SCIENCE PLANNING TEMPLATE – Part 1: Learning outcomes plan

Main idea: Gathering, Cleaning, and Cooking/Prep of Roots. (Examples: Bitterroot, Camas, & Water Potatoes)	**Science strand:**	**Level:** **K-8th grade levels** **Year:** 2018

Overarching learning outcomes:
- Traditional teaching of gathering roots from your tribe.
- Distinguish the roots that are gathered.
- Hand on digging technique, gathering field experience, and cooking field experience.

Conceptual learning outcomes (~cultural knowledge)	**Procedural learning outcomes**	**Nature of science outcomes**	**Technical learning outcomes**
Students will understand that: • All roots gathered are traditional foods/medicines. • Gathering roots is a seasonal practice for different roots. • Different families in their tribes have different traditions practiced around gathering.	Students will be able to: • Know different sites for gathering roots. • Will be able to identify different roots. • Correctly use tools for gathering. • Clean and cook traditionally.	Students will understand and appreciate that: • The time required to gather, clean, and cook traditional foods. • The importance of prayer in gathering foods. • Understanding sustainability of the roots and their environment.	Students will be able to: • Students will be able to independently gather, clean, and cook traditional roots. • Student will know traditional practices revolving around gathering. • Be able to use google maps or other mapping apps to locate roots sites.

Assessment (:
- Students will be able to make a book that includes writing, drawings, and photograph of field experience of root gathering.
- Students will continue independently continue to be a root digger.
- Students will be able to present food to be eaten.

SCIENCE PLANNING TEMPLATE – Part 2: Lesson plan

Main idea: Gathering, Cleaning, and Cooking/Prep of Roots.
(Examples: Bitterroot, Camas, & Water Potatoes)

Subtasks		Resources/focal artefacts	Planned interactions	Key student outcomes
Meso tasks	**Micro tasks**			
Lesson 1 Presenting examples & photographs of Camas.	1.1 Student draws diagrams of photo example in their book.	• Display photographs & drawing of Camas.	• Independently.	• Students will have drawn diagrams of Camas.
Lesson 2 Teach how to gather a root with the digger stick.	2.1 Students write about the importance of prayer, language, and how correctly dig.	• Display the different prayers used out digging. • Display bitterroots names in the traditional language. • Show diagrams of correct ways for digging.	• Independently.	• Student will have all steps for traditional practices of gathering roots.
Lesson 3 Teach how to skin and clean roots for preparation for cooking and drying.	3.1 Student will draw a diagram of a Bitterroot.	• Workbook. • Photographs & drawings of Roots.	• Independent.	• Students will have a drawn diagram of Bitterroots. •
	3.2 Students will write the steps for cleaning, preparing roots.	• Present steps of cleaning and preparation for cooking or drying. •	• Independent.	• Students will have all steps written in their roots workbook.
	3.3 Students will know how to say the roots name in the language.	• Displays of roots spelt in the language. •	• Independent.	• Students will be able to spell and say the roots names in traditional language.
Lesson 4 Field Experience- Root Gathering		• •	• •	• •
	4.1 Identifying and gather roots.	• Transportation Vehicle. • Designated supervision. • Enough diggers sticks. • Adult supervision. • Ipads for documenting.	• Group interaction. • Adult Supervision	• Students will know traditional practice for gathering and cleaning roots.
	4.2 Cleaning roots	• Ice Wash tub (For placing	• Group interaction.	

	and soaking roots.	cleaned root in on travel home). • Ipads for documenting.	• Adult Supervision.	
Lesson 5 Processing Roots.	5.1 Air drying.	• Needle and Thread. • Ipads for documenting.	• Partner or independent.	• String a Camas neckless
	5.2 Subterranean pit cooking.	• Volcanic rock, shovels, and supportive plants (example: Alder, sticky geranium, rye grass). • Sheet used to wrap roots. • Digging stick. • Serving dishes • Ipads for documenting.	• Grouped teams: Pit Diggers, Plant gathering, and Fire watchers. • Adult supervision.	• Be able to cook roots using traditional practices of pit cooking.
	5.3 Steaming.	• Steam pans • Stove • Serving dishes • Ipads for documenting.	• Partner or independent. • Adult supervision.	• Be able to steam cook roots and serve meal.
		•	•	•

Design principles to guide planning (Bang, Medin, Cajete, 2009)

EFFECTIVE SCIENCE-LEARNING ENVIRONMENTS:

n Use local, place-based instruction and hands-on experiences2
n Are inextricably linked with community participation and practices, and include community values, needs, language, and experiences3
n Are premised on the idea that nature is not an externality, apart from humans, but rather that humans are a part of nature
n Are motivated and organized around a big idea, in our case the idea that everything is related and has a role to play in the universe (systems level or ecosystems thinking)
n Place science in an interdisciplinary or holistic context and invite the learner to view phenomena from multiple perspectives, and especially from a seasonal/cyclical perspective
n Explore and address the relationships and tensions between Native science and Western science4

- Place science in social policy and community contexts that highlight the need for participation and leadership5

SCIENCE PLANNING TEMPLATE – Part 1: Learning outcomes plan

Main idea: *The big science idea for students to understand, for example:* • Sound is comprised of waves. • Fossils provide clues to the past. • Moulds are a type of fungus and are living.	**Science strand:** •	**Level:** **Year:**

Overarching learning outcomes:

Derived from and relating to the main idea, teased out in more detail. They show science as a holistic practice where ideas and skills come together so that the main idea can be understood. These are usually broad statements covering scientific knowledge, practice and nature of science outcomes. Here are two examples:

In building understandings about sound, students will integrate:

- understandings that properties of sound relate to the manner in which sound waves travel through a substance (scientific knowledge)
- an investigation into how musical instruments generate sound waves (scientific practice)
- understandings that scientific knowledge can be used to help people (nature of science).

In building understandings about adaptation, students will integrate:

- understandings about how the features of an animal living on the rocky shore have allowed it to adapt to its particular habitat (scientific knowledge)
- an investigation of how a local ecosystem fosters the interdependence of living organisms, including humans, and their relationship with their physical environment (scientific practice)
- understanding that the nature of experimentation can include making predictions, observing, recording results and drawing conclusions (nature of science).

Conceptual learning outcomes	**Procedural learning outcomes**	**Nature of science outcomes**	**Technical learning outcomes**
Focused on knowledge and understanding of relevant scientific concepts and procedures, for example: Students will understand that: • mould colonies reproduce and grow where the conditions meet their needs • beach ecosystems are a balance of living and nonliving elements, that interact with each other • sound travels as a wave, producing vibrations.	*Focused on strategic application of procedures and processes, such as used in science investigations, for example:* Students will be able to: • classify living things • generate and identify questions that are suitable for an investigation • confidently make predictions about direction of movement • carry out a procedure by following a sequence of simple steps • record results appropriately.	*Related to what counts as evidence and methods appropriate for communication of scientific ideas, for example:* Students will understand and appreciate that scientists: • make categories so they can understand what they see • make predictions then test them • use observation and describe what they see • change their ideas over time as they find and make sense of new fossil discoveries.	*Related to practical techniques and equipment use, for example:* Students will be able to: • label observational drawings • label test equipment • develop technical skills for cutting, threading, knotting • connect components of a circuit to make a working circuit.

Assessment:

For example: Poster, investigation report, before and after views, Short test

Background information on the science planning template

Teaching science to primary school students is not simple. Teachers need to be able to take science concepts and present them in ways that enable students to learn.

The two-part science planning template can help teachers move from simply planning activities for students to do, to planning what and how students will learn through a coherent series of lessons.

> This is not to suggest that planning should set the day in stone. The wonderful thing about planning is that once you've done it, you can make all kinds of changes and adjustments and not lose the plot. Or, if you do it's on purpose. (Earl, 2003)

The planning template

The science planning template was devised by teachers and researchers involved in the InSiTE project (Cowie, Moreland, Jones & Otrel-Cass, 2008). The project explored teaching and learning in science and technology in primary classrooms.

There are two parts to the planner:

- Part 1 is the focusing inquiry and outlines the scope of what is important to learn.
- Part 2 is the teaching inquiry helps teachers plan the pedagogical approaches and strategies that will help students learn the ideas and skills specified in Part 1. Completing Part 2 focuses the teacher on planning learning opportunities aimed at achieving the outcomes they have prioritised. There are spaces to record a sequence of subtasks that contribute towards achieving the main task, resources required for each subtask, the interaction focus for each subtask and possible student outcomes and responses.

More information and references

For best results, you may need to use the Google Chrome browser when following the links below on the Teaching & Learning Research Initiative (TLRI) website.

For a more comprehensive understanding of both parts of the planning template, see The Classroom InSiTE Project: Understanding classroom interactions to enhance teaching and learning in science and technology in Years 1–8 and click on the 'Insite Planning' link at the bottom of the page.

Cowie, B., Moreland, J., Jones, A., & Otrel-Cass, K. (2008). *The classroom InSiTE project: Understanding classroom interactions to enhance teaching and learning in science and technology in Years 1–8*. Wellington: Teaching and Learning Research Initiative. http://www.tlri.org.nz/sites/default/files/projects/9215_finalreport_0.pdf (1.45 MB)

Earl, L.M. (2003). *Assessment as learning: Using classroom assessment to maximize student learning*. Thousand Oaks, CA: Corwin Press.

Moreland, J., Cowie, B., Otrel-Cass, K., & Jones, A. (2010). *Planning for learning: Building knowledge for teaching primary science and technology.* Wellington: Teaching and Learning Research Initiative. http://www.tlri.org.nz/sites/default/files/projects/InsitePlanning.pdf (555 KB)