



Canon Envirothon

Curriculum Guidelines

FORESTRY

CORE ACTIVITY OUTLINE

The key points for each Canon Envirothon topic are “fleshed out” into core activities.

- Each of the key points is included in one or more of the core activities.
- Each core activity contains extended activities, as well as the top resources and professional contacts. Key vocabulary words are also included.
- The National Science Standards suggest evaluations for each activity should encourage the students to process the data they collect during the activity, and provide solutions based on the data. This ties each activity into the issues portion of the contest.
- Evaluation is based on the information provided for each core activity and from the data students collect. This allows students to make educated decisions and create solutions for the key issues.
- Core activities will be evaluated using a performance-based assessment.

FORESTRY CURRICULUM

Canon Envirothon Forestry Key Points

- 1F Identify common trees without a key and identify specific or unusual species of trees or shrubs through the use of a key.
- 2F Understand forest ecology concepts and factors affecting them, including the relationship between soil and forest types, tree communities, regeneration, competition, and succession.
- 3F Understand the cause and effect relationship of factors affecting tree growth and forest development (climate, insects, microorganisms, wildlife, etc.).
- 4 F Understand how wildlife habitat relates to forest communities, forest species, forest age and structure, snags and den trees, availability of food, and riparian zones.

- 5F Understand how the following issues are affected by forest health and management: biological diversity, forest fragmentation, air quality, aesthetics, fire, global warming, and recreation.
- 6F Understand basic forest management concepts and tools such as how various silvicultural practices are utilized, the use of tree measuring devices, and the best use of management practices.
- 7F Apply silvicultural concepts and methods to develop general management recommendations and goals for a particular situation.
- 8F Identify the complex factors that influence forest management decisions (e.g., economic, social, and ecological).
- 9F Understand the value of trees in urban/suburban settings and the factors affecting their health and survival.
- 10F Describe specific adaptations of wildlife to their environment and their role in the ecosystem.

Suggested Core Activities

- Students will identify common trees and shrubs in their local area without a plant key, and identify specific or unusual species of trees and shrubs using a key. Using plant presses, students will collect samples, and create plant identification collections for future study. 1F
- Students will conduct tree ring research by using tree trunk slices to determine tree age, growing conditions, insect damage, and weather conditions. 3F
- Students will use a clinometer, increment borer, diameter tape, and other forestry management tools to measure trees in their local area. Using a variety of volume tables, the students will be able to calculate the volume of lumber for each tree. 6F
- Students will download the PDF file “Forest Health” from eco-links written by the Temperate Forest Foundation. Team members will present their research on how the following issues are affected by forest health and management: biological diversity, forest fragmentation, air quality, aesthetics, fire, global warming, and recreation. 5F
- Using the Penn State “virtual forest tour” on their computer, students will understand how forest practices and policy affect sustainability. Students will compare a mixed eastern hardwood forest in Pennsylvania to a Douglas fir forest in Oregon. 2F, 3F, 6F, 7F, 8F
- Students will create a presentation display showing the value of trees in an urban setting, and the factors affecting their health and survival. 9F

- Students will make a map of their local area forest or park, including wildlife inventories, tracks, habitat, food sources, and specific wildlife adaptations. 4F, 10F

Top Resources:

- Natural Resource Skills-Tree Identification
<http://gaia.flemingc.on.ca/~dhendry/nrstrid.htm> (1F)
- Dendrology at Virginia Tech, Dept of forestry. Good maps, identification and quizzes for Canada and the US.
<http://www.cnr.vt.edu/dendro/dendrology/map/zonemap.htm> (1F)
- Canadian Forestry Association
<http://www.canadianforestry.com/> (All)
- Penn State virtual forest
www.virtualforest.psu.edu (2F 3F 6F 7F 8F)
- University of Arizona tree ring research. Students can participate in tree ring exercises.
<http://tree.ltrr.arizona.edu/dendrochronology.html> (3F)
- Canadian Forest Service
<http://www.nrcan.gc.ca/cfs-scf/> (All)
- Temperate Forest Foundation-Silviculture practices, management, and eco-links.
<http://www.forestinfo.org/> (All)
- Canadian Pulp and Paper Association
<http://www.cppa.org/english/> (All)
- Private Forest Management Team. This site includes many forest management areas including measuring, harvesting, growth, yield, pests and disease, wildlife, and many others.
- <http://www.pfmt.org/default.htm> (All)
- Auburn University- Instructions and care of the increment borer.
http://www.pfmt.org/inventories/increment_borer.htm (6F)
- Canada Sustainable Forest Association
<http://sfms.com/home.htm> (All)
- Tree measurement volume tables

- <http://www.pfmt.org> (6F)
- Canada measurement volume tables
http://nfi.cfs.nrcan.gc.ca/terms/procedures_e.html#volumespecs (6F)
 - Virginia Dept of Forestry
<http://www.dof.state.va.us> (All)
 - Idaho Forest Products Commission-Forest health and conditions, biodiversity, and management implications.
<http://www.idahoforests.org/health.htm> (3F 5F 7F 8F)
 - Canada Forest Health
<http://www.atl.cfs.nrcan.gc.ca:8080/cfsnet/index-e.html> (3F 5F 7F 8F)
 - Canada Wildlife
http://www.ec.gc.ca/wild_e.html (3F 4F 10F)
 - Urban forestry
www.americanforests.org/resources/urbanforests/ (9F)

Forestry Extended Studies

Students will explain how forest landowners can create the habitat requirements needed for the following wildlife species: bat, ruffed grouse, Canada goose, owl, whitetail deer, and wild turkey.

- <http://www.dof.virginia.gov/mgt/wildlife/index.shtml> (4F 10F)

Students will recommend harvesting methods for even and uneven age stands. They will list the benefits of shelterwood, seed tree, and clearcut methods.

- <http://www.forestinfo.org/Discover/reforest.htm> (2F 6F 7F)

Students will list and diagram the different characteristics of the following forest types: Savanna, open, dense, understory, and complex.

- <http://www.idahoforests.org/health2a.htm> (2F 5F 7F 8F)

Students will map, label and define the 12 forest regions of Canada.

- http://www.canadianforestry.com/html/forest/forest_regions_e.html
(2F 3F 5F 7F 8F)

Forestry Team Presentation Assessment

Purpose: Using a local forest type as their subject, students will describe the natural and human assisted regeneration of a forest after a natural or human disturbance such as a forest fire, insect invasion or human caused deforestation event. Students will create an educational display with labels and descriptions and defend the use of human assistance along with natural regeneration processes.

The display should contain the following Key Point information.

- The cause of the disturbance and its effect on forest communities (5F)
- Forest scenes that represent various ages (succession) (2F)
- Forest practices, harvesting techniques and regeneration (2F) (6F) (7F)
- Natural and human threats to the forest's health (5F) (9F) (8F)
- Wildlife placed in their native habitat. (3F) (10F)

Labels to include:

- Soil types in your region (2F)
- The most common tree species (1F)
- Competitive trees, shrubs or invasive species (1F) (2F)
- Insects, wildlife and microorganisms that effect tree growth (3F) (9F) (10F)
- Forest structural labels, canopy, undergrowth, snags & riparian areas (4F)
- Specific adaptations of wildlife to their environment (3F) 10F)

Resources:

http://instruction.aaps.k12.mi.us/enved/2nd_grd/images/forestsucccess.jpg

<http://www.forestinfo.org/Products/eco-links/index.htm>

<http://www.iplifeoftheforest.com/>

www.ext.vt.edu/resources/4h/virtualforest

http://www.modelforest.net/e/home_/index.html

<http://www.itto.or.jp/live/index.jsp>

http://www.cfl.scf.rncan.gc.ca/ecosys/home_e.html

<http://www.hww.ca>

A complete glossary of forestry terms can be accessed at:
<http://www.for.gov.bc.ca/hfd/library/documents/glossary/>

Assessments for **Canon Envirothon** Preparation

The National Science Standards recommend that multiple and varied assessments be employed when attempting to evaluate science understanding. Since the Canon Envirothon contest requires students to respond in a variety of ways (performance tasks, oral presentation, written response and graphics), the preparation for the Envirothon will incorporate each of these styles of assessment and evaluation.

Core Activities

Field surveys, model building and laboratory protocols each have specific learning targets. Many of the activities have built-in assessment sections. In general students should be able to:

- _____ Select and effectively use tools in a safe manner
- _____ Collect, record and analyze data in an organized fashion
- _____ Use resource material, manuals and field guides
- _____ Demonstrate teamwork while investigating solutions to problems
- _____ Clearly communicate the results of the investigations

Display Presentation Sessions

Students will provide solutions to problems presented in the issues portion of the contest. Teachers and team coaches should become familiar with the Canon Envirothon oral presentation scoring criteria. It is recommended that local agency professionals be invited to judge the presentations. <http://www.envirothon.org/competition/judging.php>

In general, students should be able to:

- _____ Ensure that all team members contribute to the presentation
- _____ Make the central theme clearly written or diagramed on the display
- _____ Use in context important vocabulary related to the topic
- _____ Include graphics that are technically correct and labeled
- _____ Use the display effectively during the oral presentation

On-line Sample Tests

The Canon Envirothon web site contains sample tests for each of the Envirothon topics and a list of issues. Many state and provincial Envirothon Web sites also contain sample tests.

<http://www.envirothon.org/competition/tests.php>

http://wps.prenhall.com/esm_wright_envisci_8/0,8543,1052446-,00.html

Energy and Solid Waste

- Students will create an educational display showing the benefits of forestry biomass resources for creating energy. The display will include pictures and descriptions of nine short rotation hardwood trees recommended for biomass use.
<http://www.eere.energy.gov/RE/biomass.html>
- Students will discuss the effects of increased paper recycling on timber harvests in North America.
<http://www.yale.edu/pswp/#inceedeffect>
- Students will outline the importance of the forest products industries in Canada and the United States and make a graph comparing the net electricity use of the major manufacturing industries to the forest products industry.
http://www.eia.doe.gov/cneaf/solar.renewables/at_a_glance/wood/contents.htm
- Students will compare the energy efficiency between wood fuel and fossil fuel by analyzing the net energy output between oil burning stoves and wood burning stoves.
<http://www.energyadvocate.com/fw13.htm>
- Wood fuel provides 7% of the world's energy, but 77% of this energy is consumed by developing countries. Students will make a chart showing the importance of wood energy in the world, and compare the energy uses of the United States and Canada to world use.
<http://www.fao.org/forestry/site/14011/en>
- Students will research the amounts of wood residue and solid waste wood that is available for recovery. They will analyze the two main sources, forest residue and primary timber processing, and make a graph of their data.
<http://www.treearch.fs.fed.us/pubs/viewpub.jsp?index=7113>
- Students will create a power point presentation comparing paper recycling facts in the United States, and Canada.
<http://www.paperrecycles.org/>
http://www.recycle.nrcan.gc.ca/background_e.htm

- Students will study the controversy over the forest management practices in the Wao Kele o Puna rain forest in Hawaii, where the drilling of geothermal wells for electricity production has been proposed. The students will divide into two groups, and debate the issues.
http://www.findarticles.com/p/articles/mi_m1016/is_n7-8_v97/ai_11012471#
- Students will create an educational display showing the reduced energy costs associated with trees planted for energy conservation in our cities.
<http://www.americanforests.org/graytogreen/energy/>

REFERENCES

Canada Natural Resources Forestry and Energy Fact Sheets

<http://www.nrcan.gc.ca/statistics/factsheet.htm>

Georgia Pacific Forestry Education in Nature

<http://www.gp.com/EducationalinNature/subjects.html>

Canada Renewable Energy Forestry

<http://www2.nrcan.gc.ca/es/oerd/english/view.asp?x=700&mid=33>

BLM National Energy Initiatives

<http://www.blm.gov/energy/>

New Brunswick Natural Resources Forestry and Energy

<http://www.gnb.ca/0079/index-e.asp>

U.S. Dept. of Energy

<http://www.eere.energy.gov/>