

The background features a complex composition of abstract elements. It includes several line-art drawings of stylized flowers or starbursts, some with intricate, scribbled centers. These are overlaid on a background of soft, grayscale, wavy patterns that resemble watercolor or smoke. The overall aesthetic is a blend of organic, hand-drawn art and ethereal, atmospheric textures.

WHEN ART MEETS SCIENCE

Presenters



Dr Lisa Terreni

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Sola Freeman

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Lisa is a senior lecturer at Victoria University of Wellington's Faculty of Education, School of Education teaching in the early childhood education degree programmes. She has been involved in early childhood education for many years—as a kindergarten teacher, a senior teacher, and as a professional development adviser for the Ministry of Education. She is also an artist.

Her Masters in Education research focused on children's and teachers' use of an Interactive Whiteboard for visual art learning experiences in a kindergarten setting. Her PhD investigated the current extent of art museum visiting by the early childhood sector in New Zealand and investigate barriers to access. It also investigated existing practices between art museums and early childhood centres, and examined ways in which art museums and early childhood centres can effectively work together to create meaningful learning environments for young children.

Lisa's current research interests focus on exploring how visual art can be used to enhance young children's thinking, and the types of ECE environments that best foster visual art education.



Sola Freeman is currently completing her PhD in Early Childhood Education. She has been involved in ECE in many different ways – as a mother, teacher, school principal, playgroup coordinator, Board of Trustees chair, Montessori Association president, and policy advisor. Most recently, she has been a lecturer in the Early Childhood teaching programme at Victoria University of Wellington where she taught courses on the New Zealand Early Childhood Curriculum, Maths, Science and Technology.

Her PhD research has explored what influences science experiences for children in ECE. Doing action research allowed Sola to share her passion for science with enthusiastic teachers and together they investigated how to incorporate more ‘sciencing’ in their centres.

For Sola science is being interested in the world around you, knowing about things, how they work and why, and through this wonder gaining an appreciation and gratitude for all that is around us. She’d like to think wondering and a love of all that is science creates people who care.

Abstract

The New Zealand early childhood curriculum *Te Whāriki* encourages teachers to “integrate domain knowledge (for example, science and arts)” (Ministry of Education, 2017, p. 59). This can be done by:

- The encouragement of children’s careful and focussed observations
- Purposeful and intentional teaching in these areas

We believe that the establishment of an ECE centre culture and kaupapa (pedagogical principles) that values art and science knowledge must involve the encouragement of curiosity, active inquiry, discussion and documentation.

It is important, therefore, for teachers to recognise the contributions that each of these important learning domains can give to each other.

This presentation specifically looks at: Observation and observational drawing, and intentional teaching.

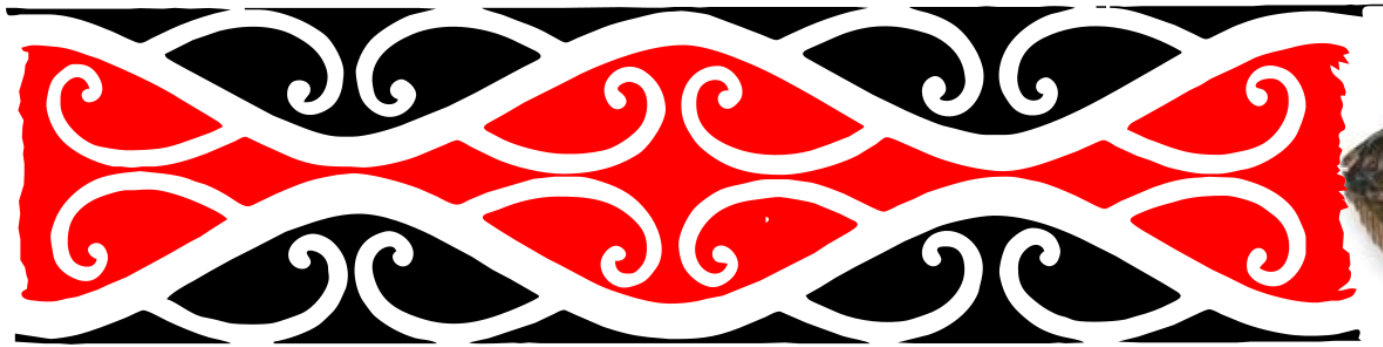


Louise de Bourgeois - *Maman*



Araneomorphae - a
Daddy Longlegs spider

Artists have long been fascinated by the natural world and have often used this as the inspiration for their art works. For example, the famous sculpture *Maman* by Louise de Bourgeois, captures the physical qualities of an araneomorphae spider. This work is a tribute to her mother and embodies ideas of spinning, weaving, as well as care and protection (<https://blog.artsper.com/en/a-closer-look/3826/>). Interestingly, de Bourgeois once said “All my work, all the subjects, find their origin in my childhood”.



Indigenous and First People's have also drawn inspiration from the natural world for many of their traditional art works. Above is the design for a kowhaiwhai (rafter panel) that can sometimes be found in Māori meeting houses in Aotearoa New Zealand. It has used the shape of the Patiki (flounder) as the basis for the symbolic shapes found in this work. Below, Australian aboriginal artist Edward Blitner has created a bark painting of carefully observed Magpie Geese. Both these were significant food sources for the peoples of these lands.





To the left is a water colour painting of a kowhai plant, showing its flower, leaves and seed pod. On the *Endeavour's* first voyage the botanist Joseph Banks collected numerous specimens of flora and fauna from New Zealand.

These specimens were studied and then drawn by botanical artist Sydney Parkinson who was also part of the voyage.

Alongside other artists, 743 watercolour illustrations were completed back in London and held in the British museum. These were made into engravings and printed in the early 1900s.

Interestingly, these were finally published as Bank's *Florilegium* in 1988.



<https://www.botanicalartandartists.com/sydney-parkinson.html>

Beatrix Potter



Beatrix Potter, well known to many ECE teachers and children, was not only an author of children's books such a *Peter Rabbit* but also a renowned a botanist and botanic artist. In her early 20's she was particular fascinated in fungi and lichens or, in scientific terms, mycology. She produced a significant number of beautiful drawings of fungi having observed them under a microscope to ensure she had the details accurate. Her observations brought about an intense interest in how mushrooms reproduced, often conducting her own experiments and germinations.

<https://www.brainpickings.org/2015/07/28/beatrix-potter-a-life-in-nature-botany-mycology-fungi/>

One of the most active proponents of observational drawing is Dr Sylvia Chard. With her colleague Lillian Katz, Sylvia has long been an advocate for children's active engagement in the natural world through engaging in project work.

They believe that "Sustained drawing enables children to study the nature of things, shapes, colours, textures, and other attributes. It encourages children to examine the relationship of parts to the whole of objects".

They also refer to the work of Reuf who astutely states that "Close observation - mixed with wonder - is essential for the development of the artist, scientist, writer, as well as the mathematician, humourist, inventor, and more" (Reuf, 1994, p.22).

Here, Sylvia Chard is modelling painting the details of a jar of apples.





The Project Approach

Lilian Katz and Sylvia Chard

51 years of collaboration



Illinois Summer
Institute
1992 - 2012

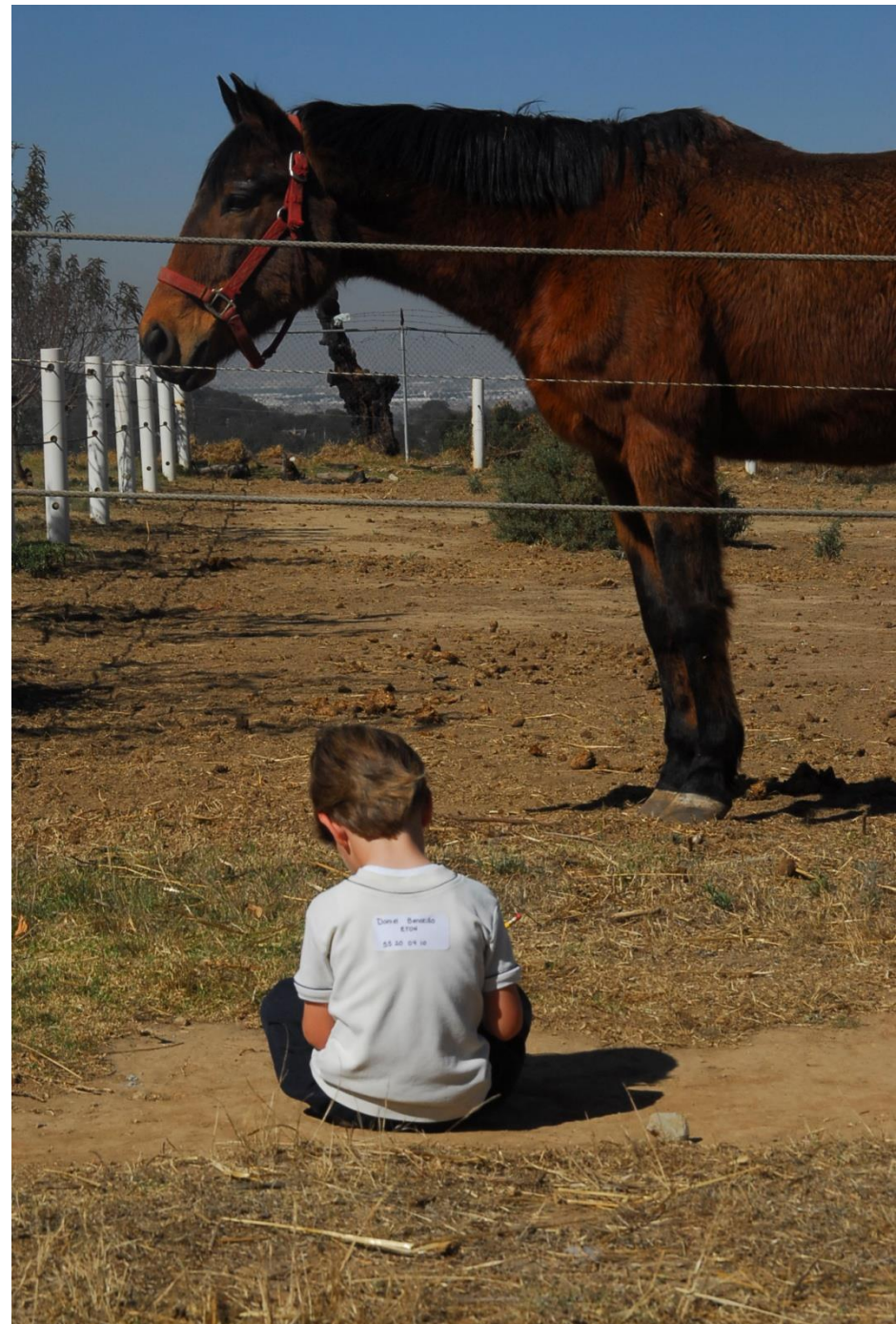
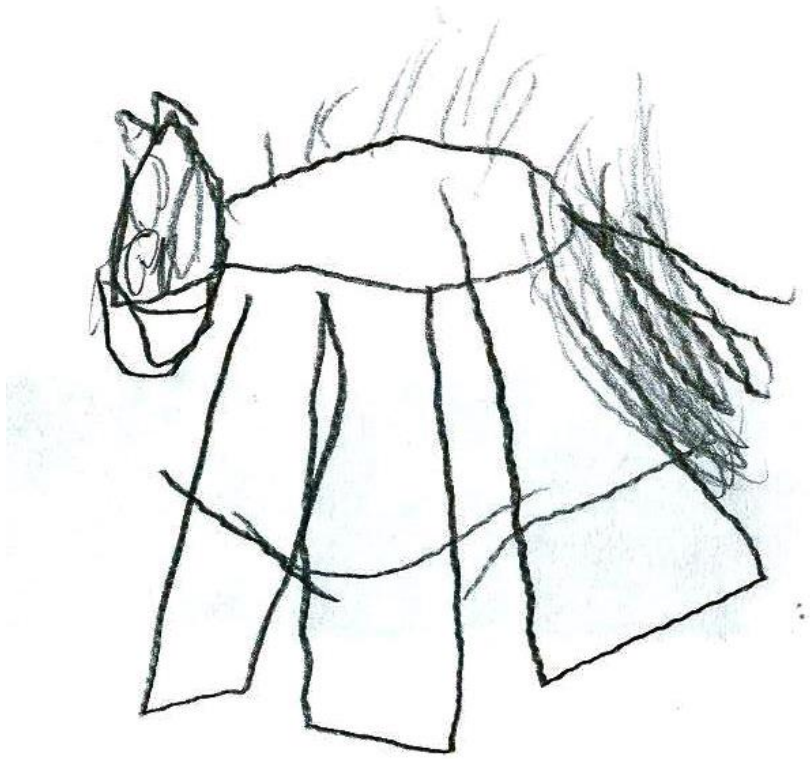


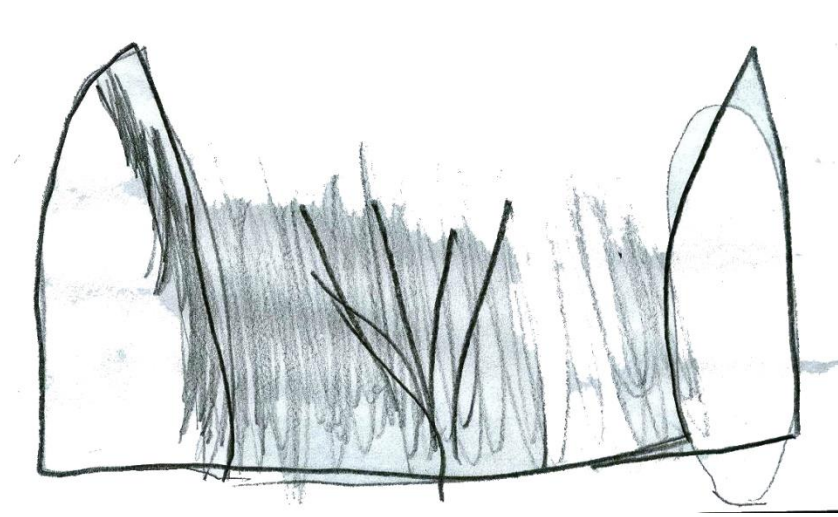


A project is an extended and in-depth investigation of a real world topic...

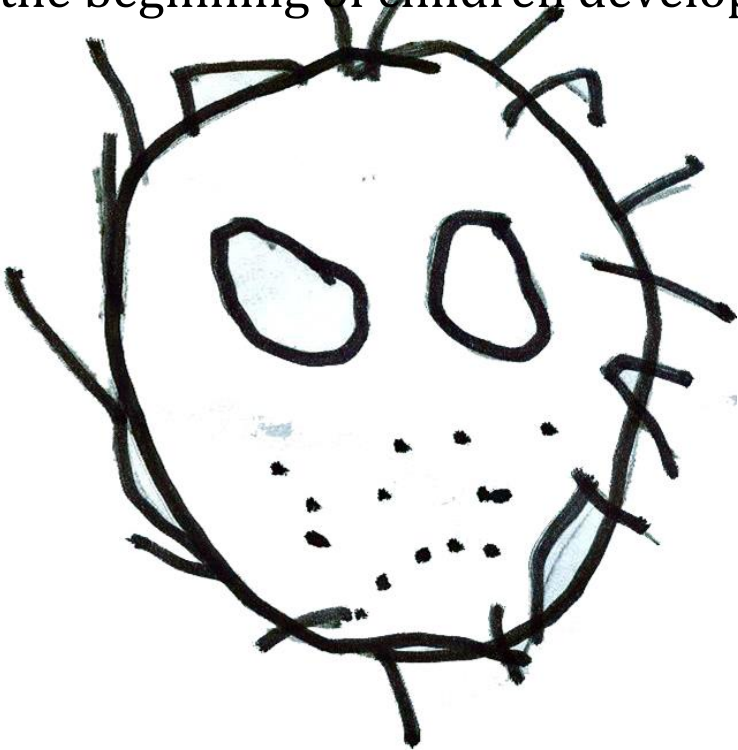


... where children (and teachers) ask questions about growth and change in plants and animals for instance. They do their own research to find the answers, often through careful study and observation of natural phenomena.





Observational drawings are a form of documentation and clearly show children's thinking and understanding. They are often the beginning of children developing working theories about the world around them.



Children need a range of materials to explore and revisit ideas generated from their research and observations.

This reflects the importance of recognising the 100 languages of children (Edwards, Gandini & Forman, 1998), and providing access to quality materials in the domains of both art and science.



Sola's research findings clearly show the importance of intentional teaching strategies to bring in science and make scientific learning more visible in an ECE context.

Intentional teaching strategies include:

- asking questions;
- having sustained shared conversations about what is happening and what the children are thinking;
- and also the sharing of knowledge – both from the children sharing their emerging working theories but also teachers sharing the knowledge they have with the children.

These are demonstrated in the video with Kate who is working with a group of kindergarten children studying a dead bird she found in her garden.



Research in visual arts education in New Zealand has shown that teachers are often reluctant to interfere with children's creative and artistic processes – this has often been called the “set up and stand back” approach (Richards, 2007).

However, contemporary research in visual art in ECE highlights the importance of a teacher's active engagement in this area (Lindsay, 2018).

This is just as important in art as it is in science. Teachers creating provocations, engaging in dialogue, scaffolding and modelling the learning of specific art related skills (Terreni, 2005), are all very important intentional teaching strategies.

Kate is modelling how she can translate her observations into a detailed drawing.



What we have seen in the video that accompanies this presentation, are teachers demonstrating intentional practice to extend children's interests and provoke exploration into new areas of knowledge.

One key aspect is language – those sustained conversations are vital when engaging in scientific observations and noticing details.

Here, children are discussing with each other what they can see in relation to the dead bird that Kate has provided as a provocation.



Research by Marilyn Fleer (2009) in Australia has argued the importance of teachers engaging with children and their explorations to ensure sustained conversations occur. She states how important conversations are with children in order to facilitate meaningful scientific interactions. These are necessary if children's knowledge of everyday concepts is to shift to scientific concepts.

Again, the role of the teacher is highlighted – it is their engagement in sustained conversations and sharing new information and introduces new knowledge. This can be seen in the video with Kate and the children carefully studying with the children the aspects of the dead bird (its feathers, markings, claws, beak, nostrils).

This use of intentional teaching practices was found to be a key enabler in supporting science experiences in Sola's PhD research too.



Dialogue is vital in visual arts as well. Often, it is through conversations and dialogue with children about their work that children's thinking is made visible and their understandings of their world becomes clear to their teachers and other adults.

ECE contexts that actively foster art and science knowledge must involve the encouragement of children's (and teachers) curiosity, promote active inquiry, discussion and include meaningful documentation.



Conclusion

We hope this discussion will be useful for your ongoing teaching and learning with children in art and science, and that you will be able to foster the skills and knowledge that are needed for our future artists and scientists!



Further resources:

Visual art inspirations: People, places and things: Layered Thinking on Canvas

This video show teachers and children at St Andrews Epsom Early Childhood centre engaged in a project involving the in-depth exploration of spiders using a range of visual arts media.

<https://www.youtube.com/watch?v=06uSZSvuX5A&feature=youtu.be>

Engaging Children's Minds: The Project Approach.

This website is managed by well known educator and author Sylvia Chard, and welcomes anyone interested in the Project Approach. It offers a number of resources and tools relating to the Project Approach.

<http://projectapproach.org/>

Reggio Children

Reggio Children exhibitions, created in collaboration with the Reggio Emilia Istituzione of Municipal Preschools and Infant-toddler Centres, are instruments of professional growth, research and communication ... Each exhibition documents learning processes in children (and teachers), often highlighting their investigations and observational drawings.

<https://www.reggiochildren.it/en/exhibitions/the-hundred-languages-of-children/>

Useful books and articles

Edwards, C. P., Gandini, L., & Forman, G. E. (1998). *The hundred languages of children: The Reggio Emilia approach--advanced reflections*. Ablex.

Fleer, M. (2009). Understanding the dialectical relations between everyday concepts and scientific concepts within play-based programs. *Research in Science Education*, 39(2), 281-306. <https://doi.org/10.1007/s11165-008-9085-x>

Fleer, M. (2015). Learning science in everyday life – a cultural-historical framework. In M. Fleer & N. Pramling (Eds.), *A cultural-historical study of children learning science: Foregrounding affective imagination in play-based settings* (pp. 3-22). Springer Netherlands. https://doi.org/10.1007/978-94-017-9370-4_1

Fleer, M., Gomes, J., & March, S. (2014). Science learning affordances in preschool environments. *Australasian Journal of Early Childhood*, 39(1), 38-48. <https://journals.sagepub.com/doi/pdf/10.1177/183693911403900106>

Grey, A., Clarke, B. & Terreni (2013). *Arts in early childhood education: Kia tipu te wairua toi: fostering the creative spirit*. Pearson.

Lindsay, G. (2016)). *Do visual art experiences in early childhood settings foster educative growth or stagnation?* Research Online: University of Wollongong. <https://ro.uow.edu.au/cgi/viewcontent.cgi?article=3559&context=sspapers>

Katz, L., Chard, S., & Kogan, Y. (2014). *Engaging Children's Minds: The Project Approach* (3rd edition). Praeger.

Richards, R.D. (2007). Outdated relics on hallowed ground: Unearthing attitudes and beliefs about young children's art. *Australasian Journal of Early Childhood* 32 (4), 22-30.

Terreni, L. (2005). Scaffolding Alex: Actively supporting young children in the visual arts. *New Zealand Journal of Teachers Work*, 1, 43-48. <https://docplayer.net/24150754-Scaffolding-alex-actively-supporting-young-children-in-the-visual-arts.html>