Maths – Measuring carbon in trees Stage 2 / Stage 3

Learning Intention Why is carbon stored in trees important and how can it be measured?	**Maths Stage 2 & 3** **Problem Solving** MA2-2WM selects and uses appropriate mental or written strategies, or technology, to solve problems MA3-2WM selects and applies appropriate problem-solving strategies, including the use of digital technologies, in undertaking investigations. **Multiplication and Division** MA2-6NA uses mental and informal written strategies for multiplication and division MA3-6NA selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation

Lesson 1 – How to measure the carbon content of trees

Measure carbon in a tree from the garden at home. Content

As trees photosynthesise they change carbon dioxide (CO_2) they absorb from the atmosphere using sunlight, water and nutrients from the soil to form carbohydrates, which make up the tree's biomass*. **CO2 is taken in at a certain rate and builds the mass of the tree over time.**

How much carbon is made by a tree in this process? The amount of carbon stored by a tree depends on its size, which in turn is influenced by factors, such as species, local environmental conditions and the way it is managed. In an attempt to find a simple answer to this question, researchers have broken down approximately how much carbon is stored in each element of a typical tree (the branches, the leaves, the stem and the roots) by percentage for a quick and simple calculation.

***Biomass is a measure of the dry mass of woody and leaf matter in kg.**

Online Links (optional)

How to measure the circumference of a tree? https://vimeo.com/54619530

Where did our rainforest trees come from? Search Big Scrub and Big Scrub plants https://www.bigscrubrainforest.org/

How to measure the carbon content of trees? https://rgsgeogy.wordpress.com/mrcs-tree-carbon-content-calculator/

Activities

1A -measure the circumference of the tree.

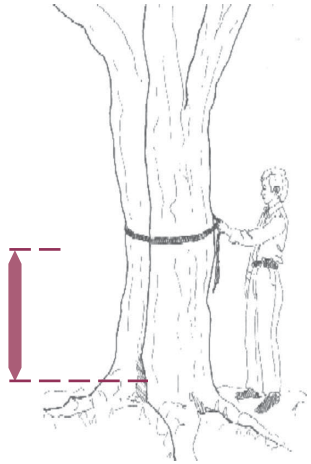
1B - When you've got the average circumference, look at the table to convert this to dry weight. (Use the nearest value in the table to your value).

1C –Half the dry weight of the tree is carbon, so you then need to divide your answer by 2. This tells you how much carbon is stored in the tree.

Optional 1D -You can also calculate how much carbon dioxide was absorbed to create this carbon store, by multiply your figure for carbon by 3.67

1A -Measure the circumference of the tree at the standard chest height (1.3m) with a tape measure. Record the result in centimeters. Repeat at least 3 times, at the same height, and calculate the average measure.

1B. - When you've got your average circumference look at the table to convert this to dry weight. Use the nearest value in the table to your value.



Circumference	Tree dry weight	Divide by 2	x 3.67
50	106	53 tonnes of carbon stored in tree	194.51 carbon dioxide absorbed to create carbon
100	668		
150	1,964		
200	4,221		
225	5,771		
250	7,641		
275	9,842		
300	12,410		
325	15,350		
350	18,700		
400	26,674		

1C. - Half the dry weight of the tree is carbon, you then need to divide your answer by 2. This tells you how much carbon is stored in the tree.

1D. - You can also calculate how much carbon dioxide was absorbed to create this carbon store, by multiply your figure for carbon by 3.67

One ton of carbon stored in any tree is equivalent to approximately 3.67 tonnes of atmospheric CO2.

*These values, provided by Forest Research, are for an individual hardwood tree in Westonbirt Arboretum. They can be used as an example. Trees will grow at different rates across Australia, depending on, for example, the species, soil, drainage, and slope, aspect and climate conditions.

My tree circumference was _____

Dry weight was ____

Stored carbon was _____

Amount of carbon dioxide absorbed was _____