University of Victoria | Science

Science to understand our forest: What conifers live near you, and how healthy are they?

Trees and forests are a huge part of BC – literally! They are among the largest life forms on the planet and we find them in almost every part of our province. Besides being important habitats for animals and birds, they have been providing us humans with shelter, food, medicines, clothing and timber for centuries.

BC's forests also provide a lot of jobs – over 100,000 in the forest sector and associated industries in 2022. Wow! On top of all that, our trees act like the planet's lungs, recycling carbon dioxide (which contributes to global warming) and putting oxygen back into the atmosphere.

Because trees can't move around, they can be affected by changes in climate, as well as by pests like the mountain pine beetle. University of Victoria biologist Peter Constabel **is** working hard to understand both how trees defend themselves against pests and herbivores, and how mountain pine beetles may spread across the province. This kind of research helps us understand our forests so that we can do the best job of managing them.

Many of our trees in BC are conifers. They stay green all year, and we especially enjoy them in December when lots of us bring branches or whole trees inside our homes for the holidays.

So, put on your shoes or sandals and let's go out and explore our conifers. Which ones live near you? While we're at it, let's see if the forests in your part of British Columbia are healthy.

What you need:

- A copy of the Conifer Identification Key (below)
- Magnifying glasses
- Pencil
- Measuring tape or ruler

What to do:

1. Find a friend, family member or a classmate and go out and find some evergreen trees or conifers. This is an activity you can do in your own neighbourhood or anywhere you may travel in British Columbia.

2. With your identification key in hand, you are just like a scientist – they use keys all the time to help them identify things like plants, animals and even rocks. To identify your tree, follow the four questions on the conifer identification key.
   - **Tree shape:** Look at the shape of the tree. Compare it to the pictures in the key.
   - **Needles:** : Look at the kinds of needles (these are the evergreen version of leaves!) the tree has. Again compare your tree's needles with the photos in the key.
   - **Cones:** Look at the cones. These contain the tree's seeds.
   - **Bark:** Look at is the trees bark. Compare how it looks and feels with the pictures and description in the key.

3. Good job! Now, if your tree isn't one of the five common conifers in the key, how about going to the library and borrowing a tree field guide? See if you can find out which tree it is by using the guide.

4. Compare the trees you found with those in your friends or grandparents neighbourhoods. Are their trees the same or different to yours?

5. See how many of the conifer types you can find.

What else you can do:

Ever notice how some of our trees and forests in BC are turning red? As you travel around you will find some forests where many of the trees have begun to turn red or a deeper shade of brown. This can happen when tiny insects called mountain pine beetles bore into some trees (mainly lodge pole pines and ponderosa pines) to reproduce and lay eggs. If too many beetles attack a tree it will gradually turn red and die as the beetles kill the parts of the tree that takes in water and other liquid nutrients. Look and see if the mountain pine beetle epidemic has affected your area of BC. How severe is the impact? Use the colours in the Legend on the top right corner of the map to help you find out.

Did you know:

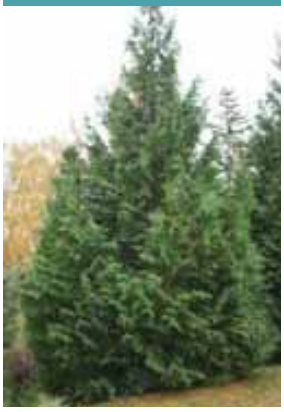
- There are more than 500 species of conifers found throughout the world.
- Forests cover more than 400,000,000 hectares of Canada.
- We have the second largest reserve of conifer dominated forests in the world.
- BC has 23 native species of conifers.

Identification Key for Common Conifers in British Columbia

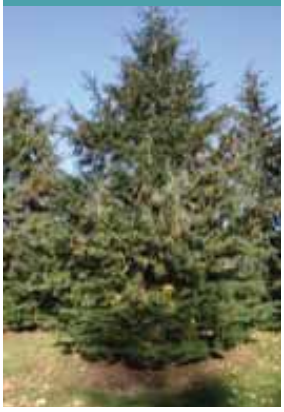
Question #1: What does the tree look like? What kind of shape does it have?

Douglas Fir
Pseudosuga menziesii

Western Red Cedar
Thuja plicata



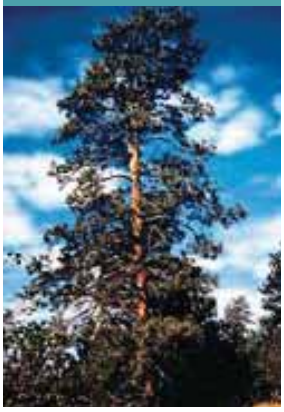
Western Hemlock
Tsuga heterophylla



Photos: UVic, Pacific CRYSTAL Project

Lodgepole Pine
Pinus contorta

Ponderosa Pine
Pinus ponderosa



Photos: BC Ministry of Forests, Range, and Mines

Question #2: What shape are the tree's needles?

Feel the needles. Are they round or flat? Are they long or short? Use the photos and description below to help you.

Douglas Fir
Pseudosuga menziesii

Photos: UVic, Pacific CRYSTAL Project

Needlelike flattened leaves that are spirally arranged along the stem. 20-35 mm long. They also have two light bands on the underside.

Western Red Cedar
Thuja plicata

Scale like leaves that are not needlelike but branch out from each other. Scales are fragrant when rubbed or crushed.

Western Hemlock
Tsuga heterophylla

Glossy flat needlelike leaves that are 5-23 mm long and broad 1.5-2 mm flattened width. They also have two light bands on the underside.

Lodgepole Pine
Pinus contorta

Photo: BC Minstry

Long thin needles (4 to 8 cm long, and 1 mm wide) that grow in pairs. Needles are dark and shiny and serrated or rough along edges.

Ponderosa Pine
Pinus ponderosa

Photo: ©Al Schneider

Even longer needles (15 to 30 cm long and 1.7 mm wide). Needles grow in tufts along and at the end of stems.

Question #3: What does the cone look like?

Does your tree have cones on it or lying nearby on the ground? If so compare the cone to these pictures.

Douglas Fir
Pseudosuga menziesii

Photos: UVic, Pacific CRYSTAL Project

Cones are 4-5 cm long and 2-3 cm wide when closed and up to 4 cm wide when open. The cones have little wing scales about 12-15 mm long.

Western Red Cedar
Thuja plicata

Small slender cones, 1.0-1.8 cm long and 4-5 mm wide when open. Scales are thin and flexible.

Western Hemlock
Tsuga heterophylla

Cones are small 1.4- 3 cm long and 7-8 mm wide when closed and 18 to 25 mm when open. Scales are thin and flexible.

Lodgepole Pine
Pinus contorta

Photos: BC Ministry of Forests, Range, and Mines

Cones are 3-7 cm long and often closed. Many types need fire for cones to open. Cones have prickles on end of scales.

Ponderosa Pine
Pinus ponderosa

Cones are 7-16 cm long and often closed. Many types need fire for cones to open. Cones have prickles on end of scales.

Question #4: What does the bark look and feel like?

Look at and touch the bark of your tree. Is it smooth or rough? Does the bark peel off in strips or is it hard to peel off? Use the photos below to help you. All these photos were taken approximately 1 meter from the tree.

Douglas Fir
Pseudosuga menziesii

Photos: UVic, Pacific CRYSTAL Project

The bark tends to be darker and gets very thick as the tree matures to protect it from fire. You can often find resin on the bark as well.

Western Red Cedar
Thuja plicata

The bark tends to be very thick and peels off easily in strips. The underside of bark is reddish.

Western Hemlock
Tsuga heterophylla

The bark is rough and dark. It becomes thick and grooved as the tree ages.

Lodgepole Pine
Pinus contorta

Photos: BC Ministry of Forests, Range, and Mines

The bark is thin, rough, and scaly. The color ranges from orange brown to grey.

Ponderosa Pine
Pinus ponderosa

Bark is very distinct with a brownish orange colour and dark brown or black areas.