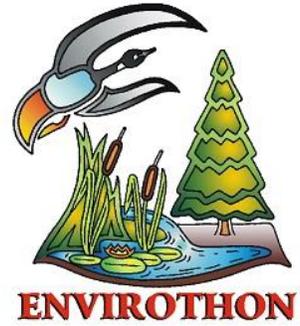


NOVA SCOTIA ENVIROTHON

Sample Forestry Test Questions



Write in the full common name for each leaf sample.

Write in the full common name for two of the twig samples.

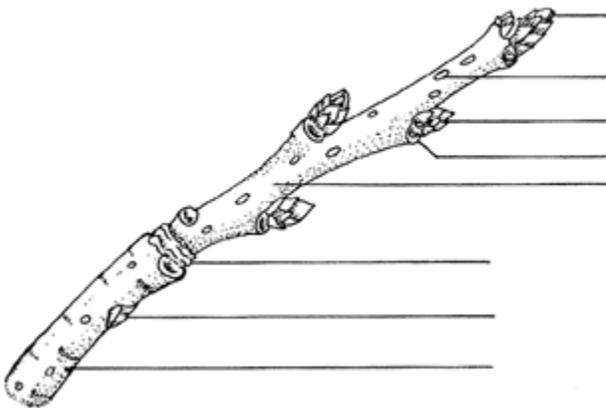
Write in the full common name for three of the needle samples.

Bonus Give the full Latin, French or Mi'kmaw name for any species

Trees of what species produced the cones on the table?

Label the parts of a winter twig.

Parts of a Winter Twig



What does a leaf's stomata do?

True or False – Nova Scotia has a greater percentage of privately owned land than any other province except PEI.

Name a species found in Nova Scotia that is well adapted to take advantage of fire. And how does it?

What is the difference between an abiotic factor and biotic factor that affects tree growth?

Identify the division (deciduous vs. coniferous) and species of the tree and measure the height, diameter, and age of the tree using the equipment provided.

Identify the species of each seedling, describe the site conditions best suited to its growth (i.e. where best to plant this species) and one commercial end use of the tree when fully grown.

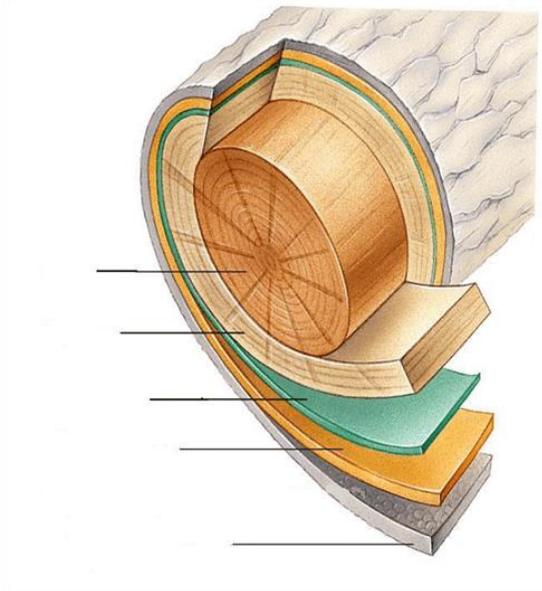
Trees provide a wide range of environmental benefits. Name three of them.

What is the scientific name for the portion of the tree sapwood that is responsible for water transport up the tree?

Identify 3 specific sites in a tree where growth occurs.

Observing the core sample provided, which has been extracted through use of an increment bore, determine the tree's age and describe its growth rate (in terms of fast or slow) by period (early, middle, late growth).

Place the appropriate letter at the beginning of the correct line in the figure below. A) Sapwood (Xylem) B) Bark C) Phloem D) Heartwood E) Cambium



Trees can be divided into two major divisions. These are: Circle correct answer.

Springwood and summerwood

Broadleafed and conifer

Hardwood and deciduous

Conifer and softwood

Heartwood and Sapwood.

Which family of softwood trees requires two years to produce mature cones?

Of the following processes, which refers to breaking seed dormancy? Circle the correct answer.

- Pollination
- Stratification
- Fertilization
- Eutrophication

Which of the following is the name given to the seed of an oak tree? Circle the correct answer.

- Pod
- Acorn
- Catkin
- Samara

Which two (2) of the following answers best describe the leaf of a white ash tree? Circle the correct answer.

- Simple
- Compound
- Alternate
- Opposite

Define an even-aged stand?

What system of harvesting is best used when managing an uneven-aged stand? Circle correct answer.

- Selection
- Shelterwood
- Clearcut

If the adjacent forest area was to be intensively managed for biomass production, describe what tree species you would favour, and the management program you would use (Species, Rotation Age, Regeneration Method, Harvest Method; for each please justify your answer). **Bonus** Estimate the energy yield (in liters of oil) per hectare that your project would produce when harvested? Show your calculation: Use the following information: Tree growth rate: 10 m³ per ha per year; Rotation age for biomass: 25 years; Moisture content of biomass: 40%; Green weight: 1.0 tonnes per m³; energy equivalent per green tonne@40% moisture content: approximately 300 liters of oil.

You are holding a two-factor prism (BAF2) during a timber cruise and count eleven trees that are “in” during the sweep. Eight of the trees are softwood and three trees are hardwood. Four more softwood trees (>10cm), and one hardwood tree (>15cm) fall just outside the plot during your sweep. The co-dominant height for the softwood and hardwood are 17m & 15m respectively. What is the total basal area broken down into softwood and hardwood in the plot? Please show your calculations.

Tree planting is an important part of forest management. Why is it important not to plant a tree too shallow? Circle the correct answer.

- Minimizes tree planter’s chance of injury.
- Decreases the chance of insect and fungal attack.
- Ensures the seedling’s roots are at the right depth.
- Reduces risk of deer and rabbit browsing.

What tree species would be a good choice to plant in Atlantic Canada on a lower slope with poor drainage that is also associated with Labrador Tea and Sphagnum moss? Circle the correct answer.

Red spruce

Balsam fir

Black spruce

White Pine

Which of the following tree species are native to NS forests? (Circle all that apply)

Scarlet Oak

Red Oak

Jack Pine

White Pine

Eastern Hemlock

Scots Pine

Norway Maple

Pitch Pine

Black Cherry

Showy Mountain Ash

Douglas-Fir

Honey-Locust

Bonus What species of trees would be the most typical components in these Nova Scotia Ecotypes (List 2 species per Ecotype) Select from the following: black spruce, balsam fir, white pine, white ash, black cherry, balsam poplar, red maple, elm, red pine, jack pine

Fresh Very Rich Floodplain

Coniferous Wetlands

Poor Dry/fresh Conifer

Mark the following statements as True or False:

Conifer trees loose needles in the fall

The color change of leaves in the fall is primarily stimulated by cool weather

Plants use all colors of light except green

Trees add a wide, light growth ring in summer and a dark thin growth ring in spring

The cork cambium generates new bark cells

Mycorrhizae is a group of fungi which attack older tree roots

Observe the snag identified with flagging tape and identify what good is it serving now? What probably caused its death? What is its present height? And where is it on the aerial photograph?

Examine the tree cookie. How long ago did its growth patterns change? What might have caused this change in growth?

Fill in the following answers concerning forest legislation and regulations in Nova Scotia:

Channel width of streams which require a riparian buffer of 20 meters on each side: _____cm.

Describe what amount of snags and large woody debris that must be left following a harvest operation. Circle the correct answer:

As close to natural amounts as possible

5 trees and 10 large logs per hectare

Equivalent to 15 cubic meters of material

Nothing is required by law

Minimum number of trees per clump required to be left standing on a harvest operation?

Where there is more than one clump, clumps are to be situated no more than ____m apart and no closer than ____m.

What is the minimum distance a clump has to be from an edge in meters?

What is the maximum opening size allowed in forestry operations in Nova Scotia?

What is the minimum size (width) in meters a wildlife corridor must be in Nova Scotia?

A Wildlife corridor that is at least _____ meters wide must be left when cut sizes exceed ____ha.

What is the riparian buffer width required for the stream crossing the trail?
____m?

Name two items that are required on a forestry operation during fire season.

What percentage of Nova Scotia's land is privately owned?

What percentages of Nova Scotia's land are federally owned?

How many people both directly and indirectly does the forest industry in Nova Scotia employ?

You have just completed a harvest and have produced many sugar maple saw logs. Give three examples of products which can be made from these saw logs? (Not fuelwood)

Give three examples of non-timber forest products available from NS woodlots?

The prism is used to determine the "basal area" of a forest stand. What does "basal area" represent? Circle the correct answer.

The average diameter of the trees on a hectare of land

The number of trees per hectare

The total surface area in square meters of the tree "stumps" on one hectare at breast height

The volume of wood per hectare that is growing at one period of time.

Measure diameter of tree in a stand.

Use a prism to calculate the basal area of a selected forest stand.

Using a clinometer determine the height of a tree.

Briefly explain one management technique you could use to accelerate diameter growth of the stand? Briefly explain your answer.

List 2 best management practices to protect soil from compaction that should be done following stand harvest.

Identify one wildlife species that could be threatened by extensive biomass harvesting (i.e. taking all trees and all limbs and slash during harvesting) and describe two habitat features important to that species that could be at risk.

Why is micro-site selection important when planting trees? Circle the correct answer.

To help predict future levels of coarse woody debris.

Increases abiotic factors in order increase tree development.

Helps as an indicator of proper tree density.

Important indicator of future species diversity.

Bonus How many trees per hectare ($10,000\text{m}^2$) would you plant at 2.1 Meter spacing?

When a trail within a forest stand is used actively by recreationalists (bikers, hikers, etc.) list two environmental impacts that this use could have on this site?

The spruce budworm is most commonly agreed to be the most destructive forest insect in North America. In Eastern Canada, massive epidemics of this pest occur periodically at 30 year intervals. These epidemics occur in spruce-fir forests resulting in losses of millions of cubic meters of spruce and fir. Traditionally the use of chemical pesticides has been used to control the outbreaks of this insect. However, public opinion has often disagreed with the use of chemicals, even if the chemicals used have been tested and determined that they are safe.

You are a forester that has been hired by a prominent landowner Mr. Smith to manage 20,000 hectares (8100 acres) of land composed primarily of mature/over mature balsam fir and spruce. There is also a minor component of stands containing white birch, trembling aspen, as well as few older stands containing white pine and hemlock. Mr. Smith is growing concerned to hear that another spruce budworm epidemic is predicted to occur in the next 5-7 years and has hired you to come up with a management strategy to protect their forest from the future outbreak. He is interested in managing his woodlot to have a continuous wood supply, therefore, extensive harvesting is not an option.

List and briefly explain (at least 2) what management applications, without the use of pesticides, that you plan on implementing to reduce your forest risk to the spruce budworm in both the short-term and long-term.

Mr. Smith is also interested in utilizing some of his woodlot for bio fuels. He has asked you for input on species that would be suitable for consideration for biofuels. List two species that would be appropriate to recommend for this. Briefly (one sentence) state your reason for picking the species.

List two ways the Forestry Profession is using GPS systems in their everyday work practices.

Generally, forests are identified as unique stands. A forest stand is the essential unit of silviculture and is defined as a contiguous group of trees that is sufficiently uniform in: (Circle correct answer)

Tree size, soil type and slope position
Species composition, age class and size
Elevation, tree height and diameter
Site index, origin and development stage.

Generally, two site factors that have an influence on the development of trees within a stand, and on which foresters can have a significant influence are: (Circle correct answer)

Light and space in the canopy
Soil moisture and water table
Air quality and acidity
Insects and fungus diseases
Slope and soil quality

Define/explain shelterwood harvesting.

List three ways trees can reproduce.

List 2 reasons why full tree harvesting should not be used on sensitive sites in NS's forests.

Select the correct definition of "full tree harvesting".

Removing all of the trees from a forest area in one cut
Harvesting only fully grown, large bushy trees

Cutting trees & moving them to roadside before removing the tops & limbs
Cutting trees when they are full of snow so they fall easier
Harvesting trees in summer when leaves are full

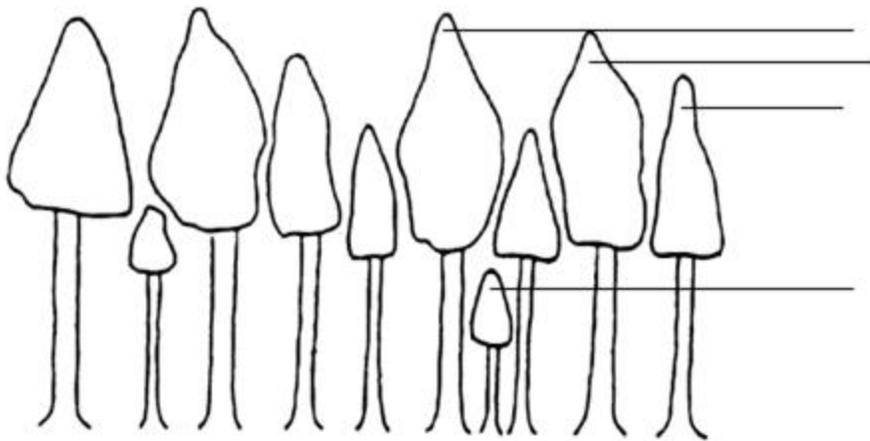
Name 3 things to avoid during a thinning operation to ensure the health and vigor of the remaining trees?

What is the most common use for sugar maple wood in NS?

Contrast the carbon sequestration vs. carbon storage functions of old forests vs young forests.

Trees are commonly classified as to the relative position of their crowns within the forest canopy. Define the following tree classifications: Dominant, Co-Dominant, Intermediate, and Suppressed.

Label the trees in the following diagram according to their crown class:



In a “thinning from below” trees from which class(s) would be removed?

Thinning forest stands allow resources such as light, water, and nutrients to be concentrated on fewer trees, therefore improving tree health and resistance to disease, insect attacks and fire. You are marking an understory thinning also known as a thinning from below. Which trees, by crown position, do you concentrate on marking for this thinning? Circle correct answer.

Dominant and co-dominant trees

Co-dominant and intermediate trees

Dominant

Intermediate and suppressed trees

What information does a Forest Ecosystem Classification provide to a forest manager? Circle the correct answer.

Information about site, soil moisture and nutrients, and tree and understory plant composition
Identifies non-timber uses of different tree species.
Information on lumber exports to other provinces.
Provides maps of various watercourse locations in a site.
Provides information to identify defoliating insects found in Nova Scotia

Mr. MacDougall has not harvested hay from his fields for ten years and the grasses are beginning to convert to an early successional forest. Which tree species would you expect to find growing in these fields? Circle the correct answer.

Yellow birch, hemlock, Sitka spruce

Hemlock, white pine, sugar maple

White spruce, red maple, white birch

American beech, Jack pine, red maple

White oak, black cherry, red oak

Out of the following list, what is the most appropriate safety equipment for an operator of a mechanical feller when working outside of machine? Circle the correct answer.

Hardhat, safety glasses, suspenders, chainsaw pants.

Hardhat, safety glasses, work gloves, steel-toed boots.

Safety glasses, chainsaw pants, work gloves, fleece jacket (warmth).

Hardhat, work gloves, fleece jacket (warmth), chainsaw pants.

Out of the following list, what is the most appropriate safety equipment for an operator using a spacing (clearing) saw? Circle the correct answer.

Hardhat, safety glasses, suspenders, chainsaw pants.

Hardhat, safety glasses, work gloves, steel-toed boots.

Safety glasses, chainsaw pants, work gloves, fleece jacket (warmth).

Hardhat, work gloves, fleece jacket (warmth), chainsaw pants.

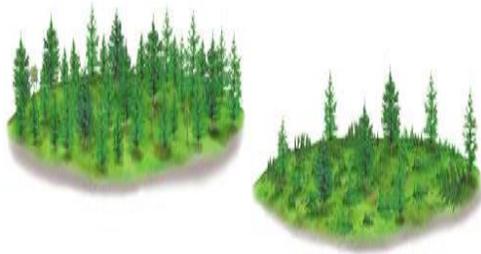
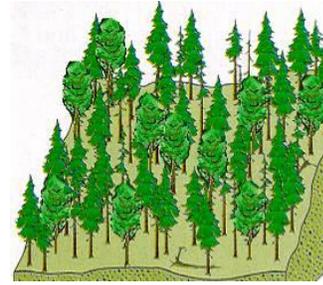
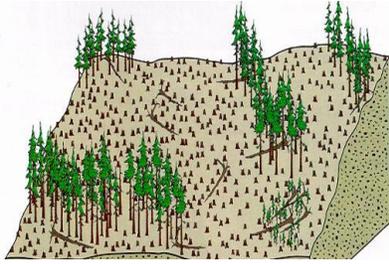
Hardhat, hearing protectors, face screen or safety glasses, Steel toed boots, pressure bandage.

Dead trees or snags in forest stands are beneficial to many wildlife species. Identify four species that utilize snags and explain how they use them (identify 2 mammal and 2 bird species).

Below are 4 different Silvicultural Methods, illustrated by a diagram and adjacent picture. For each diagram and picture set, identify the Silvicultural system (clearcut, commercial thin, single tree selection, pre-commercial thin) and list which forest condition(s) are appropriate for treatment by that method.

Possible Forest conditions:

- a) mature, even-aged, short lived species
- b) 30 years old, even-aged, good growing site, not exposed.
- c) Long lived, uneven-aged
- d) Mature, even-aged white spruce stand.
- e) 50 year old balsam fir
- f) Sugar maple, yellow birch and white pine
- g) 10-15 plantation, density over 12,000 stems/ha
- h) 5 year old, naturally regenerated balsam fir stand.



Before deciding what silvicultural practices to use, the forester must consider how tolerant the tree species in the forest stand are to shade. Identify if the species below are shade tolerant, intolerant or intermediate.

Red oak

Balsam fir

Yellow birch

Red maple

Red spruce

Trembling Aspen

You have been hired as a forestry consultant to recommend silviculture treatments on Mr. Brown's woodlot. You have cruised the woodlot, and must determine the best management practices for each of the 5 stands in his woodlot:

List of possible treatments:

Clearcut	Shelterwood cut
Selection cut	Precommercial thinning
Planting	Site preparation
Weeding	Commercial thinning

Stand #1 – Young balsam between 3-6meters tall, over 10,000 stems per ha

Stand #2 – 50 year old dense, Red Spruce

Stand #3 – 85 year old Yellow Birch, Sugar Maple, little regeneration

Stand #4 – Unevenaged stand of Red Maple, Red Spruce, White Pine

Stand #5 – Over mature White Spruce

What is an Epicormic branch?

Trees can often be found growing in urban areas as well as the forest, as in this stand. There are both advantages and disadvantages to having trees in urban settings. In point form, give three advantages and three disadvantages of having trees in urban areas.

Define the following forest succession stages.

Stand Initiation phase	Stem Exclusion phase
Understory Reinitiation	Old Growth phase

What information does a Forest Ecosystem Classification provide to a forest manager? Circle correct answer.

Information about site, soil moisture and nutrients, and tree and understory plant composition.

Identifies non-timber uses of different tree species.

Information on lumber exports to other provinces.

Provides maps of various watercourse locations in a site.

Provides information to identify defoliating insects found in Nova Scotia.

Match each Acadian Forest species to its most common past or present use.

Black spruce

Sugar Maple

Balsam Fir

White Cedar

Red Maple

Fuelwood

Christmas trees

Shingles

Pulpwood

Hardwood flooring

Bonus Two forest technicians recently completed a cruise of Stand 'X'. They used a prism with a basal area factor (BAF) of 2m²/ha. The table below shows the data they collected on one (1) of their plots.

Tree Diameter (Number of trees tallied)

Species	10 cm	12 cm	14 cm	16 cm	18 cm	20 cm
Balsam Fir	0	1	1	1	0	1
White Spruce	0	1	1	3	2	1
Total						

Using the above data, what is the average tree diameter? Please include the correct units.

What is the basal area? Please include correct units.

Using the Merchantable Volume Table below, calculate the merchantable volume of this stand. Please include the correct units.

Merchantable Volume Table (m³/ha)
Average Merchantable Tree Diameter (cm)

Basal Area (m ²)	10	12	14	16	18	20
4	9	12	15	17	20	21
8	18	25	30	35	39	43
10	22	31	39	43	47	51
12	27	37	46	52	59	64
16	36	50	61	70	78	85
18	45	62	76	87	98	107
20	54	75	91	105	117	128
22	64	87	106	122	137	149
24	73	100	122	140	156	171
26	82	112	137	157	176	192