Senior primary, lesson plan

Topic	**Waterhole monitoring**
Rationale	Following on from lesson plan 1, students learn about tools and methods that are used to monitor waterholes, both traditional and scientific. If possible, an elder talks about the cultural and historical use and management of the springs. Students collect water animals and compare the findings to information collected previously, analyse sensor camera data and complete a waterhole monitoring survey. Students use the combined information to assess the health of the springs.
Desired results	Students can make a prediction about the results of their investigation- whether the springs are as healthy, more healthy or less healthy than last year. Students learn about the springs from a local elder's perspective. Students find and catch water creatures using nets and containers. Students can identify what they have found using the adapted Gould League sheet, and record them. Students can transfer their findings into the Pollution Indicator chart and talk about the results. Students can compare and discuss the differences (if any) in the data collected each year, and as a group develop an answer to the inquiry.
Learning/ teaching activities	**Previous day:** Set up motion sensor cameras at the water source, before sundown. **Prior to leaving school;** • With the whole group, **complete a Science Investigation sheet** on the smartboard, talk about the rationale for returning to the water source and repeating the macroinvertebrate study. • **Write up 'My Question'; Is Marnta-marnta still a healthy waterhole?What do you think?** (prediction- no right answer, we are going to find out!) • **How will we do it?** (talk to elders, collect water animals, look at night photos) Remind about the **etiquette of arriving** at the water source; • Look at cameras but don't touch Meet the waterhole: • **Brief sensor camera explanation.** How can we see which animals use the water source when we're not there? Explain that we will load the images from the sensor cameras after the activity. • **Elders talk about traditional stories etc.** Hear how the water source was used/what was known about it in the old days, and now, from local elders. Film this. • **Demonstrate water animal collection process** for new students. • **Hand out** the equipment and worksheets. • Complete the activity in pairs, **filling out the Gould League record sheet.** • **Reminder: If you can't see it on the sheet, don't throw it away!** It might be a new animal that's never been found before. • **Complete the search** (around half an hour is usually a good amount of time). • Gather all the equipment and clean it up, bring the animals together.

	• **Gather to look at what was found, take a photo of each animal** with a laptop and dinoscope. Discuss different features of each. • **Return all the animals to the water source.** • Fill out the **Pollution Indicator chart** together and discuss. *During the animal collection, download the **motion sensor camera data** to a laptop and scan for activity. Show students what animals were (or were not!) caught on camera using the waterhole during the night. -If unsuccessful, talk about possible reasons eg. disturbed by visitors, plenty of water elsewhere, some animals not needing to drink much. -If successful, discuss whether the animals are feral or native, living in the area or passing through, and whether they have a positive or negative impact on the water source and why or why not. **Pack up** and return to class. *The following could be a separate class at a later time:* **Make a data table on the whiteboard-** put last year's Gould League sheet on a table with cut-out enlargements of the animals. Students put the animal pictures on the board vertically on left, with two dates at top of columns. Students add today's results in the second column. **Compare similarities/differences.** Finish the **Science Investigation sheet**- What we found out. **If time,** play the Waterbug Game (Science Pathways Two-way Science resources, Rivers and Lakes Primary)
Materials needed	Sensor cameras x 2 Nets Trays Small containers with lids Pipettes Small plastic bowls Long measuring tape Class sets of worksheets Clipboards Pencils Whiteboard Whiteboard markers Dinoscope and computer Thermometer
Workshee ts and resources *(see*	Tangentyere Land and Learning manual: • **Adapted Gould League sheet**, p.68 (use a version for the local area if available) Other: • **Pollution Indicator chart**

Land and Learning

attached)	Science Pathways, Rivers and Lakes-Primary manual: • **Science Investigation sheet**, p. 24 • **Waterbug game**, p's. 44, 51-57
Assignment/follow up activities	*If you have extra time at the water source*: Tangentyere Land and Learning manual: • At the waterhole, complete the **Waterhole Survey Form**, P. 71. *In the classroom:* • Contact a water ecologist to help with identification- students could write a description or draw the unknown animal and email it to a local aquatic ecologist.

Land and Learning

Small Water Animals Worksheet

What is the name of your animal?

_____

What is the size of your animal?
Circle the thing your animal is closest to in size.

smaller than a matchhead   a matchhead   a match   your finger

What does it eat?   _____

_____

Pollution score
Some water animals are very sensitive but others can live in quite a lot of pollution. (Damselfly, dragonfly and caddisfly larvae and water scorpions are sensitive; water boatman, backswimmers, beetles, soldier fly larvae are tolerant; mosquito larvae are very tolerant of pollution.)

What is the pollution score of your animal?

very sensitive(VS)   sensitive(S)   tolerant(T)   very tolerant (VT)

Draw a picture of your animal

Waterhole Survey Form

Name of waterhole:

Date: _____   Observer's name: _____

Location: _____

GPS: _____N _____E

Waterhole type: (eg in rocks, sand; temporary/permanent)

_____

Record water information and water animals for one or more pools:

Length: _____ Width: _____

Average water depth: _____

Temperature: _____ Salinity: _____

Water quality: very muddy   a bit muddy   clear

Water polluted with dung: a lot   quite a lot   not much

Main water animals: _____

_____

Native animals: _____

Feral animals: _____

Ground trampled by feral animals:
          a lot   quite a lot   not much   not at all
Weeds: _____

Water plants: _____