STEM LEARNING THROUGH NATURE PLAY IN EARLY CHILDHOOD SETTINGS

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WHAT DOES LEARNING ABOUT STEM LOOK LIKE IN THE EARLY YEARS?

AUSTRALIAN RESEARCH COUNCIL DISCOVERY GRANT: *EXAMINING PLAY TYPES IN EARLY CHILDHOOD ENVIRONMENTAL EDUCATION*

The project examined play-based learning and specifically what children learn from play. Three types of play, including open-ended play, modelled-play and purposefully-framed play were examined through the lens of sustainability topics (specifically biodiversity). The work was considered significant because research suggests children need more than open-ended play to support conceptual learning in environmental education. The project outcomes were focused on developing a sophisticated understanding of how play-based approaches support teaching and learning in early childhood environmental education.

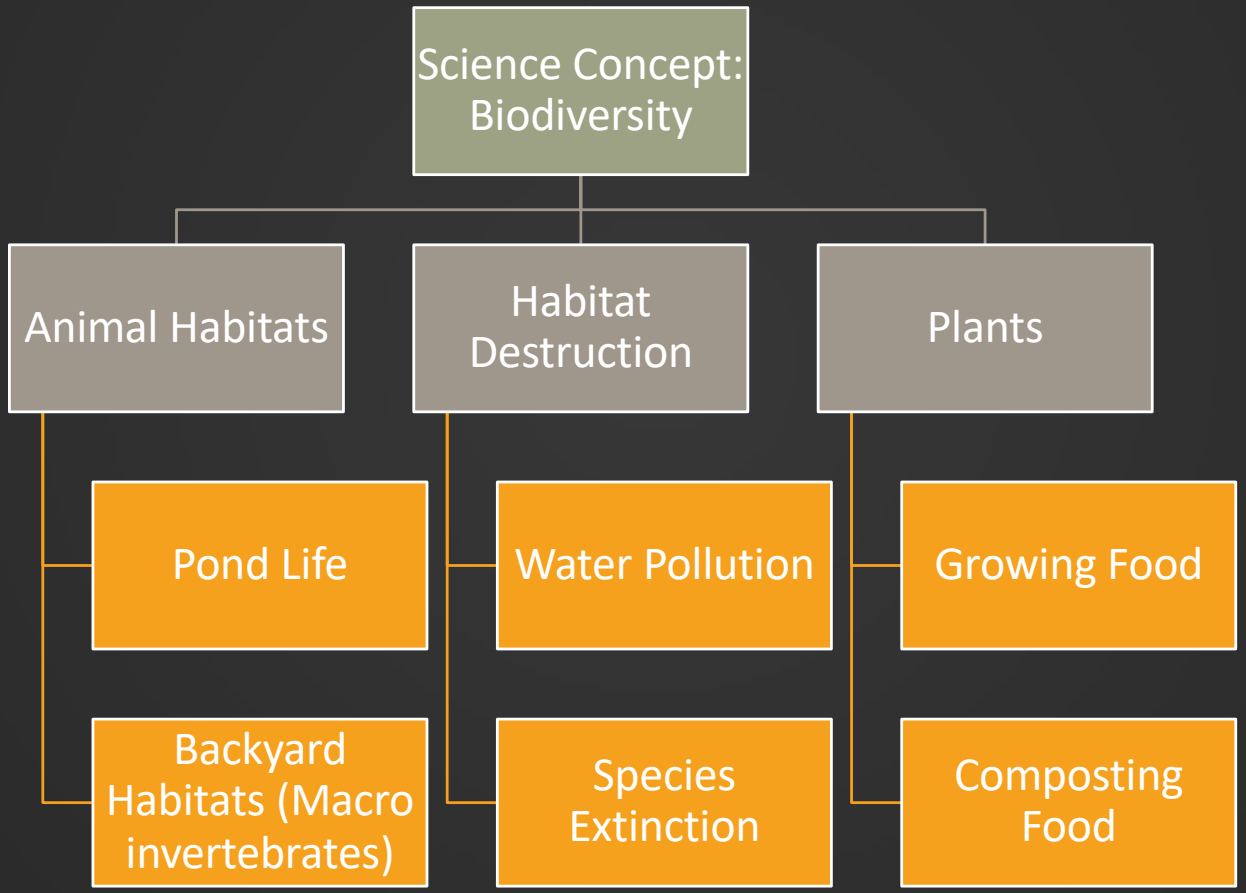
* *Joint ARC project with Prof Susan Edwards, Australian Catholic University*

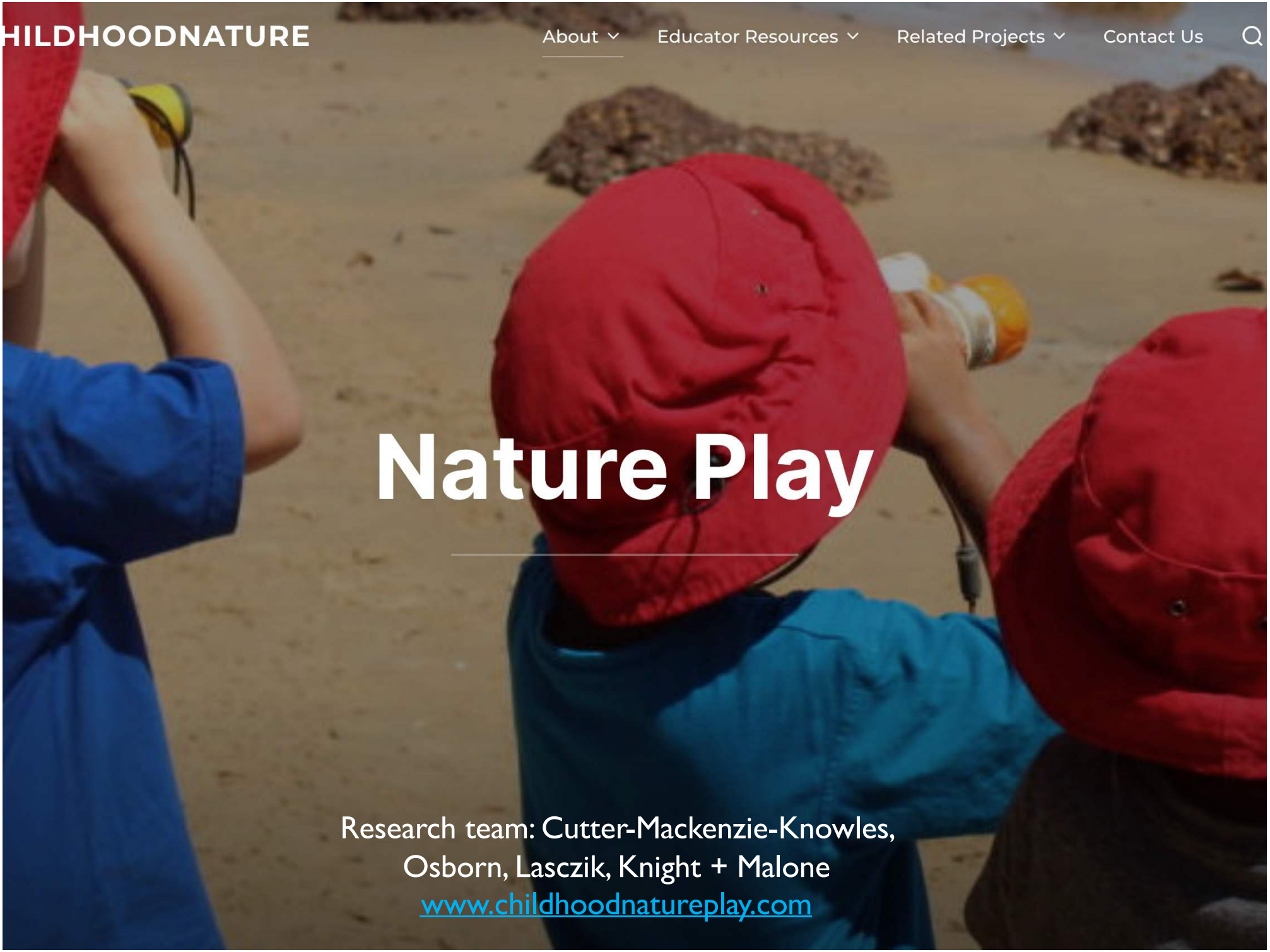
WHAT IS PLAY-BASED LEARNING?

Principle 1: Play types are equally as valuable as each other
Principle 2: Play types can be used in any combination

Open ended play	Modelled play	Purposefully framed play
• Teacher sets up materials / place / site • Minimal adult engagement or interaction during play • Children have time to explore and examine materials / place / site	• Teacher illustrates, explains or demonstrates the use of materials, and then • Children use materials with minimal adult intervention	• Teacher provides opportunities for open-ended play, modeled play, and • Teacher/child interaction, engagement

ECOLOGICAL CONCEPT MAP




HILDHOODNATURE
About
Educator Resources
Related Projects
Contact Us
Nature Play
Research team: Cutter-Mackenzie-Knowles,
Osborn, Lasczik, Knight + Malone
www.childhoodnatureplay.com

EARTH: earth, soil, mud, compost, worms, geography, landscapes, water, air, fire, land

WEATHERING: weather, climate, seasons, atmosphere, drought, humidity, rain, heat, cool, global, local, movement

RELATIONS: human, nonhuman, Country, Indigenous, connection, disconnection, reliance, entanglement

MATERIALS: objects, entities, organic, inorganic, natural, rock, plastic, hard, soft, solid, blurred, porous, wild, tame, curated, messy

BODIES: beings, human, nonhuman, affective, alive, dead, agency, moving, static, virtual, hybrid

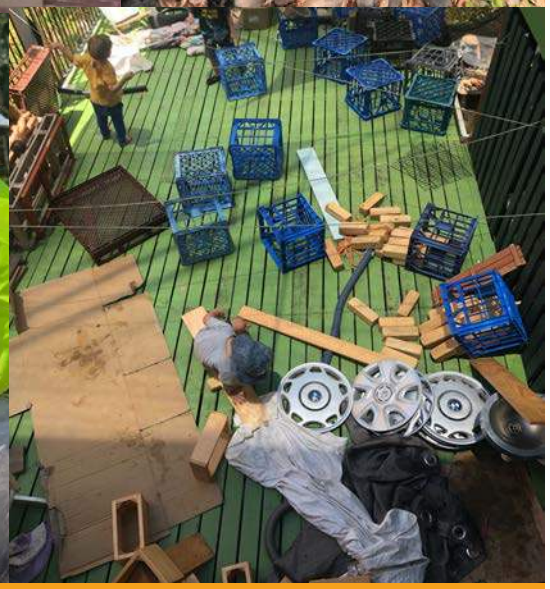
TIME: temporary, permanent, light, dark, day, night, sun, sky, moon, stars, deep time, ancient, dreaming, past, present, future, change, age, era, epoch, rhythm, pace

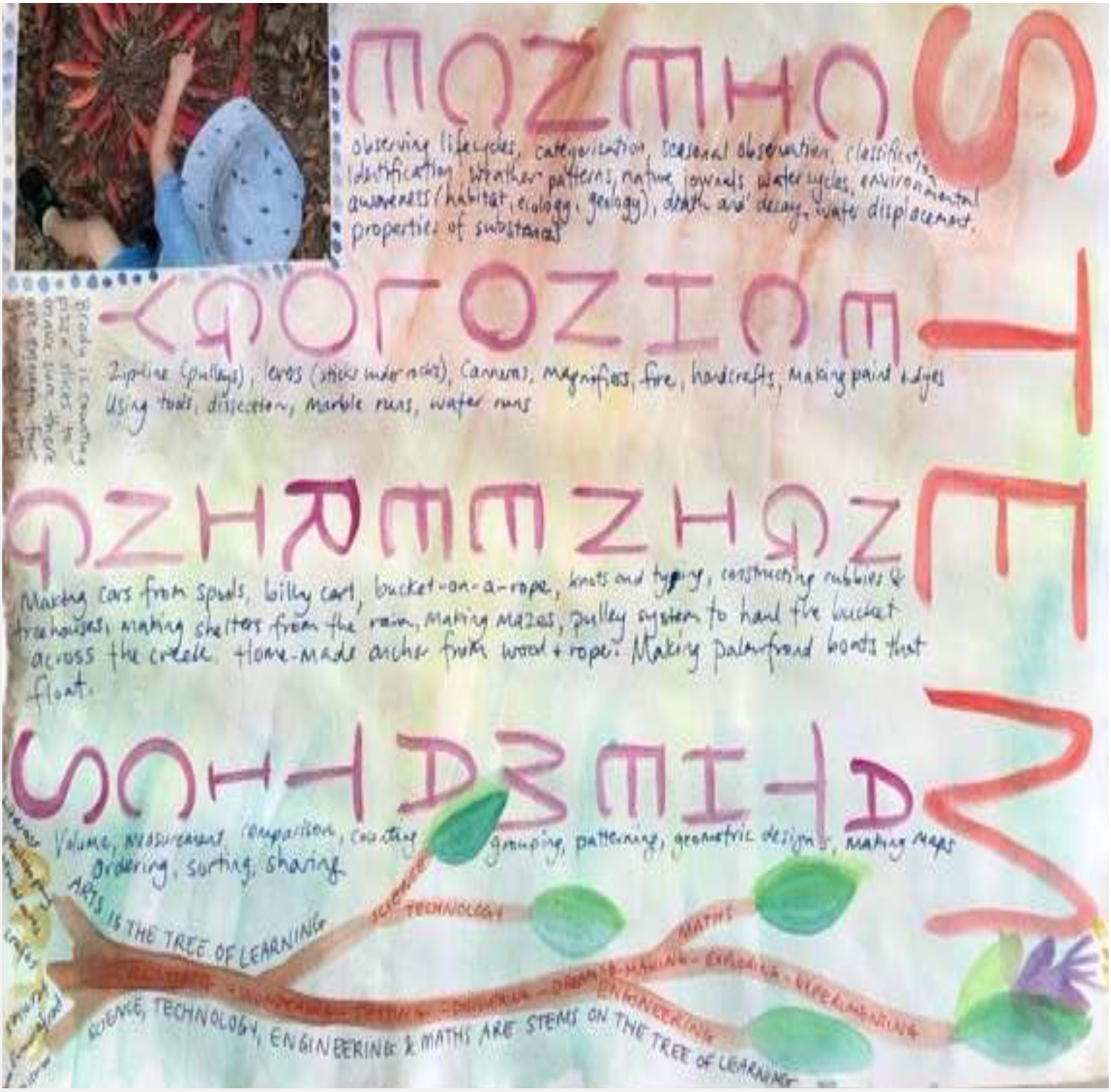
ECOLOGIES: ecological, animals, plants, bacteria, fungi, seeds, germination, pollination, lifecycles, energy, flows, systems, diversity, living, non-living, stable, fragile, enmeshed, growing, dying, conserve, sustain, regenerate, habitat, conservation


BIRDWIN



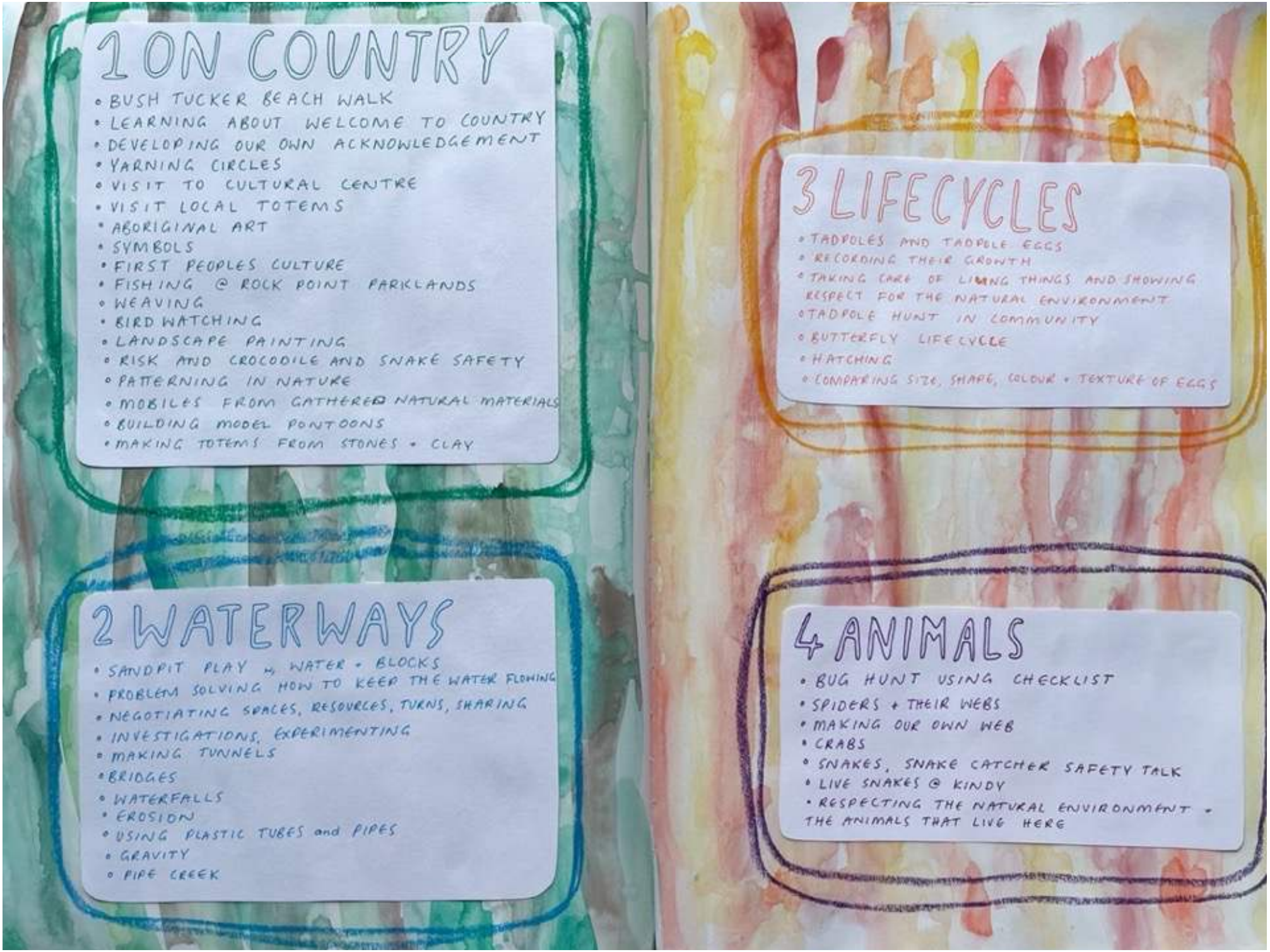

TREES
BIRDS

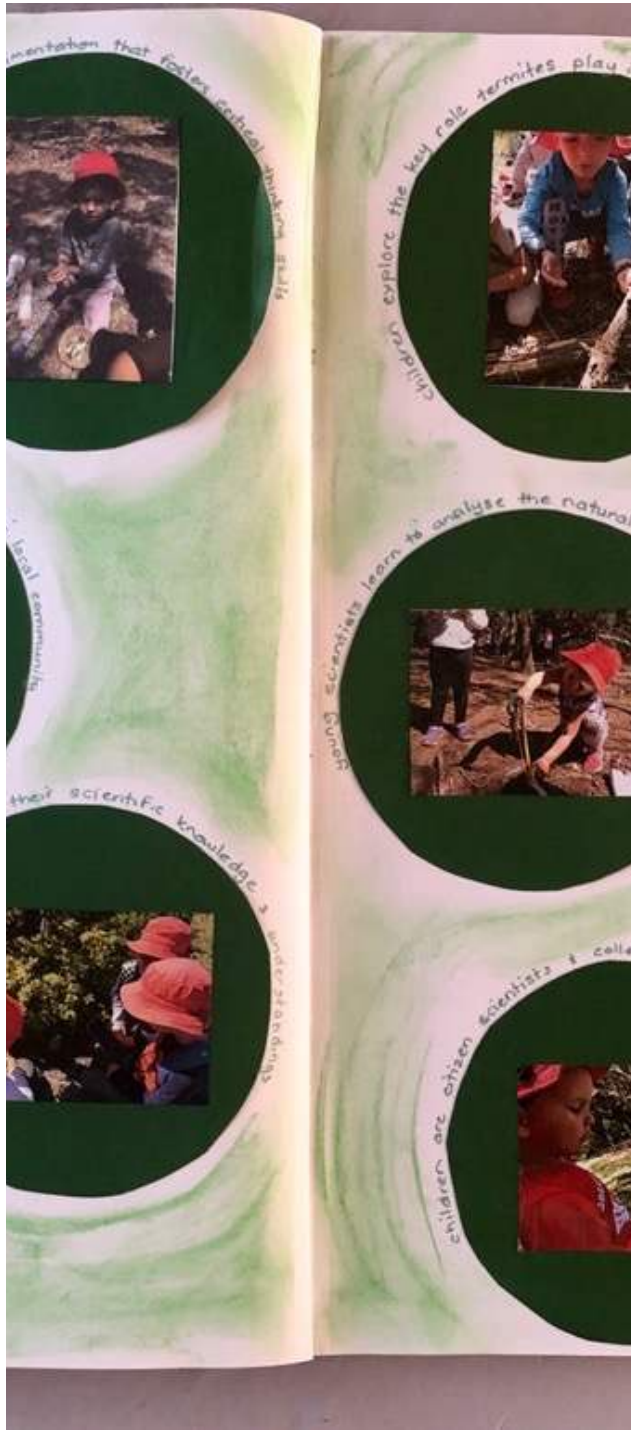




Jennifer McCormack,
Birdwings Forest School

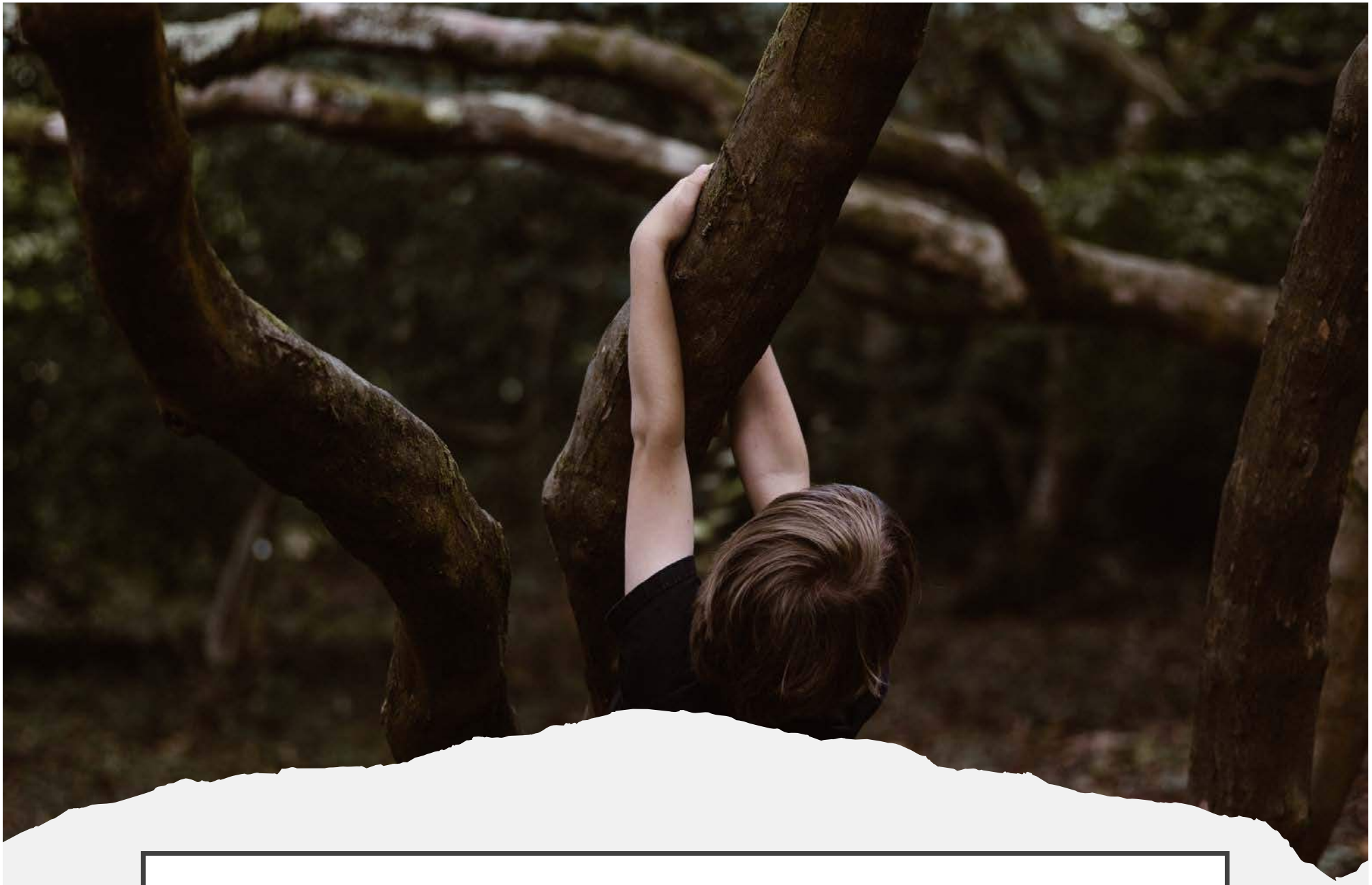

temperature
lifecycles
pets
engineering
fire
Indigenous knowledg
native plants
elements
conservation
bitat
air
germination
pollination
reactions
butterflies
ecosystems
mate
soil
birds
astronomy
flow
rties
frogs
water
biodiversity
tmosphere
weather
bugs
insects
mathemati
reproduction
wind
seasons
animals
chemical
living things
rain
energy
objects
food
nutrition
webs
silkworms
water quality
construction


1 ON COUNTRY
• BUSH TUCKER BEACH WALK
• LEARNING ABOUT WELCOME TO COUNTRY
• DEVELOPING OUR OWN ACKNOWLEDGEMENT
• YARNING CIRCLES
• VISIT TO CULTURAL CENTRE
• VISIT LOCAL TOTEMS
• ABORIGINAL ART
• SYMBOLS
• FIRST PEOPLES CULTURE
• FISHING @ ROCK POINT PARKLANDS
• WEAVING
• BIRD WATCHING
• LANDSCAPE PAINTING
• RISK AND CROCODILE AND SNAKE SAFETY
• PATTERNING IN NATURE
• MOBILES FROM GATHERED NATURAL MATERIALS
• BUILDING MODEL PONTOONS
• MAKING TOTEMS FROM STONES • CLAY
2 WATERWAYS
• SANDPIT PLAY w WATER • BLOCKS
• PROBLEM SOLVING HOW TO KEEP THE WATER FLOWING
• NEGOTIATING SPACES, RESOURCES, TURNS, SHARING
• INVESTIGATIONS, EXPERIMENTING
• MAKING TUNNELS
• BRIDGES
• WATERFALLS
• EROSION
• USING PLASTIC TUBES and PIPES
• GRAVITY
• PIPE CREEK
3 LIFECYCLES
• TADPOLES AND TADPOLE EGGS
• RECORDING THEIR GROWTH
• TAKING CARE OF LIVING THINGS AND SHOWING RESPECT FOR THE NATURAL ENVIRONMENT
• TADPOLE HUNT IN COMMUNITY
• BUTTERFLY LIFECYCLE
• HATCHING
• COMPARING SIZE, SHAPE, COLOUR • TEXTURE OF EGGS
4 ANIMALS
• BUG HUNT USING CHECKLIST
• SPIDERS + THEIR WEBS
• MAKING OUR OWN WEB
• CRABS
• SNAKES, SNAKE CATCHER SAFETY TALK
• LIVE SNAKES @ KINDY
• RESPECTING THE NATURAL ENVIRONMENT • THE ANIMALS THAT LIVE HERE


children explore the key role termites play
children are citizen scientists & colla


What scientific concepts do children learn when interacting with Nature?
children develop an ecological identity by being in the natural world
Being in & connecting to the natural world ensures we will want to protect it.
technology
microscopes
magnification
Sustainability
Weather
wind
Drought
Velocity
Geology
Rocks
earth
Biology
chemistry
life cycles
ecosystems
change
Decomposition
rich daily practice of being in nature
Indigenous Knowledge
Scientific Process.
Asking questions
Hypothesis
Design
test
Experiment
Scientific concepts
theorizer
curious
Problem solver
Thinker
Reflector
wonder
imagination
Dispositions I AM AN:
inquiry
explorer
investigator
collaborator
negotiate
Discussion
Building curiosity & wonder
children connect & embed dispositions in respect to being scientific
Data
measure
compare
classify
sort
Observation
notice

WHAT IS NATURE PLAY, AND WHAT KINDS OF OPPORTUNITIES DOES NATURE PLAY OFFER FOR CHILDREN TO LEARN ABOUT STEM?



CHILDHOODNATURE

CREATURES

During term two Jeannette noticed that the children were interested in mini-beasts (macro-invertebrates) which came about through her and the children planting seeds in the vegetable garden. Jeannette wrote in her teacher journal:

"Interest arose and a group of 5 children formed a project group called 'The Creatures House' to explore where some of these creatures live and what they need to stay alive. I decided to extend and further the interest in creatures and their habitats".

OPEN ENDED PLAY

"CREATURES IN THE LAKE AROUND THE ISLAND"

MODELLED PLAY

PURPOSEFULLY-FRAMED PLAY

JEANNETTE'S REFLECTIONS ON THE PLAY TYPES

"[Open-ended play] provides an experience where you can see where they are going with it and then being there to see. So sometimes with the experience we may not necessarily do that three times. It may have been brought down to two or sometimes a similar experience we may have taken that moment when they discovered something - found some creatures and then brought them back to class that day, so it would really be how they are going. But asking the questions and trying to get them to respond and look. One of the things when we were on the second walk, was what I learned from Tracy [the researcher assistant]. She was talking about the 'look, look and look again' approach and I have been using that a lot lately because I would say to them 'look and look' but that real 'look, look and look again' to see what they can see - I think that is a good one."

WALKING PLAY PEDAGOGIES

"Children don't have the same experiences of playing outside as much. Their lives are more controlled I think. We give them those experiences just to play in the environment because they discover as they go. But it is being there to support that discovery so if they find something outside, like we found a dead frog yesterday on the walk, so it is looking at that and talking about that and where could have the frog lived and what might have happened to it".

Place/Country responsive play

Non-human play

Slow play

Sensorial play

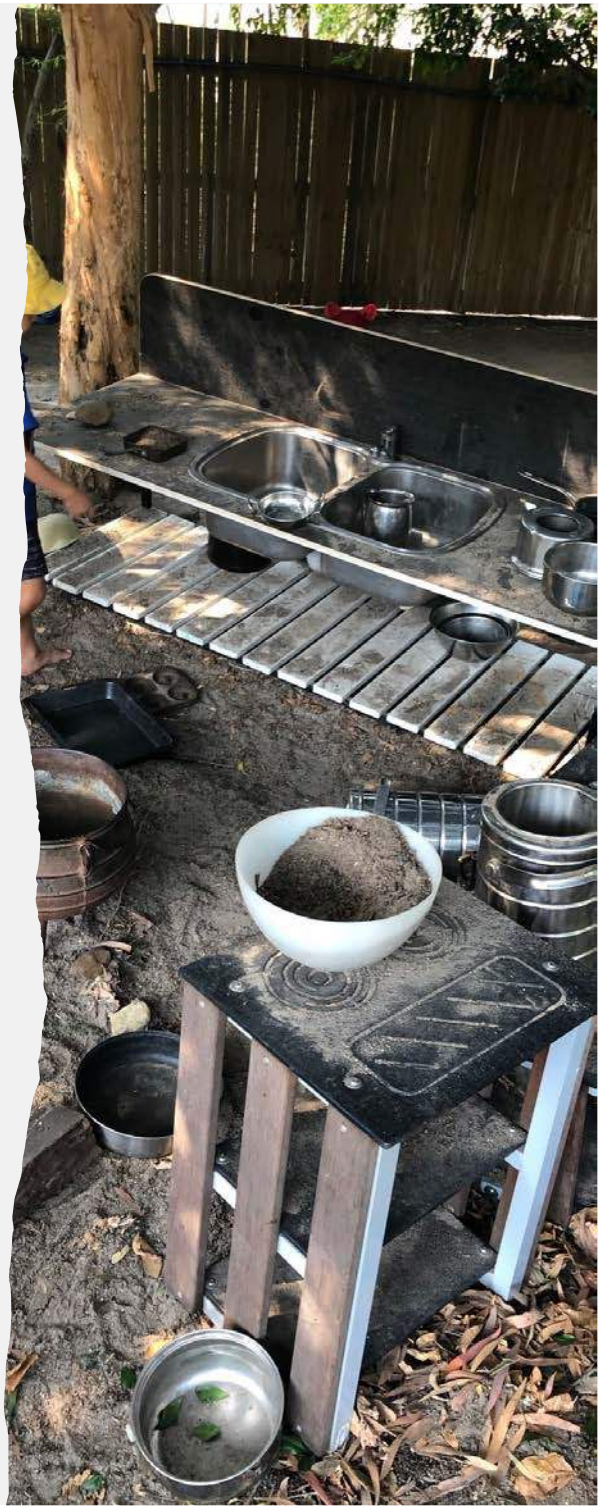
Risky play

Imaginative play

Creative play

Discovery play

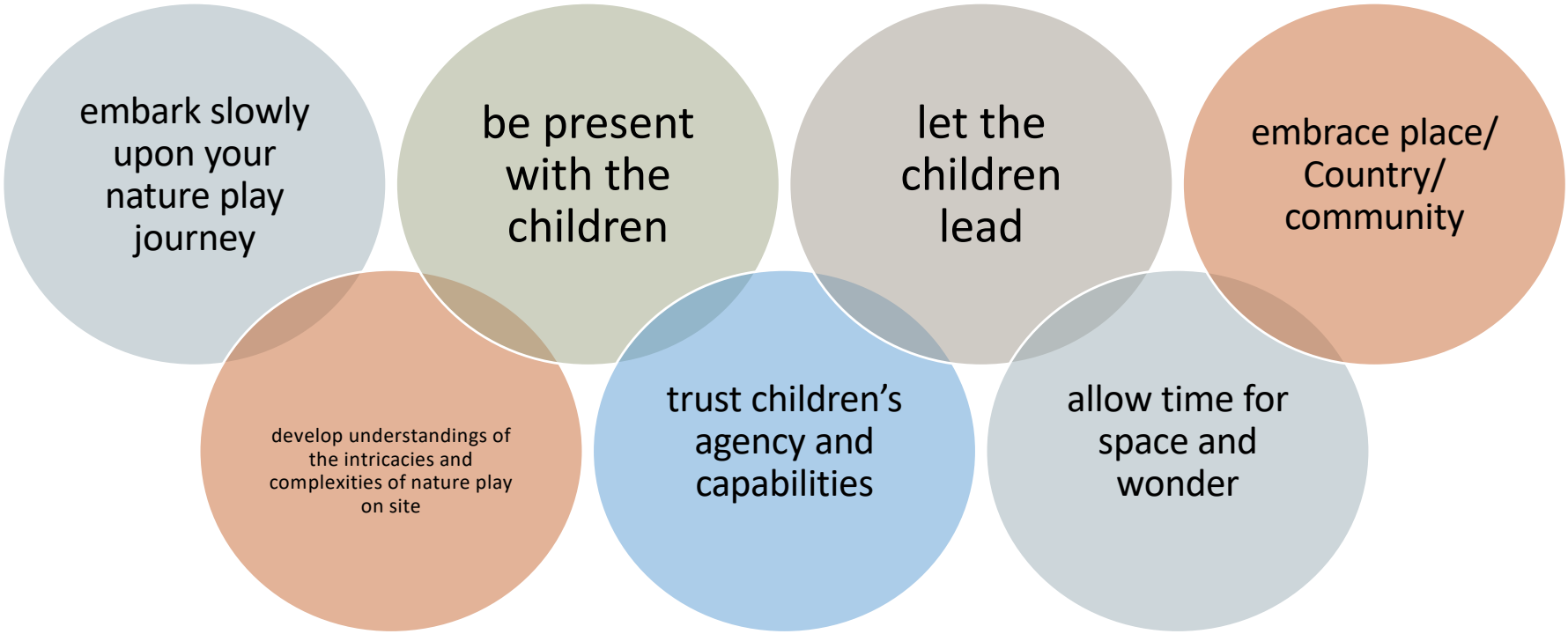
Death play



"I think one of the key things about nature play is about learning in and with nature, the spontaneity, the sensory exploration and investigations... hands-on… I think the link to Indigenous perspectives is really important… and I think the interconnectedness to sustainable practices is important… I see nature play as being an opportunity to have very deep learning, deep connections, learning about land – on land, and those investigations coming from the children."

Rebecca Burch, Nature Explorers, Pottsville.

WHAT CAN TEACHERS DO TO INTENTIONALLY SUPPORT AND BUILD ON THIS EMERGENT AND CHILD-LED PLAY TO ENHANCE CHILDREN'S LEARNING ABOUT SCIENCE AND STEM?


embark slowly upon your nature play journey
be present with the children
let the children lead
embrace place/ Country/ community
develop understandings of the intricacies and complexities of nature play on site
trust children's agency and capabilities
allow time for space and wonder

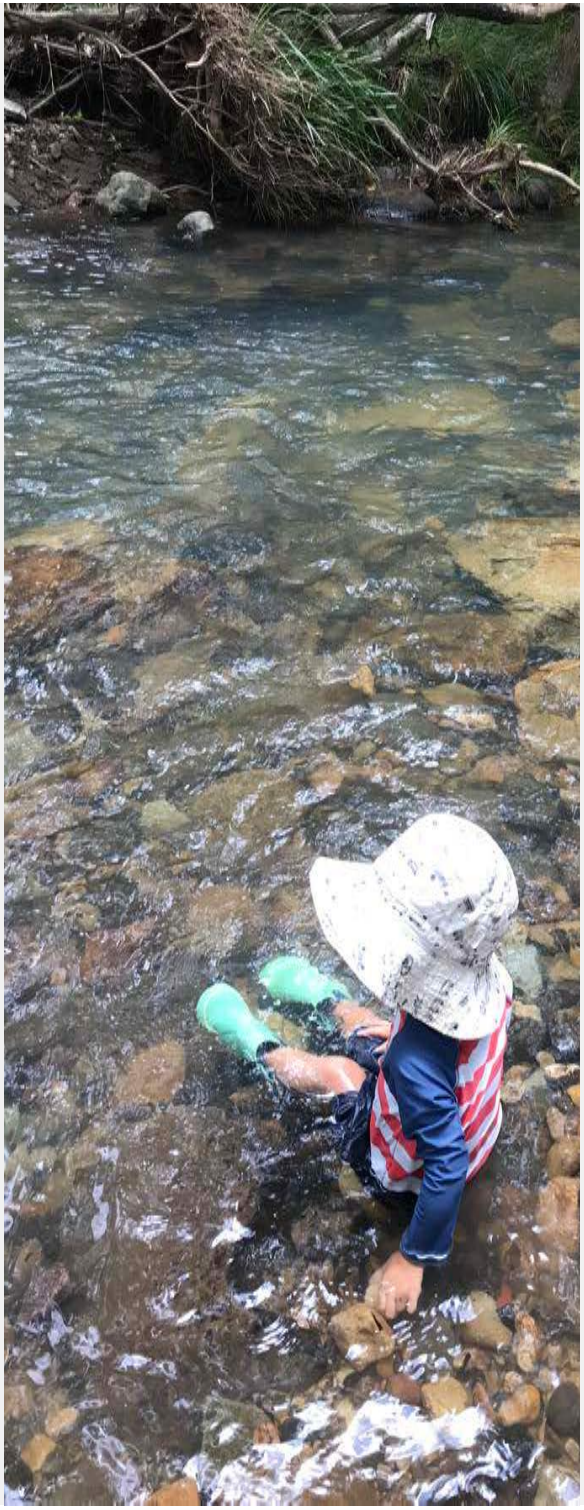

Muddy
barriers

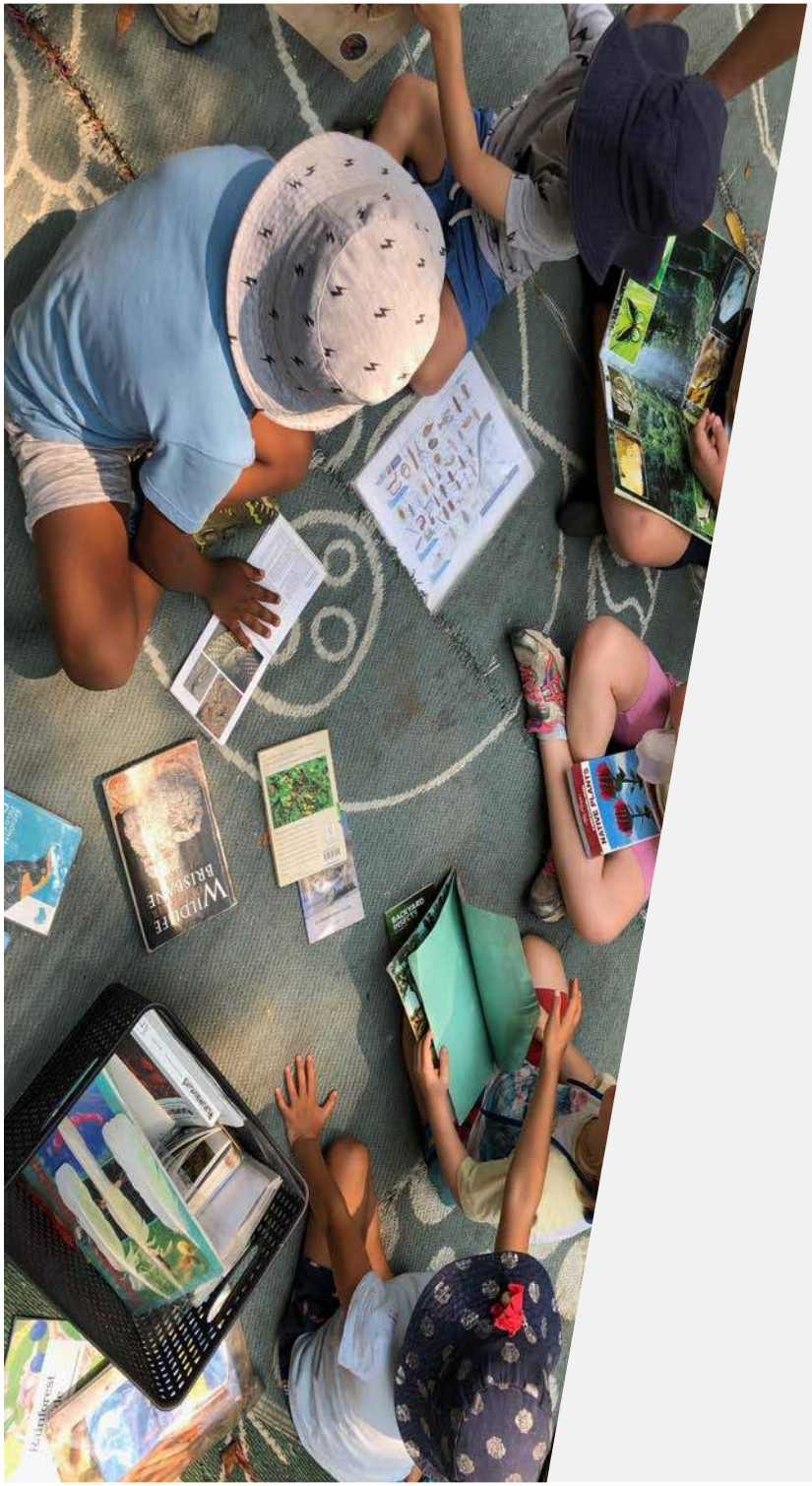
"I think sometimes educators can be scared of litigation through the regulations. Sometimes they have their own bias that comes in that might say, 'children can't climb trees', 'children shouldn't be doing that'. They have preconceived ideas of children's capabilities."

Cassy Read, Pottsville Community Preschool, Pottsville.

"Start by noticing what the children notice"

Marion Hayes, Rainbow Valley Early Learning





"It's ok to say to children 'I have no idea, let's research and understand'"

(Sofia Machado, Nature Explorers Pottsville)

"Co-learning is such a magical thing too. When I first started, I knew nothing [about plants]"

(Hannah Powell, Kurilpa Community Childcare)

"Whenever they've got a question, we just run with it and say 'right OK, well let's find out'"

(Deanna Cini, Rockhampton South Kindergarten)