

## Comparing the characteristics of two coppiced areas in Nower Wood

Aim: Our aim is to compare the abundance, diversity and living conditions of different species of plants in two coppiced areas, an old coppice (coppiced 30 years ago) and a younger coppice (coppiced 7 years ago), in Nower Wood.

Hypothesis: I think that there will be a greater amount of plant species in the older coppice compared to the younger coppice.

### Explanation:

- i. That there will be a greater abundance of different species in the old coppice.
- ii. That there will be a larger canopy in the old coppice.
- iii. Therefore, the young coppice will have a smaller amount of plant species, a smaller abundance of different species and a greater open space.
- iv. That most of the plants in the young coppice will get an equal amount of light and that, only the tall trees and plants that form part of the canopy will get to the majority of light in the old coppice.
- v. That there will be more humidity in the old coppice than in the young coppice.

There will be a greater number of plant species in the old coppice because the plants have had a longer time to develop and grow, as the area was coppiced a long time ago.

There will be a greater abundance of different species in the old coppice because the old coppice was coppiced 30 years ago, which has been left alone for a very long time. This has caused a greater growth of plants.

There will be a larger canopy in the old coppice because the trees will have had a long time to grow and become fully-grown and tall. These trees get the most light and, therefore, grow the most because photosynthesis will take place the most in their leaves.

The young coppice will have a smaller amount of plant species; a smaller abundance of different species and a greater open space because the number of plants will not have developed yet due to the recent coppicing. There will be a greater open space because the canopy won't have developed yet. This lets the light reach the plants in equal amounts.

The plants in the old coppice under the canopy will undergo plant adaptation. They will climb up on other trees and plants to try and get to the light. These called climbers. There are other plants called shade tolerant plants, e.g. Bluebells, which grow and flower early on in the spring before the canopy fully develops.

### Key variables:

- i. Light: The amount of light affects the growth of a plant because it depends on the amount of photosynthesis that takes place, which determines the amount of food produced. The formula for photosynthesis is:



- ii. Temperature: A rise in temperature will increase the rate at which Carbon Dioxide is combined with hydrogen to make Carbohydrate. Part of this is because of the rate of transpiration in the plant.
- iii. PH of soil: Some plants like acidic soils, some plants like alkaline soils and some plants like neutral soils. Therefore, acidic-based plants will not grow well in alkaline soils.
- iv. Soil type: The type of soil that the plant grows in, will affect how well the plant grows, as some soils will hold water and some won't.
- v. Soil moisture: Water is needed for photosynthesis so the more water the soil holds the more the plant can photosynthesise.
- vi. Humidity: Humidity affects the rate of transpiration in plants' leaves, which affects the amount of water that diffuses in and out of the plant.

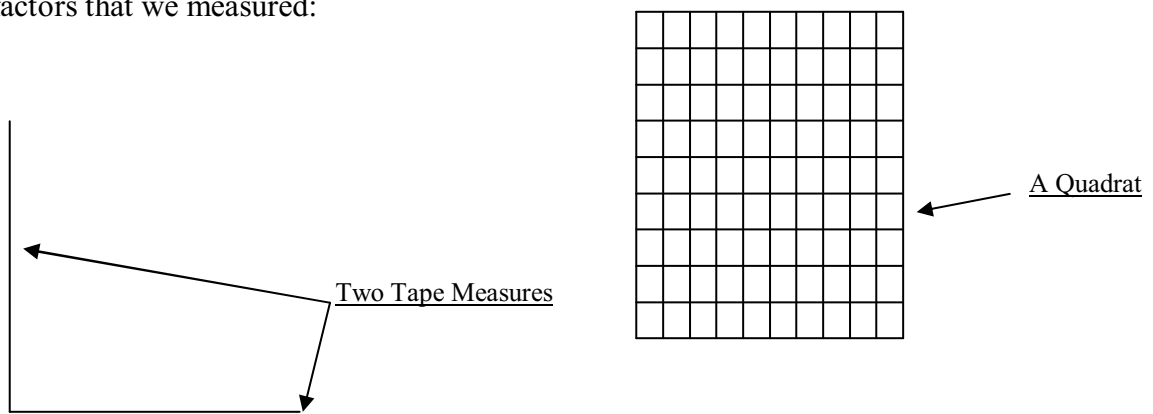
- vii. Human impact: Coppicing is the human factor that affects plant growth as this will affect the age and stage of development that the plant is in. Coppicing is when trees are cut back regularly to near ground level. This makes them produce many shoots from the old stumps or “stools”. The cut down wood is then used for building things, fuel and manufacturing.

Apparatus:

- A quadrat.
- A soil auger.
- 2 tape measures.
- A pencil.
- A data-recording sheet.
- An environmental meter.
- A pH testing kit.
- A compass.

Method:

There are 7 factors that we measured:



- Diversity: We laid out two tape measures to form a grid. We then generated random co-ordinates to place the quadrats on. We put the quadrats on the co-ordinates that we generated. We then measured the number of the different plants, using a key and we measured the percentage of the space each of the plants took up in one quadrat. Each quadrat is  $0.5\text{m}^2$  and is divided into 100 small squares to make it easier to take the percentage cover.
- Soil pH: We used a soil auger to drill into the soil about 50 cm deep. We then took the soil from the bottom of the auger and we put a spatula of soil into a clean test tube. Then we added a spatula of Barium Sulphate (this helps to release hydrogen ions from the soil) and distilled water. We then shook the mixture up and added Universal Indicator solution to it. Then we checked the colour of the mixture against a key and repeated this test five times per site.
- Soil moisture: First we obtained the soil using an auger. We then put the soil in a sealed container and brought it back to school. At school, we weighed 1g of soil and placed it in an evaporating dish. We then kept heating it until no further mass change.
- Soil type: We first took some soil from the auger, at the bottom, and did various things to it using a key to identify the type of soil it was.
- Light, temperature and humidity: To measure these variables we used an Environmental meter.

### Fair Test:

- i. We used random co-ordinates to remove bias and to make it a fair test, to place the quadrats on.
- ii. To make it a fair test, we used the same auger, the same pH chart, the same amount of indicator solution and the same amount of Barium Sulphate and distilled water.
- iii. We also dug to the same depth of soil every time and we took the soil from the bottom of the auger each time.
- iv. To make it a fair test we put the soil in a sealed container and we repeated the soil moisture method until there was no further mass change. It was also repeated five times per site.

### Preliminary Work

Before we went to Nower Wood, our class did a practice investigation at school where we looked at two areas of land in the school: a cricket pitch and a rugby pitch. We only measured the diversity of the plants at school, compared to the soil moisture, light humidity, etc..., at Nower Wood. Our results were written up as though it was a real experiment. We could only take readings for the rugby pitch as we did not have enough time in the lesson at school. We found that the rugby pitch had more plants on it; this was it due to the cricket pitch needing weed killers, pesticides and more mowing than on the rugby pitch.