Lesson Plan (class 2- 3)

Lesson Title:
General theme: NATURE-BASED SOLUTIONS. Mitigate climate change. Carbon store .
Specific topic: Calculating the amount of carbon stored in trees .

Objectives:
• Measure how much carbon is stored in trees
• Age and identify different types of trees
• Describe how trees combat climate change by storing carbon shaping students' ecological awareness.

Materials Needed:
• Information note - Carbon
• Resource cards - Carbon equivalent
• Worksheet - Carbon calculator
• Clipboards
• Pencils
• Tape measures
• Calculators
• Tree ID sheets, books or apps.

Introduction:
This lesson highlights the importance of sustainably managing our natural resources, focusing on the important role trees have as a carbon store; absorbing carbon dioxide from the atmosphere through photosynthesis.
As trees grow they take in carbon dioxide from the atmosphere and store it as carbon in their trunk, roots and leaves. Approximately half of the dry weight of a tree is carbon. This means that trees are a carbon store and can help us to reduce the effects of climate change.
This activity explains how to measure how much carbon is stored in trees, how to age and identify different types of trees and describes how trees combat climate change by storing carbon.
Outline of the lesson:

      1.- Tree species
      Use identification sheets, books or apps to identify the species of tree.
      2.- Measure the circumference
       Use a tape measure to measure the circumference of the tree at chest height (1.3 metres up the trunk from the ground).
      3.- Age of tree
      Calculate the age of the tree based on the given growth rates.
      Divide the circumference of the tree by the growth rate to calculate the age.
      Trees grow at different speeds with the circumference increasing at an average of 2.5cm per year.
      Growth rates
      • Holly and yew – 1.25cm per year
      • Oak – 1.88cm per year
      • Ash, beech, elm and hazel – 2.5cm per year
      • Sycamore – 2.75cm per year
      • Pine and spruce – 3.13cm per year
      NB If the species of your tree is not listed use the average growth rate of 2.5cm per year
      4.- Dry weight

Use the conversion table to convert the circumference of the tree into the dry weight.
Dry weight conversion table.

Circumference (cm)	Dry weight (kg)
1.5	0.009
2.5	0.04
5	0.23
10	1.4
20	9
30	27
40	82
50	106
75	310
100	668
125	1208
150	1964
175	175
200	4221

5.- Carbon stored
Use the dry weight to calculate how much carbon is stored in the tree.
Half of the dry weight of the tree is carbon, therefore you need to divide the answer for the dry weight
by two. This tells you how much carbon is stored in the tree.
Example
The circumference of a tree is 150cm. Looking at the table this means that its dry weight is about 1964kg. Dividing this by two tells us that the tree is storing 982kg of carbon.
Circumference converted into dry weight ÷ 2 = carbon stored.

6.- How do we produce this amount of carbon?
Use the table - Carbon equivalent, to find real life examples of how we create the amount of carbon which is stored in the tree.

0.16kg Carbon =Using an electric oven for 1 hour.

41kg Carbon = Running 1 dishwasher for 1 year

0.018kg Carbon = Watching television for 1 hour

15kg Carbon = Washing clothes for a family for 1 year

155kg Carbon = Running 2 refrigerators for 1 year

982kg Carbon =1 average petrol car being driven 11,000 miles

Assessment:
• How do we produce carbon?
• How are trees connected to our carbon emissions?
• What is a carbon store?
• How much carbon is stored in your tree?
• What can you personally do to reduce the amount of carbon released into the atmosphere?