Woods near house are open</td>
<td>Mow grass near house</td>
</tr>
<tr>
<td></td>
<td>Some barriers to keep embers from under deck</td>
<td>Water grass</td>
</tr>
</tbody>
</table>
Handout E15-1: Work to do on this home?

Name: _______________

1. Good job!

2. Needs work:

3. This will help because...
Handout E15-2: Work to do on this home?

Name: __________________

1. Good job!

2. Needs work:

3. This will help because...
More homes: How firewise are they?

Good job! Asphalt shingles – nonflammable.

Needs work: Clean the roof! Prune the limbs of trees that hang over the roof.

Good job! It’s difficult to see positives from this distance and at this angle.

Needs work: Clear out shrubs and trees close to the house! Make sure there’s a fuel separation between house and vegetation – rock or green lawn.

Good job! Asphalt shingles – nonflammable.

Needs work: Clean the roof! Trees seem to be hanging over the house, and limbs surround the chimney. Clear the branches away.
Slide 5

**Good job!** Trees in the area around the house have been thinned. The house looks free of clutter such as wood piles. The roof is clean.

**Needs work:** Get rid of logging slash. Prune lower branches from trees. Now that the area close to the house has been opened up, don’t let it get brushy or dry out. Establish and maintain green lawn.

Slide 6

**Good job!** Clever the way rocks have been used to landscape around the foundation. It looks like there’s green lawn on the other side of the sidewalk. It looks like trees in the background are spaced far apart.

**Needs work:** Can’t think of anything other than maintenance.

Slide 7

**Good job!** It looks like there’s some green lawn in the foreground.

**Needs work:** Are those bark chips next to the foundation? That’s not a good idea. Keep the landscaping shrubs watered and moist.

Slide 8

**Good job!** The landscaping here obviously protected the home from a severe fire. The shrubs in the margin between forest and house are dead, but the rocks under them and the green lawn kept the fire from reaching the house. It looks like the roof is asphalt shingle (fire resistant). It is likely that the home owner keeps the outside of the house clear of debris that could ignite from firebrands.

**Needs work:** Hard to find anything to suggest.
Good job! Rock foundation for deck is a good idea. The forest is very open around the house. The house is built on a flat spot rather than on the hillside. It looks like there’s a green lawn around the house.

Needs work: There seems to be a lot of vegetation around the deck. Reduce it or make sure it’s plants that are difficult to ignite.