

# **Diseases, Fire, and Pests-oh My**

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**Adapted from:** Canadian Forestry Association. "Diseases, Pests and Fires- Oh My!"

Canada's Forests: Source of Life vol. 4. PSI Print Solutions: Ontario  
2003.

**Time:** 50-60 minutes in class or at headquarters  
15 minutes on trail

## **Overview**

This activity introduces participants to the concept of disturbance specifically fire, wind, pests, disease and animal browsing, using a game, analysis of the activity, and then applying the lesson to the HJ Andrews Lookout Creek Trail or any other old growth trail.

## **Benchmarks Addressed**

SC.082.C.1(1) Identify and describe the factors that influence or change the balance of populations in their environment

SC.05.2.B.1 (1) Describe the life cycle of an organism

SC.05.2.C.1(7) Describe how adaptations help a species survive

SC.05.4.C.1(1) Collect, organize and summarize data from investigations

SC.05.4.D.1(10) Analyze scientific data to develop and present conclusions

This activity teaches about forest disturbance and allows students opportunities to graph the results of data that they generate through the activity.

## **Learning Objectives**

By the end of this activity, participants will be able to:

1. Identify wind, fire, disease, pests, and animal browsing as factors that cause disturbance in a forest
2. Describe different effects of each disturbance
3. Recognize disturbance on trail and suggest plausible sources

## **Materials Needed**

- ❑ Paper clips, poker chips or other small items (500 total)
- ❑ Bucket
- ❑ Construction paper and yarn signs designating disturbances (4 sets, w/ enough in each set for an eighth of the class)
- ❑ Copy of table for "Chief Forester" to record data
- ❑ Large gym or open outside place to do the activity

## **Background Material**

In Oregon, fire as a disturbance is an important component in our forests. There are different types of fires; some that burn below ground, some that only burn in the canopy, and some that burn through the under story layer. As discussed in “Fire Friendly Forests” fires are not a solely destructive entity. They allow for the growth of new vegetation and some trees even need fire to release their seeds. Diseases like Laminated Root Rot and Swiss Needle Cast have been a source of destruction for several stands, defined area of the forest that is relatively uniform in species composition or age, in Oregon.

Although fire is one of the most discussed disturbances it is not the only. Pests and disease play a large role in forest disturbance. Bark beetles, gypsy moths, and other defoliating insects are pests that our forests struggle with yearly.

Wind is another source of disturbance that can have a negligible effect on trees in the center of the forest, or a intense impact that shapes trees or uproots them on the outside of a forest. Along the trails at the Andrews there are (probably, will verify when we can actually see the site) trees on the ground with their entire root wad and mineral soil attached; these are trees that have been blown over.

### **Activity Description**

#### **Step 1. Getting Started: Introductions and discussion of disturbance (10 minutes)**

Have the class brainstorm ideas of what they think a forest disturbance is. It may be helpful to go over what a forest needs to survive: water, space, nutrients, and shelter. Then discuss what may affect those characteristics; disease, wind, fire, snow damage, and animal browsing. How do each of those disturbances affect, positively and negatively, the forest?

Wind: thins trees so trees that need more sun can grow

Disease: kills groups of trees, allows for natural selection to occur

Fire: can kill huge parts of forest, present property risks, recycle nutrients, allow forest to start-over

Animal Browsing: strip bark and break down trees’ defense system, allows non-browsed trees more resources to grow

#### **Step 2. Explain Activity (7 minutes)**

- Split the class in half; half will be the forest, the other half will be types of disturbance
- Give the forest 20 paper clips/poker chips each explaining that each object represents something they need to survive. Instruct that the forest need to find a good place to grow, within the field and have them spread out

- Divide the remaining half of the class into 4 smaller disturbance groups
  - Deer/Moose/Wildlife-** they are allowed to walk into the forest, tag a tree, take 1 life token (paper clip), drop it into the bucket and go out again
  - Wind-** they are allowed to walk into the forest, tag a tree, take 1 life token, drop it into the bucket and go out again
  - Insects/Disease-** they are allowed to walk into the forest, tag a tree, take 2 life tokens, drop it into the bucket and go out again
  - Fire-** they are allowed to walk into the forest, tag a tree, take 1 life token, tag another tree, take a life token, and continue until they have 10 tokens, then drop into the bucket. Once fire collects 10 tokens it is burned out.
- Take one volunteer to be the Chief Forester, they tally on the tally sheet how many tokens each disturbance took from the trees. Variation: 4 students could be a forest team, 1 student tallies each disturbance, to spread the work load around. \*\*if any tree loses all its tokens, it is dead and sits down

### Step 3. Doing the activity (23 minutes)

- Allow the deer 2 minutes to collect life tokens
- Chief forester counts up number taken
- Did any trees die? Why? Have a brief discussion. It is likely that no trees died because the effects of browsers are generally spread throughout various species in the forest. However, if one of a browser's food sources was affected by disease or drought or if there was too great a population of browsers, then it is possible that some trees would become overgrazed and die.
- Before the next round, subtly remove all but 1 life token from 2 of the border trees (in a forest these trees are most susceptible to blow down)
- Allow the wind 1 minute to collect tokens
- Chief forester tallies
- Did any trees die? Why? Outside trees take most of the force from the wind, those trees probably died. The trees in the center of the forest are usually protected from wind gusts.
- Have trees collect original number of tokens and return to spots
- Send in disease/insects for 2 minutes
- Tally and discuss effects of insects/disease. Some pests/diseases only affect one species. Some diseases can be passed from tree to tree through roots or by insects. Some trees can fight back against pests by closing their holes with sap or other defense

mechanisms, but if the tree is under any other type of stress, its ability to fight back is weakened.

- Have trees collect original number of tokens and return to spots
- Allow fire 3 minutes to collect 10 tokens each without returning back to bucket
- Tally and discuss the impacts of fire. Lots of trees may die in this round? What is the benefit of a lot of trees dying? New grasses and trees can grow. Some trees can only release their seeds if there is fire.
- Total effects of all disturbances; which disturbance took the most life tokens? Fire will probably have the greatest effect on the forest.

#### **Step 4. Gauging Understanding (10-15 minutes on trail)**

While walking down the Lookout Creek Trail, be aware of any downed or sick looking trees. When one is found, ask students “what happened to this tree?” Look for signs of burnt bark or dead foliage for clues. Students should go through the types of disturbances for what happened to the tree. As sites are identified on the trail they will be included in the lesson plan to quiz students.

#### **Step 5. Post trail activity or Back at School (20 minutes)**

In class, or back at HJA headquarters, graph disturbance results in pairs per tree or as a group. Review types of disturbance and what their effects were