UNIT: A COMMUNITY IN NATURE STICKS TOGETHER

YEAR LEVEL: 5-6

OUTDOOR LEARNING CONNECTIONS:

Four dimensions of Outdoor Learning connections:

- Conservation & Sustainability
  Students investigate strategies to reduce the local and global impact of human activity on natural environments and engage in actions that positively contribute to conservation and sustainable living
  Skills & Knowledge
- Problem solving, creative and critical thinking
  A range of skills and knowledge is needed to work together and be active and safe in the outdoors. (Problem solving, creative and critical thinking)
- Human-Nature Relationships
  Educational time in nature allows students to develop multiple ways of knowing and creates strong connections to natural environments. (Exploration, creativity, imagination and innovation.)
- Health & Wellbeing
  Students experience the deep personal impact of time in nature. This includes the role of natural environments in providing a balance to modern, technologically intense living and in supporting physical, social, emotional, mental and spiritual wellbeing.

ABOUT THIS UNIT

In this unit, students explore their outdoor classroom and natural environments with an opportunity for an integrated STEM approach to teaching and learning. They will apply mathematical understandings, scientific skills and a process of design and engineering to research and create a design solution (a stick cubby or small scaled stick structure) and to evaluate and review their product. Their design solution will be a structure made of sticks and natural materials. This could be a cubby large enough for a group to sit in, or it could be a smaller structure made to scale. They will incorporate an element of sustainable living into their shelter; water collection, solar energy, harnessing wind energy and insulating properties as well as developing appreciation and understanding of the social construct of community and the way a community is shaped by a greater collective.

Central idea: Individuals contribute to a community's sustainable future with knowledge, choice and action

Lines of inquiry:

- How can we model the process of sustainable building and design in the creation of a community of cubbies?
- How can we model the capacity to harness water, energy and light from our natural surrounds?
- What added features make our structures habitable? (insulation, passive heating and cooling)
- How does the process of building our structure contribute to 'building' our community?
- How can we share our knowledge of sustainable practice to better meet our needs of our school?

Teacher background:

This unit has been based on and around the many opportunities and powerful connections for learning with sticks and twigs; the opportunity for real-life learning while using this loose part as a simple tool for learning.

As educators who know your students best, we encourage you to use this structure to support your venture into outdoor learning and nature pedagogy. Our ultimate goal would be that you develop your own tool kit and find a place and space in your setting for students to undertake inquiries in nature and bring you own approach to outdoor learning. These activities are open-ended and therefore there is the opportunity to include more complex concepts as needed or consolidate learning where applicable.

Before you begin:

- It may be good to have an outdoor learning journal where all students can reflect at the end of each activity and draw, write, compose and record ideas and questions.
- Consider the space you would like to use as your outdoor learning environment. Are there any logistical considerations to make before you venture outside?
- Cool Australia have developed some great resources to help get your journey into outdoor learning started; beginning with an overview and introductory to Developing Outdoor Learning Guidelines

CURRICULUM CONNECTIONS

Health

Contributing to healthy and active communities

Explore how participation in outdoor activities supports personal and community health and wellbeing and creates connections to natural and built environments (ACPPS059)

Learning through movement

Participate positively in groups and teams by encouraging others and negotiating roles and responsibilities (ACPMP067)

Maths Yr 5

Problem Solving

Includes formulating and solving authentic problems using fractions, decimals, percentages and measurements, interpreting secondary data displays and finding the size of unknown angles

Geometric reasoning

Estimate, measure and compare angles using degrees. Construct angles using a protractor (ACMMG112

Using units of measurement

Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108)

Calculate perimeter and area of rectangles using familiar metric units (ACMMG109)

Shape

Connect three-dimensional objects with their nets and other two-dimensional representations (ACMMG111)

Location and transformation

Use a grid reference system to describe locations. Describe routes using landmarks and directional language (ACMMG113)

Maths Yr 6

Problem Solving

Includes formulating and solving authentic problems using fractions, decimals, percentages and measurements, interpreting secondary data displays and finding the size of unknown angles

Geometric reasoning

Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles (ACMMG141)

Using units of measurement

Solve problems involving the comparison of lengths and areas using appropriate units (ACMMG137)

Connect volume and capacity and their units of measurement (ACMMG138)

Shape

Construct simple prisms and pyramids (ACMMG140)

Location and transformation

Investigate combinations of translations, reflections and rotations, with and without the use of digital technologies (ACMMG142)

Humanities and Social Sciences Yr 5

Geography Knowledge and Understanding

The environmental and human influences on the location and characteristics of a place and the management of spaces within them (ACHASSK113)

Humanities and Social Sciences Yr 6

Geography Knowledge and Understanding

How the concept of opportunity cost involves choices about the alternative use of resources and the need to consider trade-offs (ACHASSK149). The effect that consumer and financial decisions can have on the individual, the broader community and the environment (ACHASSK150)

Years 5 and 6 Inquiry and Skills

Work in groups to generate responses to issues and challenges (ACHASSI102, ACHASSI130)

Reflect on learning to propose personal and/or collective action in response to an issue or challenge, and predict the probably effects (ACHASSI104, ACHASSI132)

Science and Technology

Science as a Human Endeavour

Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083)

Design and Technologies

Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use (ACTDEK019)

Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions (ACTDEP024)

Generate, develop and communicate design ideas and processes for audiences using appropriate technical terms and graphical representation techniques (ACTDEP025)

Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions (ACTDEP026)

Negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions (ACTDEP027)
Develop project plans that include consideration of resources when making designed solutions individually and collaboratively (ACTDEP028)

General Capabilities

Critical and Creative Thinking

- combine ideas in a variety of ways and from a range of sources to create new possibilities
- identify situations where current approaches do not work, challenge existing ideas and generate alternative solutions
- identify and justify the thinking behind choices they have made thinking (metacognition)
- reflect on assumptions made, consider reasonable criticism and adjust their thinking if necessary
- scrutinise ideas or concepts, test conclusions and modify actions when designing a course of action

Personal and Social

- identify a community need or problem and consider ways to take action to address it
- contribute to groups and teams, suggesting improvements in methods used for group investigations and projects

Intercultural Understanding

- explain perspectives that differ to expand their understanding of an issue

Ethical Understanding

- explain what constitutes an ethically better or worse outcome and how it might be accomplished
- explore the reasons behind there being a variety of ethical positions on a social issue
- evaluate the consequences of actions in familiar and hypothetical scenarios

Cross Curriculum Priorities

* Aboriginal and Torres Strait Islander histories and cultures * Sustainability

SETTING THE SCENE

Key idea: At this stage of the inquiry, students will explore the physical environment and undertake a "perceptual site survey" exercise to gain an understanding of what the senses observe. It also gives students the time to orientate themselves in the space they will use for their cubbies and think about things such as; what they can see, what is already there and what has always been there. The next step is to consider a way of adding something to this place for the enjoyment of community; something that does not detract from what is already there.

ACTIVITY 1: INTRODUCING THE 'BIG IDEA'

Focus Learning Area: Literacy

Duration: 1 hour

Resources Required: A display of the central idea and lines of inquiry for students to copy into a book or journal. Introduce the unit of work with a discussion about the 'big idea' of building a community of sustainable cubbies to model ideas about sustainability for the school community.

As a class, discuss the central idea and lines of inquiry and copy these into an Outdoor Learning Journal or workbook.

With the words, Sticks, Cubbies, Shelter, Sustainability, Community and Action on a board, ask students to generate a list of what they already know about any of these things and what they are wondering. A class wonder wall may be a good resource to set up at this stage to view and reflect on learning throughout.

ACTIVITY 2: SITE SELECTION & WALK THROUGH OF PLACE AND SPACE

Focus Learning Area: Geography

Duration: 1 hour

Resources Required: Aerial image of school site to record ideas.

Teacher Information: At this stage, the focus turns to the local environment and the intended use of these cubbies. Students will be guided to think about where the cubbies will be located and who will use them.

Begin this activity with a tuning in to place and space walk-through. Go outside and start at a central point of the outdoor learning area. Allow students to wander for 30 seconds to find where their body naturally wants to stop. Ask each student to say in a few words why they have stopped there and what drew them to that spot (cool, shade, warmth, smell of flowers etc, colour and so on). Repeat the activity in a few different areas of the grounds, recording the results.

Ask the children to work in small groups to continue this activity and observe/write down each other's responses.

Once this has been undertaken a number of times, gather students in one area to have a class discussion. Ask students to share where their favourite place is within the school grounds and why they like it. Brainstorm and gather these ideas in a way suitable for your class group. Discuss the stand-out sites as possibilities for a sustainable cubby town. (There may already be some clear ideas and understanding amongst students about the most appropriate cubby building sites in the school.)

Consider assessing the chosen area according to: size; view; northern orientation; current use; whether it is flat or sloped; locality of trees and the ability to build and leave semi-permanent structures within this area. Ask students to write a submission as to why this site would be appropriate in response to some of the headings above.

This activity could be combine with a formal site analysis so children can identify the best site based on all factors. An aerial photograph of the school is a good resource for this process as it makes the overall area visible to children.

Individuals contribute to a community's sustainable future with knowledge, choice and action.

TUNING IN

Key Idea: At this stage, students begin to explore their outdoor learning area and tune in to the way in which nature presents iwn their specific setting. They will develop an understanding of perspectives and understand that there are many perspectives and points of view in any setting. They will begin to connect the concept of building with an element of sustainability.

ACTIVITY 3: CONNECTIONS AND PERSPECTIVE IN THIS SPACE

Focus Learning Area: English & History

Duration: 1 hour

Resources required: Outdoor learning journal; Text: My Place, by Nadia Wheatley and Donna Rawlins

Nature in THIS setting

Begin by a class reading of the text My Place by Nadia Wheatley and Donna Rawlins to set the scene of connecting with place and space.

(You could do this in many ways, reading it as a set text over a period of time or assigning each student a page to read and report back to the class. The intention of this activity is to think about how one space is used by many people and changes over time.)

After reading this, go outside to the area identified by the class as the cubby building area. Undertake a number of walk-through activities where students move through the space and identify what they can see.

Each time encourage them to look for something they didn't notice before (ie look under a rock, and then under the dirt below that and then under the layer of topsoil etc.) Record some of these ideas.

Ask students to identify two items in this space such as; a living creature and a tree. Consider the point of view (perspective) of each of these things regarding the history of this space. How has their world changed over time? Ask students to record some thoughts in their journal about;

- How are people currently connected to this space?
- How is the feature you identified connected to this space?
- How has this space changed over time?
- What might it have looked like -10, 20, 50 or 100 years ago?

ACTIVITY 4: THE BUILDING PROCESS BEGINS

Focus Learning Area: Geography

Duration: 1 hour

Resources Required: Outdoor Learning Journal

Now that students have identified a space that will be used to create a community of sustainable cubbies and have carefully looked at how nature already exists in that setting, they will begin to think about the 'how to' of cubby design and site development.

Establish small groups that will be working on each cubby. Once in these groups, ask students to work together to drew a site plan of the complete area. Research what a site plan or site survey might look like before they begin. The aerial photographs of the area will be useful at this stage.

Discuss and workshop ideas on sustainability. Ask students to consider; what does sustainability mean? What could this look like in your design? Encourage them to draw some of these ideas in their outdoor learning journal.

Once the concept of a site survey and a basic introduction to the concept of 'sustainability' has been explored, the next step is to begin thinking about what the cubby will look like and how it will be built.

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FINDING OUT

Key Idea: Students develop skills and understandings of the mathematical and engineering concepts that will be needed to build their cubbies.

ACTIVITY 5: TAKING NOTE OF DIMENSIONS IN NATURE

This activity has been adapted from a Maths lesson, published by Juliet Robinson on her Creative Star Learning blog and can be found at the following website: http://creativestarlearning.co.uk/maths-outdoors/

Focus Learning Area: Maths

Duration: 1 hour

Resources required: Sticks, Twine, Scissors, Protractor, Cardboard boxes

Before you begin: Gather sticks of set lengths such as 30 and 60cm. If sourcing sticks this size from your site or local area is problematic, bamboo poles at set lengths of 60cm and 120cm can be purchased from gardening stores (often in bulk buy bags). Twine is also a good resource to collect at this point.

In this activity, students will begin to explore how to construct a 3D shape and design and make a home or house that fits one, two or three people.

With an assortment of sticks, make 3D net shapes flat out on the ground. Tie them together with twine or wool. (Use different shaped cardboard boxes as inspiration to open up and look at the net shape to guide thinking at this stage, if necessary).

Questions to guide students' thinking: How large does the space need to be to fit one person inside? Two people? The whole group?

What angles are used in your cubbies and how are these measured?

What is the volume and the capacity of your 3d shape?

* While undertaking this activity, students will also be thinking about techniques of how to join sticks together in a secure way. There will be some independent research and trial and error in this phase.

"Create the biggest 3D shape using the 1-metre sticks which would hold its shape and not collapse. "

This may provide you with a great launching pad into other ideas and concepts that might suit your students and your site.

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APPLYING IT – GOING FURTHER

Key Idea: In this phase of the inquiry, students work together to build their cubbies and shelters. They undertake some topographical mapping of their newly built cubby town and share their cubby town designs with one another.

Beginnings of the Building:

The following note (or something similar) will need to go home to families the week before the cubby building begins:

We would love for children to go on a stick hunt and bring in 4 sticks of length between 80-120cm to contribute to their groups' sustainable cubby build. Before they bring these in to school, they may like to have a go at joining these sticks together at home. They are encouraged to draw a diagram or make a poster or video clip to demonstrate how to make a self-supporting structure using these sticks and string. These ideas will be shared in class before the cubby building begins.

ACTIVITY 6: CREATE A SHELTER OR CUBBY

Focus Learning Area: STEM

Duration: 2 hours

Resources required: Sticks, Ropes, Twine, Hessian, Cameras, Site Survey (in Outdoor Learning Journal)

Teacher Background: Building cubbies and small shelters is a great way for students to develop team work, co-operation, problem-solving and creative and critical thinking skills.

At this stage of the inquiry, students have established an area to build in, have completed a site survey to map out the placement of their cubby and have collected some resources to get started.

In their small groups, and working off the plan in their outdoor learning journal, students will construct their cubbies.

By the end of this session, students will have used sticks and twigs and an assortment of other materials to construct a cubby. It should be self-supporting and have a clear entrance and exit point to guide potential traffic.

They might use sticks, twigs, hessian, ropes, twine, leaf litter, old scraps of material or other scrap resources to make their cubbies.

ACTIVITY 7: MAP MY TOWN

Focus Learning Area: Health & Maths

Duration: 2 hours

Resources required: Aerial map of area, grip paper, ruler, pencil

Now that the community of cubbies has been built, ask students to revisit their site survey and draw an aerial map of their cubby town.

In this mapping exercise, they need to reflect;

- The layout of each cubby in relation to one another
- Understanding of scale in their drawings
- Natural features in the landscape
- The use of a grid reference system and directional language
- Location of north on the map

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APPLYING IT – GOING FURTHER

Key Idea: In this phase of the inquiry, students work together to focus on an element of sustainable living to model in their cubby. Follow the links below to find in-depth lesson plans and examples of the 'how to' explore these elements of design.

ACTIVITY 8: MODELLING A SUSTAINABLE PRACTICE

Focus Learning Area: STEM

Duration: 6 hours

Resources required: Internet research, other resources as required

Once the cubby has been built the last building phase is to include as many elements of sustainability into each cubby in readiness to showcase to the wider community.

These may include: Water collection, Solar energy, passive heating and cooling, making a wind turbine and insulation practices.

At this stage, it may be useful to research different types of sustainable houses/initiatives as a project or homework task. Some ideas include: straw bale houses; rammed earth houses; solar panels and wind turbines (to name a few).

Passive Heating and Cooling

https://www.steampoweredfamily.com/activities/heat-transfer-projects-for-kids-stem-activities/

https://www.teachengineering.org/activities/view/cub_energy2_lesson09_activity1

Measuring Wind Speed

https://www.teachengineering.org/sprinkles/view/cub_anemometer_sprinkle1

Solar Cooker

http://www.solarcooking.org/plans/newpanel.htm

Insulation
The link below will direct to a lesson from a Primary Connections unit. This can be adapted to conduct in your outdoor learning environment with the insulating materials being natural materials such as mud, clay, sand, wood or dirt. Experiment with mud bricks, rammed earth, straw and stick clay bricks...

http://www.scootle.edu.au/ec/viewing/S7160/material-world_2012/lesson_6.html

Water Collection and a Rain Gauge

http://theimaginationtree.com/2012/04/homemade-rain-gauge.html

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DRAWING CONCLUSIONS

Central Idea: We all contribute to our quality of life through knowledge, choice and action.

Key Idea: Students consider what elements could be built into this to contribute to a sense of community.

ACTIVITY 9: COMMUNITY STRUCTURE…WHAT MAKES A HOME GREAT?

Focus Learning Area: Health

Duration: 45 mins

Resources required: Outdoor Learning Journal

Think about the definition of community and what can be added to this sustainable cubby community to make it a good place to live.

Ideas to consider: Should there be an essential agreement or rules to live by? Does this space have designated green spaces to enjoy and connect with nature? Does it feature areas that function to bring people together? Where will people gather? Where will they rest and relax? Draw these on your aerial map and share these with the wider group.

ACTIVITY 10: IDENTITY IN A PLACE AND SPACE: DEVELOPING A TOTEM

A totem pole is a stick that tells the story about the person who made it, their family and their traditions and story. Traditionally they were carved, but in this activity we are using natural materials such as twine or wool to make a totem from a special stick to share something about our personal stories with one another.

Go on a walk with students to each collect a stick that will be used as their totem pole - or ask students prior to this activity to each bring in a stick to decorate as a totem pole (decide on a length and width that you are comfortable working with)

Ask students; what can you do to make that stick a personal reflection of you? Research the concept of totem poles with images and stories inside the classroom, before taking this learning outdoors (thus facilitating a connection between teaching a concept indoors and the practical application of this concept in an outdoor learning environment.)

Ask students to divide the stick into four or five equal spaces and draw a line between these. In each of these spaces students will create something that tells 'reflects who they are and where they have come from'. They might draw or create; animal faces, things they would find at the beach, bush or around you right now. (Bush, tree, clouds, flower) Brain storm ideas that could go on to them. Discuss the connection between the items they chose and how this will make this totem a unique reflection of their story. Section off each area with some twine, wool, ribbon, grass or by carving and then draw symbols or pictures in each space. You might like to weave your favourite colours around it or tie loose threads of ribbon on to it. These can then be displayed around the sustainable cubby community to reflect the participants' beliefs, values and understanding.

ACTIVITY 11: REFLECTION AND ASSESSMENT

The showcase of these cubbies will provide a forum for self, peer and external feedback regarding the build process and the degree to which elements of sustainability have been woven into the design. Self assessment and reflection using the General Capabilities outlined earlier in the unit will provide a structure with which to review not only the end product, but the thinking and approaches to learning within the unit. This will be something that is best generated by the educator and their site specific focus within this unit.

CULMINATION OF UNIT: SHOWCASE

At the end of the design phase, engage students in the process of planning a showcase of these sustainable cubbies. This might be something that could include the school and wider community or industry professionals working in the field of sustainability.