Field Studies Council

Measuring woodland density
Using fieldwork to engage students with the importance of different types of woodlands in the UK through measuring woodland density.

What is a Relascope?

A Relascope is a technical piece of equipment used in forestry industries to measure attributes of woodlands such as tree height, width and angle. This tool is used to calculate the density of the woodland by looking at the basal area of trees. Basal area is 'a measurement of total cross-sectional area of tree stems within a specific area'. We can calculate this as area per unit of land area, e.g. $10m^2$ per Hectare.

We can take inspiration from this method and simplify it to allow us to look at density of woodlands. We can apply this when looking at different types of woodlands, this can be used in a variety of different investigations for groups of all ages, including but not limited to:

🍃 Carbon sequestration within contrasting woodland sites
🍃 Impact of plantation woodlands on biodiversity
🍃 Importance of ancient woodlands on carbon storage

As you can see, woodland A appears to be more dense than woodland B, therefore, if this method was carried out in these woodlands, A would have a higher basal area than B.

Try using this method in conjunction with other woodland fieldwork techniques as part of topics around carbon or biodiversity.

Making your own 'Basal Area Gauge'

To do this you will need to start with a small piece of cardboard, approx. 5cm x 7sm.
You will then need to cut a 1cm aperture at one end of the cardboard.
You will then need to attach a 50cm piece of string through the centre of the cardboard.

1cm

50cm

Methodology:

🍃 Firstly, as with all data collection, you will need to think about your sampling strategy. Choose a location within your woodland that is safe and accessible where you have a good view of the trees in your surrounding area. How many samples are you going to collect? Think about the reliability of the data you are collecting.
A few things to think about:
　🍃 Is your woodland homogenous?
　🍃 Does your woodland type/ species vary a lot within a small area?
　🍃 Does the topography vary a lot?
　🍃 Is there lots of low-lying vegetation that will block your view?

🍃 Once you have chosen your location, hold the end of the string to just below your eye, touching your face. Holding the gauge taught straight out in front of you.

🍃 Choosing your first starting tree, count all the tree's that are the same size or are larger than the aperture of your gauge.

🍃 Turn around 360° whilst stood on the same spot, counting all the trees in view as you move.

🍃 Try and keep the gauge at a consistent height and distance away from your face.

🍃 Trees smaller than the aperture of the gauge are not counted.

🍃 We then calculate, number of trees x aperture = Basal area(m^2) per hectare(ha)
For example, if we counted 50 trees, our basal area calculation would be 50 trees x 1cm aperture = $50m^2/ha$.

🍃 Repeat this for your other sample areas in your woodland.
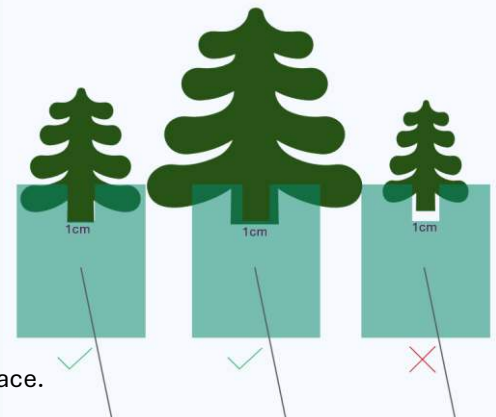
What are the limitations of this method? Can you think of any improvements?

Not counting trees that are smaller than our gauge is a clear limiting factor and gives us a warped view of the woodlands basal area. Similarly, counting trees that may be significantly larger than our 1cm aperture may also make our total not representative of the true woodland. To improve this, we could have multiple size apertures, such as 0.5cm or 2cm. When calculating our basal area as above, are calculation would be 50 trees x 0.5 aperture = $25m^2/ha$.