

Frosty Forests Fact Sheet



Our last topic looked at how animals survive the winter, but what about the trees? They can't migrate or hide away in a burrow, so how do they cope with below freezing temperatures, heavy snow and no available water?

Firstly, if it's already growing in a good spot **what does a tree need to survive?** Well, the main things a tree needs are: 1) water, 2) food from the soil and 3) sunlight to make more food using photosynthesis. In the winter water is often frozen, have you ever tried drinking ice? It's not very easy and a tree has to suck it up to all its branches, which is tricky. It can still get food from the soil, if the soil isn't too frozen, but there is definitely less sunlight, so growing pretty much stops in the winter and life is all about surviving.



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Leaf Shape - Deciduous trees and Evergreens

Deciduous trees are trees like oak, ash, beech, sycamore, silver birch, willow etc., which lose their leaves in winter. Have you ever thought about why they lose their leaves? Well, their leaves use sunlight to make food, and in the winter there is less sun so their leaves are not as useful. Also, most leaves cannot handle freezing weather. Freezing weather causes the water in the leaf cells to freeze into ice crystals. 'What are cells?' you may ask, well, they are the tiny microscopic building blocks which make up all living things. These ice crystals in the

leaf cells cut into the cell walls and destroy the leaves, so the tree is better off without leaves in very cold weather, which is why they are released and fall to the ground.



Scots Pine trees ©Peter Cairns

What about **evergreens trees** though, they manage to keep their leaves or needles all year. If you have ever examined a pine needle or a holly leaf you will notice that they are quite different to an oak leaf. They are thick and waxy, most conifers also have a lovely smell. This waxy coating on the leaves protects them from losing water and drying out. They also fill their cells with a concentrated sugar solution which acts like an antifreeze, protecting them from ice crystal damage.

Snow collecting - leaf shape

It looks very pretty when snow collects on a tree, but it can be dangerous. You must know if you have ever made a snow man and tried to lift the head on, that snow is very heavy! Too much heavy snow on a tree can make branches break, or trees can even fall down with the weight.

Leaf shape can help protect trees from damage. Imagine you are a pine tree and it's snowing. Put your hands in your sleeves and hold a couple of sticks out as needles. Not a lot of snow will land on your needles as there isn't much surface area. If you were a broad leafed tree, like a sycamore, you could hold out a gloved hand, palm up and you would collect more snow on your palms. If broad leafed trees didn't lose their leaves they would have to carry a huge weight of snow. This could cause them a lot of damage. Conifers don't collect as much snow, as the snow builds up it's more likely to slip off between the needles, and between the branches so there is less weight for the tree to carry. Clever isn't it?

Drunken Forest

Have you ever heard of drunken forests? Sounds very strange doesn't it? Move away from the relatively warm winters in the UK and head north, then north again until finally you get to the frozen arctic and countries like northern Russia, Canada and Alaska. Many of the huge forests growing in these countries grow on frozen ground called **permafrost**. With climate change, some of these areas are warming up, so much so that the permafrost is melting. The permafrost changes from being hard and frozen to becoming wet muddy ground and trees growing here can begin to lean over or even fall, looking like they are drunk. Though very cold weather is challenging for trees to cope with, they are adapted to these extreme conditions. They are not however adapted to the changing climate, which in some places is causing some more serious difficulties for trees and other wildlife.



Larch ©Ross Hoddinott

Conifers which lose their needles

What about larch trees you may ask. Larch trees have needles but they are deciduous, their needles fall off in the autumn. Why do they lose their needles when other conifers don't? Well, larch needles are not as thick and waxy as other conifer needles so not as good with the cold, and the tree needs less energy to make them. Also their needles are very carefully arranged to get as much sunlight as possible, helping the tree to produce as much food as possible in its shorter growing season.

Pine trees, which keep their needles all year round, can produce some food even in the winter if there is a warm sunny spell but as their needles are in thick bunches and overlap a lot they are not as good at it as larch.