

## Learning Intentions

### For students to:

- Use appropriate fieldwork techniques and instruments
- To draw plans
- Work effectively in a group

### Context:

- Outdoor activity
- Use of maps and compasses

## Resources

### Provided

- Background information for teachers - case study 'Effects of drought on growth of beech (*Fagus sylvatica*) trees'
- Worksheet for students

### Needed

- Compass and map of the area for each pair of students
- Clip boards, pencils, paper and reflective card
- Cameras (optional)
- Tree identification sheets or books
- Sheet of A3 paper per group
- Access to five deciduous trees – e.g. beech, oak, horse chestnut. These trees may be found in the school grounds, local park or botanic garden

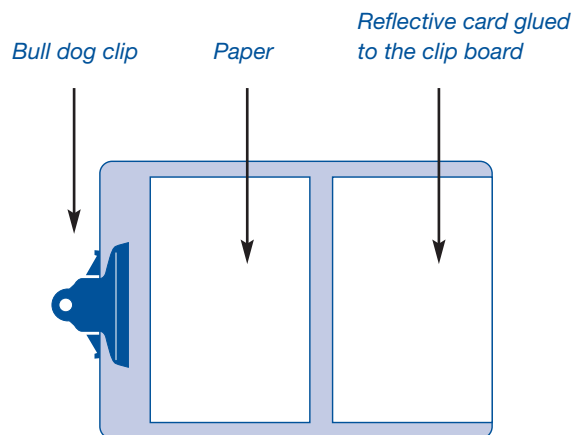
# 5. Close encounters with trees

## Overview

This two part activity encourages students to become aware of the links between weather and trees. Students work with their peers to collect data using drawings or photographs. They also make notes about the weather and surroundings so they can refer back to this data at a later time. Ideally, the activity should be carried out at the end of summer (September) and then again in late spring or summer (June, July).

## Teaching activity

- 1 Divide the students into groups of six. Designate a tree to each group.
- 2 Give each pair of students a map of the area, a compass and a clipboard, prepared as in the diagram below.



- 3 Ask each group of students to note exactly where their tree is located on the map.
- 4 Following the instructions on their worksheets, students place themselves at different locations beneath the tree. Get them to draw a section of the tree's canopy in detail. If it is a dry day then they can lie down. If not, the reflective strips on their clipboards will help them view the canopy without getting a cricked neck. If the students have cameras, they could also look up and take a picture of a section of the tree. If the tree is large, students will need to clearly define the segment they are drawing – picking out significant branches to delineate their segment before they draw the detail.
- 5 Ask the students to make notes about the weather and to observe whether the tree is displaying evidence of stress –for example, brown, yellow or shrivelled leaves, loss of leaves, wilted leaves, cracked bark and fruit dropping earlier than expected.
- 6 Ask the students to use a compass to note which way they are facing and to mark this on their diagram so they can return to the same spot for a repeat visit later in the year. Also ask them to note the date.
- 7 In class, ask each group to produce a collage of their drawings to represent their tree canopy. Encourage groups to discuss what they observed and the differences between their trees. If their drawings show evidence of stress (see above) discuss with them why this might be. Discuss what will happen as the climate warms.

## Links to National Curriculum subjects

### Geography KS2

Enquiry and skills (1a, 1b, 1c, 1e, 2a, 2b, 2c, 2e)  
 Knowledge and understanding of places (3a, 3c, 3d, 3e)  
 Patterns and processes (4b)  
 Environmental change and sustainable development (5a, 5b)  
 Breadth of study (6e)

### Geography KS3

Enquiry and skills (1a, 1c, 1d, 1f, 2b, 2c)  
 Knowledge and understanding of places (3a, 3c, 3d)  
 Patterns and processes (4a, 4b)  
 Environmental change and sustainable development (5a, 5b)  
 Breadth of study (6e, 6j, 6k),

## Follow up activities for students

Find time later in the year for the students to visit their trees again and carry out the same activity. Ask the students to carry out a comparison of their collages.

Carry out the activity over a number of years. Try to do it at the same time each year so that students can build up a picture of change over time.

## Assessment

Pupil discussions assessed for levels of response  
 No recognition of change (if there was change)  
 Some recognition of change

## Visits to botanic gardens

Botanic gardens usually have many trees that can be used for this activity. Educators working in botanic gardens could build up a display of collages over a number of years and this could form the basis for a discussion about change over time.

### Note

*Many school activities outside the classroom involve counting which is valuable for the development of numeracy. This activity however, focuses on collecting knowledge visually and encourages students to observe and pay attention to detail, without necessarily measuring.*

## Case study

### Effects of drought on growth of beech (*Fagus sylvatica*) trees

A study of *Fagus sylvatica* trees in Catalonia in Spain showed that populations of the species toward the southern limits of the species' distribution are increasingly limited by drought. Further, the region is expected to warm in the future. The study looked at annual growth levels over the past 50 years and found a rapid recent decline of southern range-edge populations, starting in approximately 1975. By 2003, growth of mature trees had fallen by 49% when compared with predecline levels. The decline is not seen in populations at higher altitudes, therefore the effects of drought (less water, higher temperature) is impacting tree growth.

## 5. Close encounters with trees

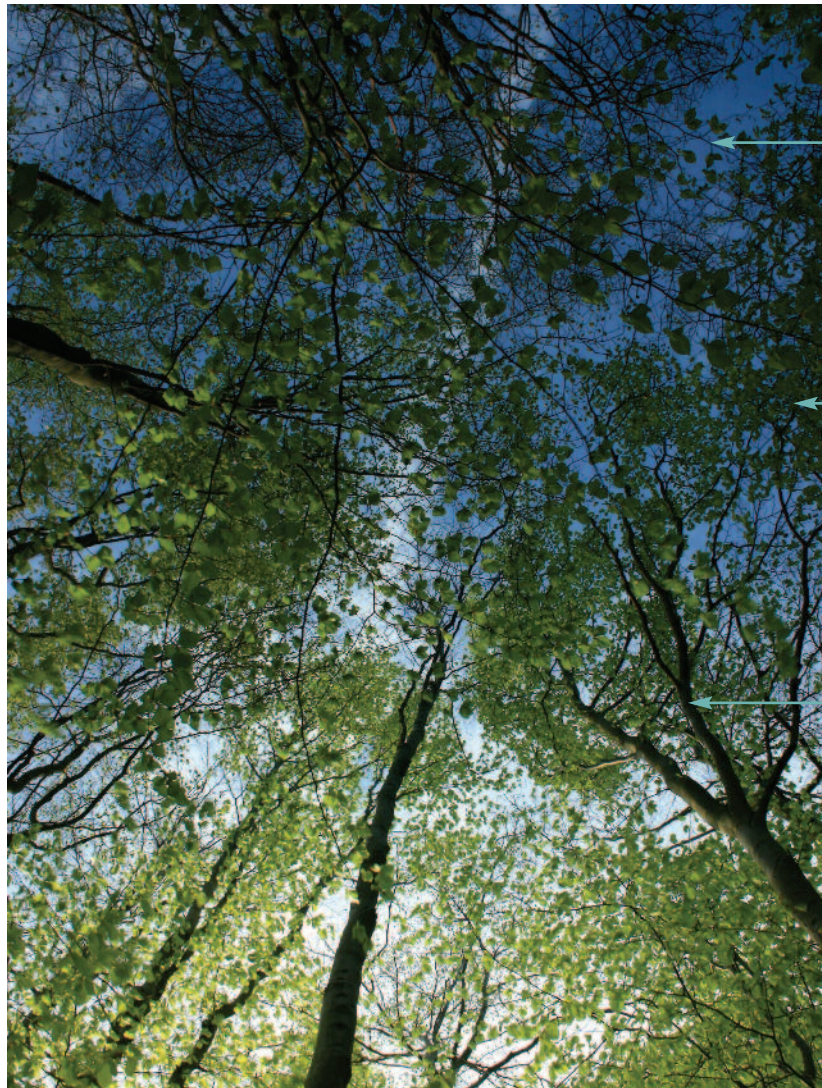
.....

A study of beech trees in Catalonia (north east Spain) showed that drought is having an impact on how far south these trees are able to grow. For the past 30 years beech trees in the south have been growing much slower than beech trees in the north. This region is set to get warmer with climate change. The study concluded that the effect of drought (less water, higher temperature) is impacting on tree growth.

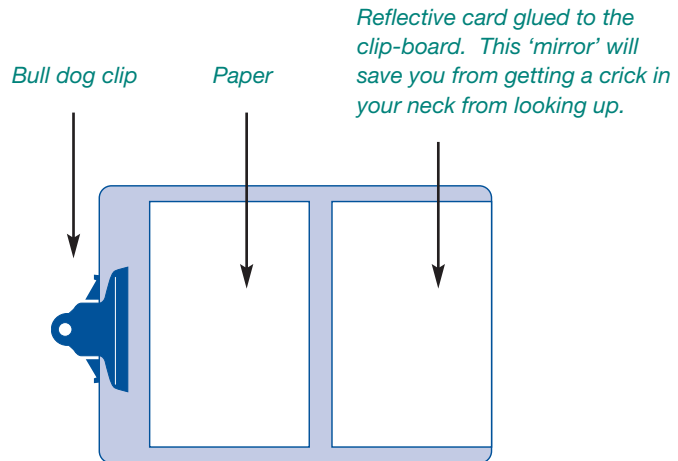
### How often do you look up?

Have you ever stood under a tree and looked up?

Canopies are made up of branches, twigs and leaves



You need a clip board that looks like this:



### Looking at the canopy of your tree

- Your group needs to select a deciduous tree (a tree that loses its leaves in winter). Mark where the tree is on your map. You need to do this so that you can find your tree again when you repeat this activity later on in the year.
- Find out what tree you are studying. Is it a beech? In May there are catkins and in October it will have beech nuts (changing weather patterns may change these timings). The bark is nearly always smooth even in big old trees.
- Each group member needs to choose a dry spot to sit or lie down. Use the compass to mark on your sheet the direction your head is facing. Also note the date. Space yourselves out so that you are looking up at different parts of the tree.
- Use your clipboard with its mirror to look up. You should find it easy to copy and draw your part of the canopy onto the piece of paper. You could also take a photograph. Try to show as much detail as you can. Notice whether there is any evidence that the tree is under stress - brown, yellow or shrivelled leaves, loss of leaves, wilted leaves, cracked bark, fruit dropping earlier than expected. Make a note of this and also of the weather.

### Now or on your return to class

- Put your drawings (or photographs) together with those from your group and make a collage. This will give you the bigger picture.
- Discuss your collage and compare it with other groups. If your drawings show evidence of stress why do you think this might be? What might happen to your tree if the climate warms?
- Remember to keep your map and drawing safe as you will be repeating this activity later on in the year.