The Coconut Tree

Resources

Notes

These resources should be added to those local resources already collected.

Resources can assist teachers to

- help students use content knowledge to complete tasks,
- use pedagogy and teaching strategies to assist students to undertake tasks well
- plan and organise activities
- help students use thinking strategies to achieve higher order outcomes
- access further resources on Nauru and online, including people who can help students

Reading the tasks

Each task helps students address some of the goals in the Nauruan Curriculum Footpath. Interpret the task through the list of goals for this task.

This task is part of TVET program, thus teachers need to talk about preparing for work, having a work ethic, and contributing to community work.

This task is a response to community research which emphasised that young people of Nauru need to develop appreciation for Nauruan culture and "bring back" Nauruan cultural skills and knowledge. This means teachers have two responsibilities:

Nauru Curriculum Footpath

Personal Pathways

Communication Pathways

Community Pathways

Environments and Technology Pathways

1) To assist children to learn from community members and archives and keep that knowledge (perhaps digitising it before it is lost) and

2) To show the community that the students are developing the skills (use the community as an audience for student work).

Existing resources

Use the Teachers Diary to include thinking skills in lessons and to assist students to engage in deep thinking when doing activities in this task. Explicit training in using thinking strategies is required throughout schooling and especially during tasks. The "Included Skills" list contains thinking strategies embedded in tasks. The diary describes the strategy and gives examples.

Use local people and existing publications. Collect information and where practical, digitise it so it can be reproduced and used over and over. Develop a Teachers' Library for each task in the school to preserve resources for next year.

Use resource lists from other tasks. There is some overlap in the subject matter, skills and cultural knowledge, so resource lists from other tasks will support this task.

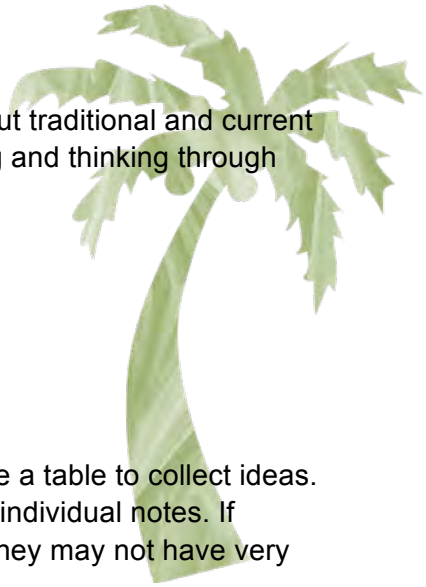
Thinking skills

Aim at using the higher levels of Anderson's Taxonomy of Thinking as much as possible in classroom questions and in helping students' record information. Have a Thinking Levels chart on the wall and constantly encourage children to ask good questions. Use your Teachers Diary to find out more about Anderson's Taxonomy (Remember, Understand, Apply, Analyse, Evaluate, Design) and the question starters for each level of thinking. Remembering and Understanding are low levels of thinking. Note the tasks are specifically designed to help students demonstrate high levels of thinking. This is clearly evident in the Grading Masters, especially for A and B standards.

Thinking Framework

http://www.itcpublications.com/free_resources

Free PDF version plus information about the poster to help teacher use it. Includes a discussion of Gardiners Multiple Intelligences.



Example: KWHL

In this task students need to brainstorm what is already known about traditional and current uses of coconut trees on Nauru. KWHL is a neat way of organising and thinking through your ideas.

K-What do I know?

W-What do I want to know?

H-How will I find out?

L-What have I learned?

There will be some templates in your teacher's diary for KWHL. Use a table to collect ideas. It may be useful for students to collaboratively brainstorm but write individual notes. If students have not had a lot of training in using KWL's or KWHL's, they may not have very deep responses to each of the four parts.

K -What do I know? - tell stories, write notes and then write sentences

W-What do I want to know? – write questions

H-How will I find out? – students discuss ideas with teachers

L-What have I learned? – to be completed at the end of the task as a reflection – combine with an Impact Ladder to help students rank the most important things learned or to articulate the values they attach to what they have learned.

An effective way to get depth or facilitate divergent thinking is to do each part (K W H) more than once and on the second round, ask a divergent question – a question that encourages children to think outside of their current ideas from the first brainstorm; for example; What could Nauru do to have good supplies of coconut trees as the sea rises or tsunamis occur? This would encourage children to revisit their responses and add more divergent (or different ideas). Use the Socratic Questioning notes in the resource kits for this TVET Task Kit to ask deep divergent questions or any of the question-starters in the Teachers diary.

The three key teacher resources

These three resources are available from the CASE office and included in the original version of this resource kit as additional files.

http://www.agroforestry.net/tti/Cocos-coconut.pdf

Very detailed teacher resource but certainly one which should be in the teachers resource library for this task. With this resource and local knowledge, teachers would have access to answers to any questions from students. This ONE resource will be the main resource for this task.

http://www.unu.edu/unupress/unupbooks/80824e/80824E0h.htm

Agroforestry in the Pacific Islands with considerable reference to Nauru – a teacher resource, which will help teachers consider issues and provide ideas to share with students. You may find ideas here for divergent questions so students interact with the bigger picture.

http://www.knowledgebase-script.com/demo/export.php?ID=320&type=PDF

Benefits of coconut water/juice. Excellent short article with scientific and nutritional information. Very readable for students.

Other ideas for resource gathering on Nauru

1. Search the Google images for pictures www.google.com click Images. When you have found pictures, you can look at the web site hosting the page. Search for things like “coconut crafts” and see what great ideas you can share with students.
2. Use the ARM Education Kiosk at the airport to browse for information on traditional trees, how climate is impacting on growth and what local elders have to say about that.
3. Ask Government Departments for copies of reports written about Nauru agriculture, forestry and environment. They contain great local and recent data. Some are available on the web.

Snippets of info

There is no doubt of the pre-eminent place of the coconut tree in Nauruan life. It provided a staple source of food before the coming of the European and afterwards provided a valuable source of copra to be exchanged for money or equivalent to be exchanged for goods (and before German annexation arms and ammunition).
http://www.murdoch.edu.au/elaw/issues/v2n2/macsporran22.html

"Copra, dried coconut meat, was a major trade item in the tropical Pacific. It was a natural transition for the Nauruans to shift from preparing dried coconut meat for their own use to making commercial copra, because for thousands of years they had been drying and storing coconut meat for the inevitable droughts. These droughts had been coming to Nauru for millennia as a consequence of extended La Niña events, during which westerly winds persist, thereby preventing the El Niño phase of Southern Oscillation, the periodic warming in the eastern Pacific Ocean that brings heavy rains to Nauru. In good years, when Nauru experienced El Niño-associated rains, a million pounds of copra could be produced for export. In 1886 such a crop was valued at 150,000 German marks on the Hamburg market. On Nauru, as on other islands, beachcomber-traders established themselves as middlemen who processed and exported copra. Although the beachcombers provided valuable services, their presence led to aggressive behavior among the natives. In 1852, in a disputed purchase of a cannon, the Nauruans, encouraged by beachcombers, captured the American brig *Inda*, killed the captain and several of the crew, and then set the ship adrift. Several other purported incidents gave Nauru a bad name. An amicable people started to settle quarrels in ways contrary to their traditional customs. For a number of years ships avoided the island whenever possible.

Traditional life was also disrupted by the introduction of alcohol, a drink absent from ancient Nauru. Although the Nauruans had drunk toddy for millennia, it was always consumed soon after it dripped from the cut coconut flower. In the mid 1800s visitors from the Gilbert Islands came to Banaba and introduced a new way of preparing toddy by letting it ferment for several days. The product, though sour, induced new sensations. The Banaban chiefs quickly recognized the disruptive nature of the new drink and put the Gilbertese back to sea in their canoes. The currents brought them to Nauru, where sour toddy took hold, and many islanders began to get drunk regularly."

Extracted from this interesting version of the history of Nauru
http://www.ucpress.edu/books/pages/8453/8453.ch02.php

Making Toddy

An extract from article from the Phillipines. The names may be different, and processes may vary slightly. It would be interesting to do a "same and different" activity on this article. What is the same and what is different about how Philipino people use coconut? Students need structure and scaffolding to learn how to read articles. A same and different activity would focus their attention and give them a purpose to analyse and think about the article while reading it. Refer to your Teachers Diary for information on structuring a same and different reading activity.

http://www.thefilipinoentrepreneur.com/2008/09/10/how-to-process-coconut-sap-or-toddy.htm

"Toddy

Locally, toddy is commonly called "tuba". It is usually bottled and made into coconut wine, mixed with cinnamon bark to prevent fermentation which turns it into vinegar. Palm toddy is another kind of sap but not from coconut tree, it is from palm trees. Below are some technologies and procedures to convert the coconut sap into other value added products aside from wine.

Technology Description

Sequential toddy & nut production (SCTNP) technology which produces toddy and nuts from the same palms has provided the farmers increase farm income without sacrificing the copra products and fully maximize economic potential of the palms with addition of another product which is coconut sap or toddy. It has high total sugar, ascorbic acid, phosphorus, and in amino acids, vitamins and minerals. Can be an alternative source of sugar other products like sap drink (fresh cooled beverage), coco nectar (syrup) and vinegar which are high value food products.

Tapping & harvesting of toddy

Tapping is done twice a day. Harvesting of toddy can be done morning (taken before 8 am) for production of 'tuba' or vinegar while the production of fresh sap drink, nectar and sugar, it is best to used the afternoon harvest (taken not later than 3 pm which is sweeter than the morning harvest.) To produce sweet toddy, it necessary that all tools and containers be used should be clean at all times. Adding of lime to the receptacle prevents the sap from fermentation.

Toddy processing

The conversion of toddy into sap drink, coco nectar and sugar involves a simple operation. As the coconut sap is highly perishable due to the yeast microflora, the harvested sap should be immediately processed by boiling for 1/2 hour in a large cast iron pan. This process prevents the sap from fermentation.

Sap Drink

This can be simply done immediately by pasteurizing (heating at 60°C) the toddy. The toddy is then poured separately in the desired container tightly sealed and placed in the refrigerator. If hygienically prepared, the sap drink can be stored until 3 days without deterioration.

Coco Nectar/Syrup

Further boiling of toddy until it reaches 110° C temperature or sticky under a moderate to very low heat. The sticky liquid shall be allowed to cool then poured into a desired container.

Coco Sugar

Boil coco sap to evaporate the water under moderate heat with occasional stirring until liquid thickens at 115°C. Remove it from the flame when it begins to become very sticky. Continue mixing until it becomes granular. Air dry the brown sugar before placing them in a packaging material.

Sap Natural/Organic Vinegar
Pour toddy in a wide large container with a clean netted cover to allow aeration and prevent entrance of dirt and foreign objects. After 5-10 days fermentation period in a well ventilated room, the sap can be harvested as vinegar. To maintain the desired quality of the matured vinegar (with at least 4% acidity),pasteurize it by boiling for 5-10 minutes at 60-65° C, allow the vinegar to cool before placing in very clean bottles and then cover tightly and sealed."

Features of Coconut Timber

http://supertimber.com/node/18

This article may be useful to talk to students about qualities of timber and factors to consider when choosing timber for practical tasks It is an important glimpse on ideas that tradespeople and craftspeople know and will learn in formal VET programs. It is also discussing the environmental movement to grow and use coconut tree timber instead of cutting down hardwood forests globally. An important opportunity for Pacific countries.

"The coconut palm is a monocotyledon (similar to a grass) as opposed to a dicotyledon (a tree). Vascular growth of xylem and phloem is up the centre which, as it ages, is compressed to the outside. The hard wood is therefore found on the outside of the trunk. Coconut palms grow from the 'heart' at the top and have no annual rings, branches or knots. The wood is hard, durable and dense. The hardwood has a high resistance to indentation. Generally the hardwood is used for flooring, window frames, furniture and tool handles whilst the softer core timber is used internally for panelling, ceilings and less demanding uses.

Common Name: Coconut Palm
Botanical Name: Cocos Nucifera
Variety: Malaysian Tall Species

Save global hardwood forests by using coconut
Using coconut wood for furniture and construction actually save our forest. As exotic timber becomes scarce, and the lumber forest are cut by the million hectare per year, price of wood has risen with the decreasing supply and increasing demand for modern furniture.

Coconut timber for furniture construction is most suitable, since only senile coconut are cut and these senile coconut trees are no longer productive and posed immediate danger as it decays away.

Routine cutting is needed in coconut farms, and these timber are used for construction and furniture making.

Please do your part, by supporting the Coconut Movement.

Biology:
The monocotyledonous coconut palm does not have a distinguishable separation of sapwood and heartwood as with dicotyledonous trees. It has vascular bundles that are spread throughout the cellulose structure of the palm, denser on the outside and continuous for the length of the palm. It is non-branching and free of knots. The older vascular bundles are located on the outer perimeter of the trunk and give the palm its high strength and elasticity.

Colour:
Colour varies from golden to deep chestnut. The colour is not necessarily related to hardness but a darker colour usually means a harder wood.

Density:
Coconut wood has three degrees of density:-
Soft : 250 -399 kg/m3
Core : 400 -599 kg/m3
Hard : 600 kg/m3 and above

Hardness Janka:
1600 psi. Load required to embed a 1.128 steel ball to 1/2 its diameter.
Side 524kg, End 488kg

Stress Grade:
F27 for seasoned high density wood

Density:
Coconut wood varies in density from 110kg/m3 at the centre of the top to 1000kg/m3 in the peripheral area at the base. Generally it is graded as:
Soft : 250 -399 kg/m3
Core : 400 -599 kg/m3
Hard : 600 kg/m3 and upwards.

Swelling and shrinkage:
Because coconut does not have any diametric growth, wood rays, branches or annual rings, the swelling and shrinkage properties hardly differ in the tangential or radial direction. Volumetric shrinkage is 5-7% for the soft and core wood and 10-12% for hard wood. Compared to other species of corresponding densities the volume shrinkages is mostly smaller.

Sorption properties:
The equilibrium wood moisture content in a state of balance with the air humidity and the temperature corresponds with the sorption properties of other wood species of similar density At 20degC, 75% relative humidity = 12% equilibrium moisture content.

Drying rate is generally higher in the softer wood than the hard because of the higher initial moisture content. The high density wood, however, will under-step the fibre saturation point earlier. The equilibrium moisture content, around 17% in the tropics near the coast, is reached at the same time, 60-90 days.

Definitions:
Hardness gives an indication of a species' resistance to indentation and abrasion. It is usually

determined by a test called the Janka indentation test which measures the force required to embed a steel ball a certain depth into the wood. The higher the Janka rating the more resistant the timber to indentation.

Impact Strength is a measure of the energy needed to break a standard sized specimen.

Strength Group is mainly used by structural engineers to determine the size of structural timber. The strength groups are based on the following five strength properties:-
•Air Dry Density is the average density of the timber at a moisture content of 12%.
•Modulus of Rapture is a measure of the bending strength of the timber
•Modulus of elasticity is a measure of the timber's stiffness and resistance to deflection.
•Maximum crushing strength in compression parallel to the grain
•Maximum shear strength parallel to the grain
A strength group rating from S1 to S7 is given to green timber and a rating from SD1 to SD8 is given to seasoned timber. The lower the number the stronger the timber."

http://www.dpi.qld.gov.au/cps/rde/dpi/hs.xsl/30_12661_ENA_HTML.htm

Coconut palms - the timber of the future

Timber industry representatives from Australia, Fiji and Samoa, including flooring market and production specialists and potential suppliers and processors, are studying drying and processing technologies to ensure strict quality control of the product.

"Even medium-density palm logs can be processed to make attractive veneers and plywood.

"The positive results achieved to date support development of palm stem processing in Pacific island countries of origin, with value-added flooring and other products produced in Australia."

Many Pacific island nations including Tonga, Fiji, Papua New Guinea and Vanuatu have large but ageing coconut palm plantations, where there is declining coconut and copra crop production.

Mr Hopewell said the project was looking at opportunities to use these plantations to generate new timber industries, and create new Australian export and consumer markets, while providing a new source of income for Pacific island peoples from a locally available resource.

"With strong demand for flooring products in Asia, America and Europe, cocowood products could be very lucrative for Queensland and our Pacific neighbours," he said.

"By developing a cocowood industry to provide a range of timber products, we could help reduce the demand for timber from old-growth forests in Pacific island nations."

This year the project enters a new stage with the further refinement of cocowood processing for commercialisation and entry to domestic and international markets.

The cocowood project is co-funded by the Australian Centre for International Agricultural research (ACIAR). QPIF is a partner agency with the Secretariat of the Pacific Community (SPC), the Fiji Coconut Industry Development Authority, (CIDA), Fiji Ministry of Fisheries and Forests, Samoan Ministry for Natural Resources and Environment and Strickland Brothers, Samoa.

Coconut Leaf Weaving

http://polynesia.com/tonga/houses-and-village-life.html

"The easy availability of fresh coconut leaves makes them the most important weaving material in Polynesia, especially for every day use. The leaves are chopped off the trees and particularly used for outside needs. They also have the advantage of being disposable.

Once a green coconut frond is cut, it's relatively easy for a person to split off one side along with a thin piece of the mid-stem. The piece of mid-stem, which is more woody, can be easily made into a circle, secured at the ends, and formed into the rim of a basket. Weaving the individual leaves now hanging below the rim follows the usual alternating over-and-under pattern. When the basket is sufficiently deep, or the leaves almost all plaited, the ends are clumped into three strands and braided into a long line across the bottom. Finally, the three strands are tied into a knot, sealing the basket. Tongans and almost all Polynesians frequently make such baskets and use them to carry coconuts from the plantation, carry food, hold materials for crafts and many other uses.

Coconuts leaves can also be woven into interesting toys for children, such as a windmill, ball, fish, grasshopper, bird, pineapple, or musical instrument, or a three-leaf piece from one side of the frond can be quickly braided into a cool coconut headband.

Polynesians will also use coconut leaves to quickly finish off a house: For example, they can be layered to make a roof, woven to decorate walls, used to screen out the wind and rain, or made into mats to line floors over which finer mats would be placed.

The traditional craft of weaving is also enjoyed for the companionship it promotes among women, as well as the creative pleasure it gives, and the comfort and utility woven goods provide. “

Ideas for weaving with coconut leaves

http://www.hatsandbaskets.com/home/

Great site to stimulate your imagination about novel and traditional things to weave.

http://www.origami-resource-center.com/palm-weaving.html

Great site with how to weave and make religious symbols using palm fonds plus other ideas including a great link to Palm leaf art of flickr.

http://www.flickr.com/groups/palaspas/ This is a great site with photos of things made from palm leaves plus instructions and ideas. Great site for this task.

Recipes

There are many recipes on the Internet and in books. Not only read the recipes for content, but read them for layout, attractive designs and ways to communicate interesting information during the recipe. There is one example below.

When searching for recipes use as many key search words as you can – especially use words of the ingredients.

An interesting exercise for students is to look at recipes from different countries which use the same ingredients. Give students a purpose for searching well. Comparing and contrasting recipes will add a focus to the search and encourage children to invent interesting recipes for themselves.

Chicken and Coconut in Banana Leaves

Difficulty: Easy

Serves: 2

Yield: 2 Serves

Ready in: 1 hour 50 mins (40 mins Prep - 1 hour 10 mins Cook)

This is adapted from a style of cooking that I experienced in Papua New Guinea. It basically involves making banana leaf parcels in which to bake the ingredients. Serve parcels on plates, bamboo mats, or - more traditionally - on fresh green banana leaves. Enjoy with a very cold beer (preferably of tropical origin) although a bottle of Chardonnay has a lot of appeal as well!
Recipe provided by: Craig Nanango

Ingredients

- 1 tsp low-sodium soy sauce
- 1 tsp barbecue sauce
- 1 tsp minced fresh ginger
- ¾ cup (180 ml) coconut milk
- 2 chicken drumsticks
- 2 chicken thighs
- 2 yellow plantains, peeled and cut into 2cm slices
- 1 sweet potato, peeled and cut into thick sticks
- 1 large fresh, unsplit banana leaf

Preparation method

1. Preheat oven to 175 degrees C.
2. Whisk together soy sauce, barbecue sauce, ginger and coconut milk.
3. Place chicken drumsticks, thighs, plantain, and sweet potato in a bowl and pour over the marinade. Marinate 30 minutes.
4. Gently warm the whole banana leaf over a fire or gas burner until the leaf is pliable but not burnt, 3 to 4 minutes.
5. Cut the leaf into four large squares, measuring at least 30 x 30 cm. Carefully cut four long, thin strips from the rib of the leaf, these will be used as 'string' to tie the packets later.
6. Place a piece of chicken onto each banana leaf square and evenly divide the vegetables on top. Pour in any remaining marinade and fold the leaves around the chicken like you are wrapping a present.
7. Securely tie with the rib strips and place the packets onto a baking sheet.
8. Bake in preheated oven until the chicken is tender and no longer pink in the center, about 1 hour. Check the packets occasionally to make sure they do not burn.