UNSEEN

Workshops & Public Programs for High School
Grades 7-8 and 9-10

INFORMATION FOR TEACHERS

Do you want to engage your students with dynamic, complex, contemporary artworks that interrogate both art and science concepts?

An opportunity to do just this is coming to the Cairns region from 23 May to 3 June 2018, with ecologist, Dr Sapphire McMullan-Fisher and contemporary visual artist, Donna Davis visiting the region to run a series of art/science workshops in conjunction with Davis' touring exhibition 'Unseen', showing at the Tanks Art Centre.

'Unseen' explores symbiotic connections in our ecosystems, with reference to plant roots and fungi hyphae. The artwork reflects on the power and complexities of living systems with a focus on elements often hidden from view. Beneath our feet is an intricate matrix of roots, hyphae, minerals, organic matter, chemicals, invertebrates, and micro-organisms all working together to support life above ground.

This exhibition with the associated workshops and talks provides an excellent, unique opportunity for collaboration between Art Teacher and Science Teacher. 'Unseen' provides opportunities for valuable trans-disciplinary study of both The Arts (Visual Arts) and Science.

CURRICULUM LINKS

SCIENCE YEARS 7 - 8		
	Year 7 Content Descriptions	Year 8 Content Descriptions
SCIENCE AS A HUMAN ENDEAVOUR	NATURE AND DEVELOPMENT OF SCIENCE	
	Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available (ACSHE119)	
SCIENCE INQUIRY SKILLS	QUESTIONING AND PREDICTING	
	Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (ACSIS124)	Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (ACSIS139)
	PLANNING AND CONDUCTING	
	Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed (ACSIS125)	Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed (ACSIS140)
	Measure and control variables, select equipment appropriate to the task and collect data with accuracy (ACSIS126)	Measure and control variables, select equipment appropriate to the task and collect data with accuracy (ACSIS141)
	PROCESSING AND ANALYSING DATA AND INFORMATION	
	Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence (ACSIS130)	Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence (ACSIS145)
	EVALUATING	
	Reflect on scientific investigations including evaluating the quality of the data collected, and identifying improvements (ACSIS131)	Reflect on scientific investigations including evaluating the quality of the data collected, and identifying improvements (ACSIS146)
	Use scientific knowledge and findings from investigations to evaluate claims based on evidence (ACSIS132)	Use scientific knowledge and findings from investigations to evaluate claims based on evidence (ACSIS132)

SCIENCE YEARS 9 -10		
	Year 9 Content Descriptions	Year 10 Content Descriptions
SCIENCE UNDERSTANDING	BIOLOGICAL SCIENCES	
	Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176)	
SCIENCE AS A HUMAN ENDEAVOUR	USE AND INFLUENCE	
	Values and needs of contemporary society can influence the focus of scientific research (ACSHE228)	Values and needs of contemporary society can influence the focus of scientific research (ACSHE230)
SCIENCE INQUIRY SKILLS	QUESTIONING AND PREDICTING	
	Formulate questions or hypotheses that can be investigated scientifically (ACSIS164)	Formulate questions or hypotheses that can be investigated scientifically (ACSIS198)
	PLANNING AND CONDUCTING	
	Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods (ACSIS165) Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS166)	Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods (ACSIS199) Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS200)
	PROCESSING AND ANALYSING DATA AND INFORMATION	
	Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (ACSIS170)	Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (ACSIS204)

THE ARTS - VISUAL ART YEAR 7 - 8 & YEARS 9 - 10	
YEAR 7 AND 8 CONTENT DESCRIPTIONS	Develop ways to enhance their intentions as artists through exploration of how artists use materials, techniques, technologies and processes (ACAVAM119)
	Practise techniques and processes to enhance representation of ideas in their art-making (ACAVAM121)
	Present artwork demonstrating consideration of how the artwork is displayed to enhance the artist's intention to an audience (ACAVAM122)
YEAR 9 AND 10 CONTENT	Manipulate materials, techniques, technologies and processes to develop and represent their own artistic intentions (ACAVAM126)
	Plan and design artworks that represent artistic intention (ACAVAM128)

WORKSHOPS & PROGRAM OPTIONS

Exploring the intersections between Art and Science with Dr Sapphire McMullan-Fisher and Donna Davis

Photography, nature observation, identification skills, digital tools and art making activities.

1. FIELD & STUDIO WORKSHOP

Stage 1: In the Field - SCIENCE
Participants will undertake a field visit (site to be selected in liaison with workshop organiser) to learn field research, documentation, and identification skills with ecologist Dr McMullan-Fisher.

Dr McMullan-Fisher will cover ways to use photography and nature observations to develop identification skills and document findings in the field, using the digital field application *'iNaturalist'.*

The *iNaturalist'* platform will allow participants to record their photographic collections of flora and fungi found during the field survey. This useful tool will not only educate participants in flora and fungi identification, whilst engaging in their regional ecosystems, but also serve to add to the documentation and recording of Australian flora and fungi.

Stage 2: In the Studio - ART
Donna Davis will present a hands-on workshop showing how this data can be explored artistically and used as an entry point for inspiration in the creative process. The art making activities will focus on drawing, soft sculpture and/or print based works.

Cost: $600 (Group of 30)
Requirements: Digital devices with *'iNaturalist'* digital application loaded
LINK: https://www.inaturalist.org/pages/teacher's+guide

Dates: Monday 28 May 2018
Thursday 31 May 2018
Friday 1 June 2018
Times: 10am - 2:00pm (including lunch break)
Venue: Cairns Botanic Gardens

Bookings essential: contact Donna Davis on donnadavisartist@gmail.com (limited places)

iNaturalist works on all devices and can be downloaded via: https://www.inaturalist.org

Every observation can contribute to biodiversity science, from the rarest butterfly to the most common backyard weed. We share your finding with scientific data repositories like the Global Biodiversity Information Facility to help scientists find and use your data. All you have to do is observe. https://www.inaturalist.org

WORKSHOP / PROGRAM OPTIONS

Exploring the intersections between Art and Science with Dr Sapphire McMullan-Fisher and Donna Davis

2. PROFESSIONAL DEVELOPMENT SESSION: Science and Art educators

Designed especially for educators, Dr Sapphire McMullan-Fisher and Donna Davis will discuss ways of working with nature including fungi, lichens and mosses to encourage ecological learning. This workshop uses photography, nature observation, identification skills and digital tools coupled with art making activities.

Dr Sapphire McMullan-Fisher will talk about teaching strategies, learning outcomes, equipment, tools, risk management and preparation for taking students into the field. Sapphire can also suggest fun identification games to help students develop identification skills using focus sets: fungi, cryptogams and native Australian flora.

Donna Davis will discuss how environmental observations and data can be explored artistically and used as an entry point for inspiration in the creative process.

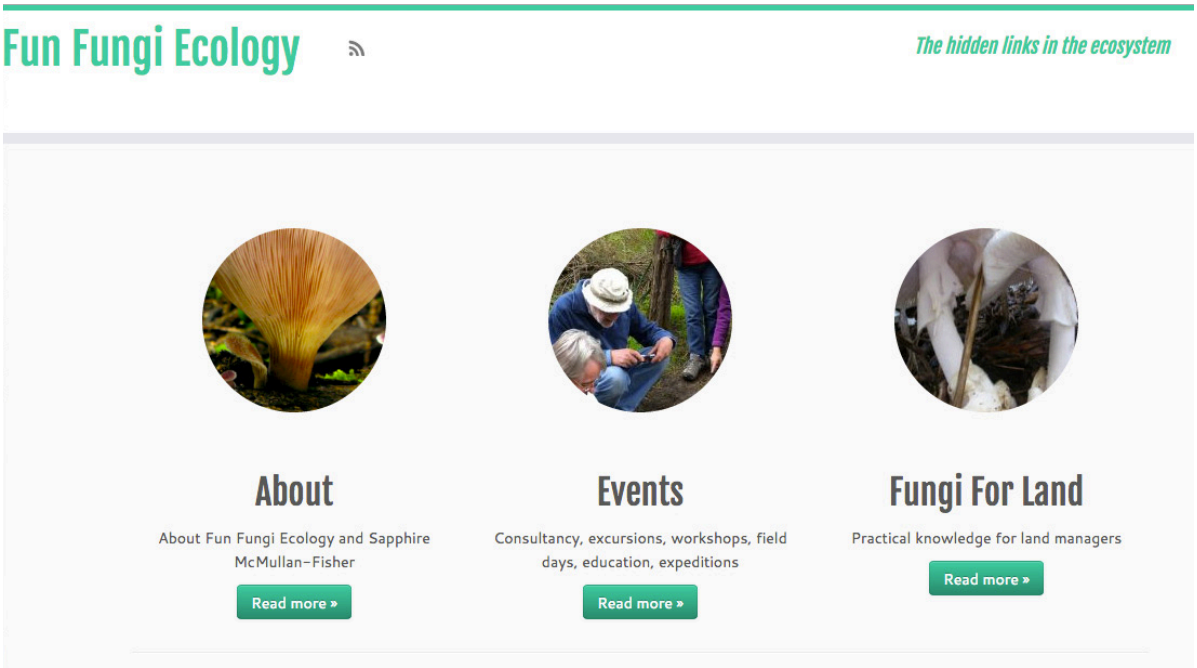
Cost: $20 per person
Date: Friday 25 May 2018
Time: 4 - 6pm
Venue: Cairns Botanic Gardens
Bookings: donnadavisartist@gmail.com

3. TALK: Ecology with Dr Sapphire McMullan-Fisher

Learn about macrofungi and mosses: what they are and what role they play in ecosystems and conservation.

Ecologist, Dr Sapphire McMullan-Fisher will also talk about how citizen science can play a valuable part in ecological conservation strategies.

Cost: $150 / group of 30
Dates: Monday 28th May 2018
Tuesday 29th May 2018
Time: 12:30 - 2:30pm
Venue: Cairns Botanic Gardens or School
Bookings: donnadavisartist@gmail.com



www.funfungiecology.com

About the Artist

Donna Davis
BA (ART) Curtin University

Donna Davis explores the nexus between Art and Science. She creates new ways of working with scientific concepts and data to develop artworks that capture and create sites of ecological observation.

As an artist, she is intrigued with the idea of connection, and works across a range of media including sculpture, installation and digital media to explore connections and relationships with the natural world. She believes that the art/science field provides a powerful catalyst to challenge our discourse, raise environmental awareness and promote conservation of our ecology: by providing new ways of 'seeing' and creating new 'connections' in the mind of the viewer.

Davis often works with scientists undertaking arts/research projects to develop new works. The *Unseen* project saw Davis work with mycologists (scientists who study fungi) and botanists (scientists who study plants) from the Queensland Herbarium. This project explored fungi that grew alongside the endangered swamp tea-tree (*Melaleuca irbyana)* with reference to potential mycorrhizal associations between species. Unseen has been inspired by this research project. Donna's past exhibitions, inspired by similar research projects include:

The Plant Room'
Beyond the Seed
http://donnadavisartist.weebly.com/unseen.html
http://donnadavisartist.blogspot.com.au/

Donna has artworks held in both public and private collections. She has exhibited widely in both solo and selected group exhibitions, and her artwork has featured in state and national touring exhibitions.

About the Ecologist

Dr Sapphire McMullan-Fisher, Ecologist
B.Sc (Hons - First Class) La Trobe University, Ph D University of Tasmania

Dr Sapphire McMullan-Fisher is an ecologist, mycologist and expert in the conservation management and ecology of cryptogams, particularly macro fungi and mosses. With only a handful of mycologists in Australia, she couples her field of expertise with a passionate focus on community education and ecology. By bringing these two areas together she helps people understand what fungi are doing in ecosystems and why they are import to conserve.

As an ecological advocate she has undertaken many community education and engagement programs working with citizen scientists, council, communitygroups and novices alike. Her experience includes environmental consultancy, ecological research, biodiversity surveys, tertiary education, event management and publishing. Currently based in Victoria, Sapphire continues to work with Queensland communities with her most recent work producing two pocket field guides for the Sunshine Coast on mushrooms and fungi. She particularly enjoys getting out into the bush to discover fungal treasures as often as she can.

https://funfungiecology.com

About the exhibition

Unseen explores symbiotic connections in our ecosystems, with reference to plant roots and fungi hyphae.

Complex networks known as mycorrhizal associations, are often shared between plants and fungi for mutual benefit ensuring optimum health for both species.

The artwork reflects on the power and complexities of living systems, with a focus on elements often hidden from view. Beneath our feet, exists an intricate matrix of roots, hyphae minerals, organic matter, chemicals, invertebrates, and micro-organisms all working together to support life above ground.

Many of the artworks are created from discarded materials or industry waste in order to reference the idea of a closed loop ecosystem, where nature recycles resources in order to renew, grow and create balance. Fungi, themselves are also known as the great recyclers, so this analogy is apt as it reinforces their vital role within the system.

Through an immersive experience, the viewer is invited to interact with the artwork to reveal intricate webs of ‘unseen’ connections, which are constantly at work maintaining healthy ecosystems. By using human input to reveal nature’s grand design, Davis aims to evoke a sense of interconnectedness between systems, reinforcing the idea that we, too, form part of this amazing grand design.

Donna Davis, *Intertwined* (DETAIL), 2017. Mixed media installation. Photograph by Andrea Higgins.

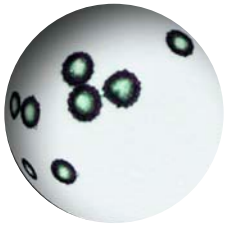
About Davis' work with the Queensland Herbarium

A collaboration between artist Donna Davis and mycologist Nigel Fechner from the Queensland Herbarium, the project — surveyed, documented and classified fungi that grew in association with the endangered swamp tea-tree over a twelve month period.

This collaborative Art/Science project provided a unique opportunity for researching fungi-tree relationships, as this particular habitat contains only one dominant ectomycorrhizal (ECM) species, the swamp tea-tree (*Melaleuca irbyana*). The physical collections were carried out at the Purga Nature Reserve, home to an isolated population of the endangered swamp tea-tree. Given the ephemeral nature of fungi, with above ground fungal bodies often only appearing for a few days at a time, collections were carried out over a twelve-month period, with surveys conducted every week for 52 weeks.

In a collaboration between artist and scientist, these specimens were morphologically and microscopically examined, documented, and classified; they were then sorted into groups of mycorrhizal and non-mycorrhizal species to form a data set of the symbiotic fungi-tree relationships for the reserve.

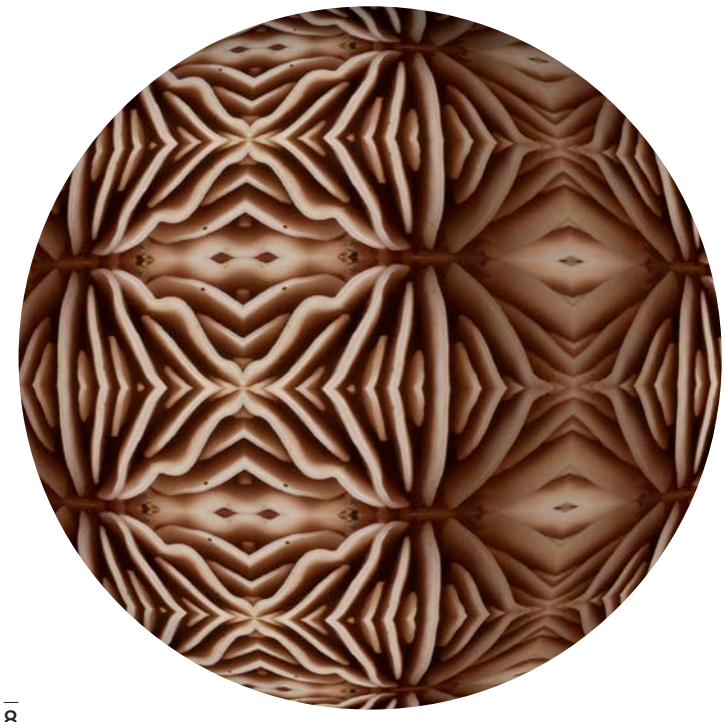
The process, methodology and data set that resulted were equally important to inspire the development of artworks that ecologically and philosophically explore questions of inter-species relationships. The artist was challenged to consider her role as artist and citizen within the biosphere, which in turn allowed her to form questions to which she sought answers through her art. To answer some of these questions the artist developed new skills to incorporate elements of human-powered interactivity in her works, in order to reference ideas of ecological sustainability and interconnection between systems.



This work is invaluable in furthering the science of mycorrhizal associations, as well as documenting the unknown fungal flora of the Purga Nature Reserve for the first time. There is increasing awareness of the vital role that fungi play in facilitating plant species survival in Australia s mostly nutrient poor soils, but the majority of fungi species are yet to be discovered. The science of mycology (study of fungi) is heavily dependent on good photography and illustration for the recording of cellular and spore structures, as well as colour, textural and growth changes over the life cycle. However, few scientists have the skill or ability to study and record these fungi and their dynamic interactions with plants using the highly visual and detailed methodology that Donna employs. This is a great example of the enrichment of both science and art through cross-discipline innovation.

DIRECTOR QUEENSLAND HERBARIUM
G.P. Guymer

Davis's botanical drawings of specimens from the project now form part of the Queensland Herbarium collection.



CURRICULUM LINKS

Years 7-10 Australian Curriculum:
The Arts — Media Arts and Visual Arts (version 8.3)
http://www.australiancurriculum.edu.au/the-arts/curriculum/f-10?u=ma&u=va&y=7-8&y=9-10&layout=2

Years 7-10 Australian Curriculum: Science
http://www.australiancurriculum.edu.au/science/curriculum/f-10?layout=2&y=7&y=8&y=9&y=10&s=SU&s=HE&s=IS#page=8

Cross-curriculum priority: Sustainability – OI.7
Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.
http://www.australiancurriculum.edu.au/crosscurriculumpriorities/sustainability/overview

Queensland Curriculum and Assessment Authority.
Years 7 and 8 Visual Arts band plan
https://www.qcaa.qld.edu.au/p-10/aciq/p-10-arts/year-7-arts

Queensland Curriculum and Assessment Authority.
Years 9 and 10 Visual Arts band plan
https://www.qcaa.qld.edu.au/p-10/aciq/p-10-arts/year-9-arts

Queensland Curriculum and Assessment Authority.
Year 7 Science, Year 8 Science, Year 9 Science,
Year 10 Science.
https://www.qcaa.qld.edu.au/p-10/aciq/p-10-science

This Workshop and Public Program outline has been developed with concepts and curriculum links from the 'Unseen Education Resource' written by Bonnie Melrose.

Download the *iNaturalist* application at: *https://www.inaturalist.org*

Teachers Link: *https://www.inaturalist.org/pages/teacher's+guide*

Queensland Government

'Unseen' is supported by the Queensland Government through Arts Queensland. Donna Davis is supported by the Visual Arts and Craft Strategy, an initiative of the Australian, state and territory governments'. This project is also supported by the Queensland Herbarium, centre for research and information on Queensland ecosystems, plants and fungi.

Concept research and development of the project was proudly supported by the Regional Arts Development Fund (RADF). The Regional Arts Development Fund is a Queensland Government through Arts Queensland and Ipswich City Council partnership to support local arts and culture. The project also received support from Ipswich City Council and the Queensland Mycological Society.

Author: Bonnie Melrose

Design: Designfront

Cover: *Hidden Worlds*, (detail), donna davis, 2017, pigment print on fine art rag. Image courtesy of the artist.