



Science - Material World/Living World - Plant Fibres S2-S3

Learning Intention

Expanding knowledge and understanding of our natural world and how we use natural resources.

Curriculum Outcomes

Science

ST2 - 1WS-S -questions, plans and conducts scientific investigations, collects and summarises data and communicates using scientific representations.

ST2-7MW-T investigates the suitability of natural and processed materials for a range of purposes

ST3-7MW-T explains how the properties of materials determines their use for a range of purposes

ST3-5LW-T

explains how food and fibre are produced sustainably in managed environments for health and nutrition

Lesson 2 - Fibres from plants can be used to produce sustainable materials. Some plant fibres, such as cotton, have been used by humans for thousands of years. Scientists are still discovering how to make new materials, such as leather from pineapple leaves. Materials made from plant fibres are more sustainable than synthetic materials. Making your own cordage (string/rope) from plant fibres is an interesting way of investigating the different properties of different plants.

Activities

2A -
What are plant fibres and why are they sustainable?

2B - How can you use plant fibres to make cordage (string/rope)?

2C - How useful is the cordage?

Online Links (optional)

Gardening Australia "A Wealth of Resources"- watch from 1:20min to learn how to make cord <https://www.abc.net.au/gardening/factsheets/a-wealth-of-resources/9435036>

What is cellulose? <https://www.bbc.co.uk/bitesize/topics/znyycdm/articles/z2d2gdm>

FAO Natural Fibres <http://www.fao.org/natural-fibres-2009/about/15-natural-fibres/en/>

Making cordage by hand <http://www.primitiveways.com/cordage.html>

2A) What are plant fibres and why are they sustainable?

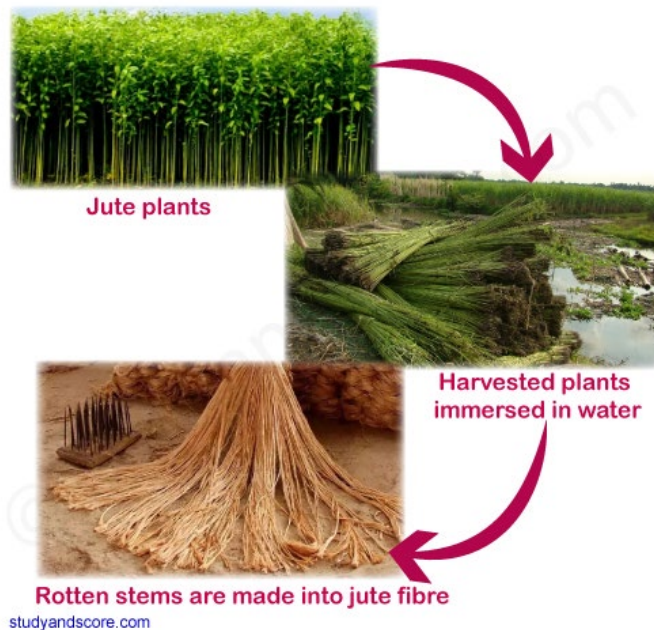
Cellulose is a compound in plants that helps them stay stiff and upright. Many plants have a high concentration of cellulose in parts of their tissue and we call this the plant fibre.

You have probably felt and seen plant fibres many times. The long string bits in celery are plant fibre.

Common crops that produce fibre include cotton, bamboo, flax, hemp and jute. People are also now experimenting with using cellulose from bananas, pineapples, palms and sugarcane.

Plant fibres are used to make fabric cloth, rope, eco-plastics and many other materials.

Plant fibres that we use are mostly made from crops that can grow quickly. This means that they are a renewable resource. Often they are plants that don't need lots of extra water (irrigation), fertiliser or pesticides. This can mean that they use fewer resources and create less pollution than synthetic fibres. Most plant fibres are also biodegradable which means that at the end of their use they break down and return to the soil.



2B - How can you use plant fibres to make cordage (string/rope)?



INTRODUCTION

For this activity you will need to collect some leaves or long stringly bark. The thinner and bendier the fibre the finer your cord will be.

You want to use leaves that are long, thin and bendy. You can use fresh green leaves or dry leaves that have been soaked in water for a few hours to make them flexible. Some suitable plants include:

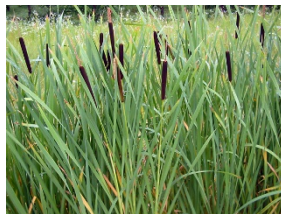
- Lomandra



- Gynea lily



- Typha (Bulrush)



- Cordyline (Palm lily)



- Long grass

Once you have learnt how to make the cord you can experiment with what leaves work best or even try using long thin strips of bark.

MATERIALS

- 3-4 long leaves from a suitable plant
- Bucket of water (if using dry material)
- Small smooth rock that fits in your hand

DIRECTIONS (IMPORTANT- IF YOU ARE LEFT HANDED REVERSE THE INSTRUCTIONS)

1. Take one of the leaves and gently pull the leaf through your fingers to squash and soften the fibres
2. If your leaf is wider than your little finger you will need to rip it down the middle to make it thinner. Start at the fatter end and tear it apart.
3. If your leaf isn't really bendy you might need to bash it gently with a smooth rock. Place the leaf on a hard surface and give it a few bashes. Not too much or you will break your leaf.
4. Take one long strip of leaf and fold it in half. Hold the folded end in your left hand.



5. With your right hand take the loose end that is furthest from your body and twist it AWAY from you between you thumb and forefinger. Hold it tightly.



6. Bring the twisted piece **OVER** the other loose end so that it is now closest to your body and **HOLD IT** between the thumb and forefinger of your left hand.



7. Again, with your right hand take the loose end furthest from your body and twist **AWAY** from you and then bring it **OVER** the other piece and **HOLD IT** tight with your left hand.
8. Repeat repeat repeat.



9. To make your string longer, add a new piece of fibre as you are twisting.
10. To finish your string, tie a simple knot on the end.

TESTING YOUR STRING

- How long is your string? Use a ruler to measure your string.
- How strong is your string? If you pull the ends of your string does it break? If you make your string into a loop can you lift something with it?
- How flexible is your string? Does your string bend easily? Can you tie it into a knot?
- What could you use your string for? Depending on how long and strong your string is you could make a bracelet, a necklace, a lead for your pet, a belt or a hanging ornament. What else could you do with it?

RESULTS

I found it _____ to make the string. I tried using leaves from _____ that I collected from _____ . I made a piece of string that was _____ cm long.

If I was to describe my string I would say it was _____

Some things that worked well or were easy were

Some things that didn't work well or were difficult were _____

