



**An Early Childhood Education
for Sustainability resource
that embeds the Sustainable
Development Goals and STEM
into pedagogical practice**



Boyd, King, Mann, Neame, Scollan and McLeod, 2021

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Introduction

This resource has been developed to support early years practitioners as they engage with babies, young children, and parents/carers in the exciting world of science, technology, engineering, and mathematics (STEM).

Within the non-statutory Birth to Five Matters (2021, p6) guidance, reference is made to the sector's responsibilities under the United Nations Sustainability Goals and UNESCO Education for Sustainable Development. This document will support practitioners and parents to engage with the sustainability development goals (SDGs), learning more about our responsibilities to each other and the world in which we live.

There are 17 SDGs, and this introduction draws your attention to SDG 12, specifically 12.8.1. This target is key overall: Extent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment.

Starting Early Matters and this resource is full of fun ideas, activities and experiences that promote the creativity and curiosity of young children.

Why is it important to introduce STEM subjects in the early years?

STEM subjects help children to make sense of the world, exploring the "what if" and the "how". Through STEM, children begin to connect with and develop a passion for the environment, for nature, their relationship with nature and the criticality of sustainability.

What do we mean by sustainability?

We all have a responsibility to sustainability, an appreciation of our relationship with the environment, a respect of the world around us and the greater order of nature. Through this resource we have identified opportunities to embed the SDGs.

Foreword by Dr Diane Boyd

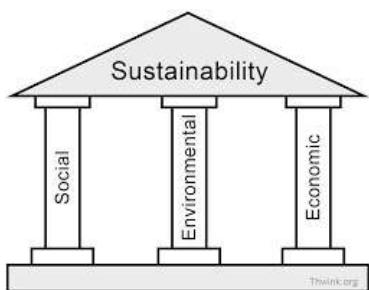
The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body responsible for assessing the science related to climate change. In August 2021, its report highlighted the urgency of solving the current crisis in regard to our world and it strengthened our need as early childhood educators to be part of this solution. This resource will bring to the fore the importance of Sustainable Development Goals (SDGs) and their place in early childhood pedagogy.



Pioneering ideas of early childhood are the foundations for Early Childhood Education for Sustainability. Key pioneers such as Froebel, Montessori, Owen, and Steiner all advocated for social justice, equality, rights, and empowerment of all children – especially the disadvantaged and girls. They also recognised the importance of the environment as a valuable resource, but also the interconnectedness of the child to their world.

Early Childhood is situated in the ecological context of the family, the locality, the community, and the global world. Children need to be aware of how they are interconnected and that actions (theirs and those of others) have an impact. Children must not be framed as "saviours" of the planet, but if the foundations are laid in early childhood, research shows that fundamental values and attitudes are formed at this time. These emphasise the importance of early childhood education.

It is commonly acknowledged that there are three pillars of sustainability (UNESCO) – environmental, economic, and socio-cultural. All three are interconnected and must not be considered in isolation. Considering only one pillar at a time drastically reduces the impact of the strategy or action.



In 2015, all United Nations Member States adopted the 2030 Agenda for Sustainable Development. It provided a clear blueprint for peace and prosperity for all people and a recognition of the importance of caring for our planet. Global partnership is key (it is the final SDG 17 Partnerships for the goals too) in taking action to end poverty, discrimination, improve health and education for all, reduce inequality, ensure clean water, and encourage economic growth. At its heart are the 17 SDGs to enable countries to devise strategies that can

support and empower citizens, whilst also tackling climate change and life on land and below the sea.

The Effective Provision of Preschool Education (EPPE) has shown that the quality of the early home learning environment, regardless of socio-economic family influences, remains positively correlated to attainment in school. Further studies show that this influence goes right through primary and secondary education, and into late adolescence (Sylva et al, 2010). EPPE also showed that high quality preschool provisions, resonating with the importance of **SDG 4.7** quality education, narrowed the gap between those disadvantaged and advantaged.

These ecological features were also identified in the Common Assessment Framework (CAF) which provided a central aspect of Every Child Matters Policy of England and Wales (2000-2010). Additionally, CAF is still implemented in the current "Early Help Assessments". This image below depicts the relevance of the United Nations Sustainable Development Goals to the development of more joined-up thinking and inter-agency collaboration. The UN Global Goals for Sustainability provide a comprehensive transdisciplinary framework with the potential of providing a common vision and stronger foundations for partnership working and collaboration, in the interest of every child. (See Appendix A in Hindmarch and Boyd, 2021)

Appendix A in Hindmarch and Boyd, 2021



Sustainable development has the ultimate potential of offering a holistic transdisciplinary and transformative perspective that can support the integration and future development of early childhood and family services. <http://www.schemaplay.com>

Hindmarch, T., and Boyd, D. (Eds.) (2021) *A Path Made in the Walking: Forest Schools in Norway and in England, An OMEP Special Report*, OMEP (UK) and SchemaPlay Publications.

The African proverb: "it takes a village to raise a child" remains valid, as across our communities, parents and professionals work in partnership to achieve the best outcomes for babies, children, young people and families. SDG 17

<https://www.nesta.org.uk/report/parents-helping-parents-it-takes-village-raise-child/>

<https://sdgs.un.org/goals>

UNESCO (2015) notes that education is the key to a better future and anyone working within any part of education needs to recognise this. SDG 4 specifically highlights the importance of quality education for all, starting in pre-primary. This resource provides an opportunity to embed education for sustainability, in particular the SDGs into all aspects of early childhood education, from level 2 to level 7.

Dr Diane Boyd

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How to use the resource

The resource includes activities and experiences for the setting, presented as activity sheets. The activity sheets can be given to students, parents and carers so that reflective accounts can be included and shared in the setting. Practitioners could develop simple resource packs to support each activity for parents to borrow and enjoy with their children at the setting or at home.



An example of home learning.
Credit: Chris and Jenson Boyd

Section 1

Links to the Early Years Foundation Stage (DfE, 2021) and education for sustainability.

For the purpose of this resource, the emphasis is on education for sustainability through the 17 Sustainability Development Goals (SDGs) and STEM, exploring early scientific concepts with young children in a fun, exciting and motivating way.

A key aspect of education for sustainability is creativity. This is about thinking divergently, "outside the box" and being solution focused. Within the Early Years Foundation Stage Statutory Framework, (EYFS), there is a significant emphasis placed on the characteristics of effective teaching and learning. The third characteristic specifically focuses on such thinking, and it is the responsibility of all those working with children to ensure all activities, experiences and educational programmes challenge children both physically and mentally.

EYFS 1.15 In planning and guiding what children learn, practitioners must reflect on the different rates at which children are developing and adjust their practice appropriately.
(EYFS, DfE, 2021, p16)

The three characteristics of effective teaching and learning are:

- *Playing and exploring - children investigate and experience things, and "have a go"*
- *Active learning - children concentrate and keep on trying if they encounter difficulties and enjoy achievements*
- *Creating and thinking critically - children have and develop their own ideas, make links between ideas, and develop strategies for doing things (EYFS, DfE, 2021, p16).*

The Early Years Foundation Stage statutory framework reminds us that the Early Learning Goals are not assessed until the child reaches the end of their reception year. There are 7 areas of learning, and each area will have specified Early Learning Goals. Prime and specific areas of learning make up the 7 areas of learning.

There are 3 prime areas, of which one is Communication and Language. It is crucial that practitioners/students remember the development of children's spoken language underpins all seven areas of learning and development (EYFS, DfE, 2021, p8).

Whilst there is limited reference to "science" or "technology" within the statutory framework, it is a specific area: Understanding the World.

There is an expectation that through planned and unplanned activities children will foster their understanding of our culturally, socially, technologically, and ecologically diverse world.

An Early Learning Goal for **Understanding the World** depicts what children at the expected level of development will achieve surrounding aspects of the natural world. It states that children at this level of development will: *Explore the natural world around them, making observations and drawing pictures of animals and plants; know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; understand some important processes and changes in the natural world around them, including the seasons and changing states of matter* (EYFS, DfE, 2021, p14).

When considering Understanding the World, there is an opportunity to also consider the prime area of Communication and Language with an emphasis on questioning.

Children at the expected level of development in Communication and Language will: Participate in small group, class, and one-to-one discussions, offering their own ideas, using recently introduced vocabulary; offer explanations for why things might happen, making use of recently introduced vocabulary (EYFS, DfE, 2021, p11).

Mathematics is a specific area of learning and a key part of STEM (Maths). Within the EYFS, developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, "have a go", talk to adults and peers about what they notice and not be afraid to make mistakes (EYFS, DfE, 2021, p10).

When planning for STEM, ensure there is the opportunity to incorporate all areas of learning from the EYFS together alongside sustainability. Reflect on the characteristics of effective teaching and learning which encourages children to investigate, have a go and be creative; key to both STEM and sustainability. Adopting an inclusive approach to learning is essential through providing stimulating and enjoyable activities.

A useful text has been developed by Montessori Europe and the Flourish Wellbeing that can be used as an introduction to the SDGs. Print off a couple of copies and leave in the reading area so the children become familiar with them.

https://www.flourishproject.net/uploads/1/8/4/9/1849450/sdgs_for_the_early_years_final.pdf

Section 1: Inspiring learning

A key document, Education for Sustainable Development (ESD) Goals Learning Objectives (UNESCO, 2018) highlights the aims of the SDGs.

ESD aims at developing competencies that empower individuals to reflect on their own actions, taking into account their current and future social, cultural, economic, and environmental impacts, from a local and a global perspective. Individuals should also be empowered to act in complex situations in a sustainable manner, which may require them to strike out in new directions; and to participate in socio-political processes, moving their societies towards sustainable development (UNESCO 2018, p 11).

ESD is explicitly recognized in the SDGs as part of Target 4.7 of the SDG on education, together with Global Citizenship Education (GCED), which UNESCO promotes as a complementary approach. At the same time, it is important to emphasize ESD's crucial importance for all the other 16 SDGs. With its overall aim to develop cross-cutting sustainability competencies in learners, ESD is an essential contribution to all efforts to achieve the SDGs, enabling individuals to contribute to sustainable development by promoting societal, economic, and political change as well as by transforming their own behaviour. ESD can produce specific cognitive, socio-emotional, and behavioural learning outcomes that enable individuals to deal with the particular challenges of each SDG, thus facilitating its achievement. In short, ESD enables all individuals to contribute to achieving the SDGs by equipping them with the knowledge and competencies they need, not only to understand what the SDGs are about, but to engage as informed citizens in bringing about the necessary transformation (UNESCO 2018, p12).

Provocations and questions reflect scientific/engineering/mathematical and technological thinking as well as being linked to the characteristics of effective teaching and learning (EYFS, DfE, 2021).

Think about the "what if", "what do you think", "I wonder if" type of questioning to provoke curiosity and a keenness for children to think, to imagine, to participate, to contribute, to take interest, to pay attention, to enjoy, to share, to discuss and to learn.

UNESCO 2018 suggests there are three domains to reflect upon when planning your provocations. They are cognitive, behavioural, and socio-emotional.

The cognitive domain comprises knowledge and thinking skills necessary to better understand the SDG and the challenges in achieving it.

The socio-emotional domain includes social skills that enable learners to collaborate, negotiate and communicate to promote the SDGs as well as self-reflection skills, values, attitudes, and motivations that enable learners to develop themselves.

The behavioural domain describes action competencies (UNESCO, 2018, p 15).

It is important to consider that competencies cannot be taught, but through experiences, taking action, and reflection on the processes involved during the provocations, learners can be supported in developing the competencies themselves.

Use thinking books to show the children's visible thinking, ensure their voices are heard and the environment enriches the opportunities for further consolidation. Provide a range of technologies to capture children's thinking or let the children capture significant moments, sharing, discussing, and reflecting. Collating a range of child-led data, including facilitated discussion, can support reflections - placing children at the centre of learning. An interesting approach to consider here may be the Mosaic approach, introduced by Alison Clarke (<https://www.nicole-brown.co.uk/the-mosaic-approach-according-to-clark-and-moss/>).

Facilitation as a methodology to promote children's self-determination and its implication for learning (Angela Scollan)

Self-Determination Theory (SDT) is a leading theory for research on the intersection between children's behaviour and self-determination. For SDT, there are three *intrinsic* (innate and universal) motivations for (any) self to initiate behaviour:

- 1) Need for competence that allows control in the field of individual experience
- 2) Need for relatedness that refers to interactions, to be connected to care for others
- 3) Need for autonomy that concerns making choices that determine own life trajectory.

Intrinsic motivations interact with extrinsic motivation. Extrinsic motivations influence behaviours in terms of external demands and rewards on the individual. In SDT, they allow us to acknowledge the influence of the environment on individual attitudes. The interplay between intrinsic and extrinsic motivations defines behaviours, and it is observable in real-life situations by observing how children display objective markers such as being willing, creative, pro-active and self-confident.

For SDT, the most influential extrinsic motivation is trust. The importance of trust has been widely recognised by psycho-pedagogical research, suggesting that children's self-determination is promoted within environments where adults trust children to make choices. Children need spaces and opportunities to make choices, to have personal control to regulate their own behaviour and to feel capable of self-realisation (SDG 1.2.4).

SDT can be fruitfully applied to research the motivation of children's engagement in education. For instance, research based on SDT indicates that students' engagement decreases with more authoritarian forms of teacher control.

The Actor's System Mode (most influential in UNICEF educational planning) is based on the idea that self-determination does not only concern behaviour. Self-determination is meaningful only when it entails opportunities for reflexive construction of identity, moving between conscious and unconscious knowing, reaction, will and choice.

Pedagogy of listening, facilitation and promotion of children's self-determination in education

Whilst young children's participation in education is generally advocated, questions may concern the nature of young children's participation in education. In the last 20 years, a critical view of how young children participate in education has been advanced by influential research, contributing to the development of a pedagogical framework: *early childhood education* (ECE).

For ECE, the question is not whether children should be listened to or not; the question concerns the best way to listen and dialogue with them. The promotion of children's self-determination is therefore an ethical and methodological tenet of ECE as a pedagogy of listening.

Facilitation is a methodology that aims to create conditions of dialogic teaching, where adults and children are both positioned as authors of knowledge which is a condition for *real listening* to children. Facilitation aims to build knowledge with children and can favour:

- 1) A participative approach to learning based on *equality of opportunities*
- 2) *Empathic reflection* on the background of personal memories
- 3) Expectations of *personal expression* as the form of participation to interaction.

Facilitation expects both teachers and pupils (to) make substantial and significant contributions. In facilitation, children's thinking on a given idea or theme is helped to move forward, through which teachers can encourage children to participate actively. Facilitation invites the teacher to work not as the exclusive holder of knowledge, but as an organiser of and for learning. Facilitation aims to create the conditions for children's self-determination to make a difference in the contexts of their own, as well as adults', learning.

Results from research suggest that facilitation can combine learning with promotion of self-determination, nurturing children's trust in education, engagement and motivations. Facilitation can transform any educational activity in an environment that enables the co-construction of knowledge between adults and children. The transition between other teaching methodologies and facilitation can be supported by reflective tools and CPD.

Facilitation can be adapted as a technique to support other pedagogical methodologies. Facilitation is thus a resource for, rather than an alternative to, other ways of working with children. The only condition is that facilitation can be utilised exclusively within activities that are interested in promoting children's active participation as personal expression.

Technical Appendix: Transitioning from teaching pupils towards facilitation with children



The RARA Key model is utilised to support facilitators' reflection in action. The RARA Key invites the articulation of reflection across four dimensions:

- 1) Recognise
- 2) Adjust
- 3) Review
- 4) Act.

Transition between "ordinary" teaching and facilitation requires time, space and reflection for self-awareness. Based on the RARA model, a resource for reflective transition between "ordinary" teaching and facilitation has been developed.

The RARA Key model can be used as a foundation for CPD training to promote reflection on classroom talk, dialogue and communication.

	If facilitation is introduced into the classroom environment, what might be done differently and why?	Reflect and self-audit communication and engagement styles
Recognise	Recognise aspects of interactions used to engage children that may need to adjust or change when introducing facilitation. (Self-assessment and reflective stage)	Example: How does the adult invite or engage children to communicate or talk about their knowledge or personal experiences during facilitation? How might this differ from traditional teaching or interactions? Question: Pedagogically, who am I? What do I do and why do I do it like that?
Adjust	What action(s) or teaching approach might need to adjust if facilitation is to be engaged with? Why? (Planning to adjust stage)	Example: Adjust expectations or interpretation about: i) children's knowledge and capability ii) classroom routines or boundaries during facilitation to indicate difference between teaching/facilitation activities or outcomes iii) what knowledge is and where it comes from. Question: Do I always have to do "it" the way I always do? Why?
Review	Change needs to happen (although if change is not possible or is not working, there is a need to explore why?) Evidence or an example from practice is helpful to analyse. (Critical thinking stage)	Example: Facilitation did not work the way I expected. Children were not participating, they seemed to be waiting for the usual "hands up" to engage during the activity. So, how do I work with children to promote and evolve facilitation? What do I need to do differently? Maybe it is "me" who is not participating? Was I teaching or facilitating during the activity? How can I be sure? Or Maybe, I didn't change what I usually do in the classroom, so how should I signal a change of approach? What non-verbal cues or communication style can be used to signal a change in approach? Was I talking to the child or the pupil? Question: How does facilitation differ from teaching? Why? What do both have in common? How do both differ? Why? How do I manage teaching and facilitation during activities? Am I aware of when, why and how I switch between teaching and facilitation?

Action	<p>Change is happening or has happened. How did change actually happen and how did facilitation evolve?</p> <p>Reflect in action (during the activity) or on action (after the activity). Discuss changes with children and colleagues. For example, share reflections and views about how facilitation was experienced.</p> <p>(Analyse, listen and do stage)</p>	<p>Example: Analyse reactions to facilitation. Encourage children to share their reactions about the use of facilitation. Teachers/facilitators reflect and share reaction towards dialogue change and outcomes. For instance, focus on classroom dynamics, noise, engagement, connections and relationships, body language, motivation, connections, listening, who participated and how, did the environment change? If so, how?</p> <p>Physical or emotional change? Did you learn something different about children and their lives; experiences; capabilities; strengths; fears; humour?</p> <p>How did children support or challenge your knowledge?</p> <p>How has facilitation impacted on your own teaching style; experience; reflections; approach?</p>
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Through our conversations with children, we can evoke a respect for the environment, move away from a humanistic perspective, reconnect to the ecosystems and to consider the lowly caterpillar or daisy!

Sustainable Development Goals (UNESCO, 2015)

End poverty in all its forms everywhere



Possible examples of No Poverty STEM provocations:

1.41 Consider what this means? *Households with access to basic services.* Discuss with children (get resources and books); what are "services"?

List them and discuss what each service does to make their life easier.

Pose questions: What would you do if... (example: you had no water/tap or toilet).

Look at images from other countries and compare/discuss.
How do they work? What do they need to work?

How can they make their homes more sustainable?

Make a tippy tap (SDG 6).

1.5 Disasters/shocks – how can natural disasters impact upon families/homes?
Terminology – flood/fire/hurricanes – link to SDG 7 energy/power.

Look at images of flood/fire/hurricanes from parts of the world – consider the damage to the environment.

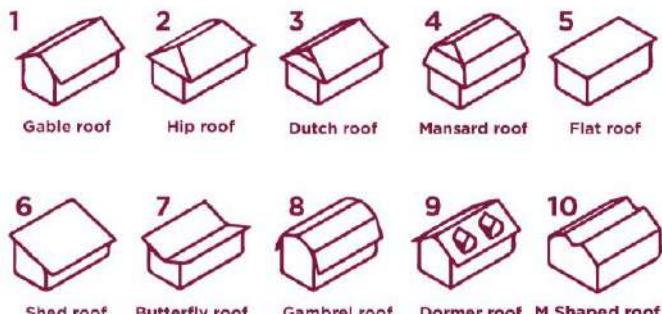
Pose questions: how do floods/fires start? Are they man-made?

Build a dam in a large water tray. Use different materials to assess strength. Look at animals in the wild that make structures, such as beavers. Pose questions of structure/materials/tools needed. Try out different real tools and see what they can do.

Development Matters (2021, p90) Mathematics: *Select shapes appropriately: flat surfaces for building, a triangular prism for a roof, etc.*
Combine shapes to make new ones – an arch, a bigger triangle, etc.

Read the 3 Pigs story with a new focus – which house is stronger from floods/fire/hurricanes and why?

Types of roofs



hummingbird who adopts the stance of "I will do the best I can". When other larger animals stand back and stare, watching their homes burn in a devastating forest fire, the little hummingbird carries drops of water to help put out the fire:

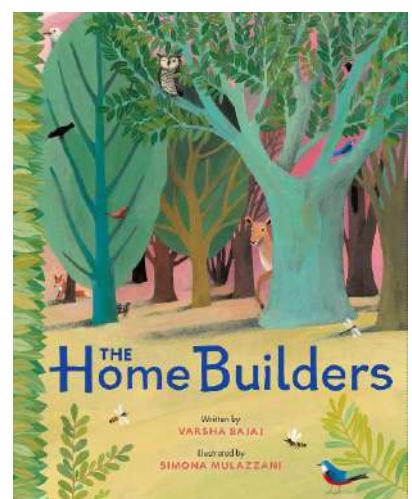
<https://www.youtube.com/watch?v=6vgJKOvEKE4&list=RDLVIGMW6YWjMxw&index=3>

Link to **SDG 2 Zero Hunger, SDG 15 Life on Land.**

Design homes for animals that give them protection – what do they need? Think sun, water, warmth, and food.

Read together: Home Builders (2019) by Varsha Bajaj.

Welcome to a serene woodland where lots of expectant animal parents are in their nesting phase – that is, busy preparing safe, cosy homes for their growing families. As they dig, tunnel, gnaw, and gather, they create dens, burrows, lodges, and, of course, nests. Soon the woods are full of new little ones peeping, crawling, romping, and snuggling. With artwork so gorgeous that it feels like an invitation into the scenery it's depicting, readers will be eager to join them in their beautiful home.



**SDG 14: Life Below Water.**

Use images that provoke but not distress, but sadly marine life is dying because of eating plastics (due to humans) rather than their food chain. Links to **SDG 1** as it is impacting on our food chain for all ecology as plastics are being food inside fish.

With the children, plan a beach (or park/garden/community) campaign locally to ensure plastic/litter is not left on their beaches, using all aspects of STEM. Become community planners!

Try to enforce that **no poverty** is not just a human stance. All living things need a healthy environment and food to survive!



The children here were drawing their reflections of the local beach after discussing sea life. Ensure correct terminology is always used.

These are just a few examples of how you can utilise **SDG 1**.



End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Possible examples of Zero Hunger STEM Provocations:

Hunger does not just impact humans!

Terminology – malnourishment/hunger. Why would you be hungry? How do you know that your body is needing food? What does your body need food for? Link to **SDG 7** Energy and **SDG 3** Good Health and Wellbeing.

Pose questions: which food is better to eat? Fresh – frozen – perishable?

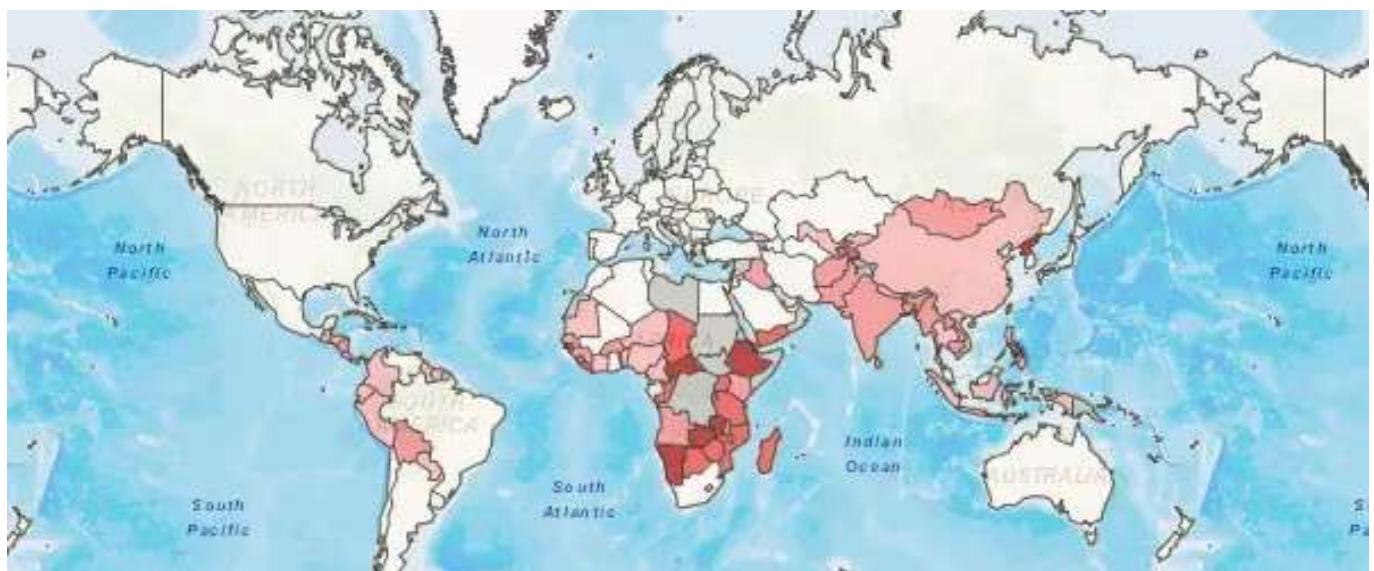
Experiment with the same food 3 ways (e.g. frozen fruit – tinned and fresh). Ensure children have opportunities to use real tools to cut and slice food, as noted in prime area Physical development.

Link back to disasters – how can we save our crops from disasters?

Teacher information / for older early years children to discuss: how do we end hunger?

<http://www.fao.org/hunger>

Maps are a key aspect of Understanding the World – discuss the UNESCO Hunger map.



One in seven people on Earth live on less than one dollar each day.



Provoke thinking – show two images of fridges – one full and one empty.

Ask the children to discuss why it might be full/empty. Why do we need fridges? How would you keep food fresh in the wild?



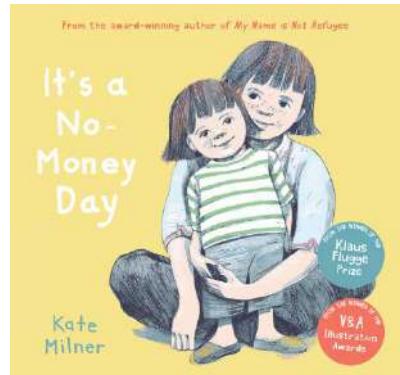
Consider new heroes – Marcus Rashford championed food for children during the pandemic and highlighted the need for nutritious meals. Look at the images that were painted on walls in Manchester and the messages for him.

Link to food banks locally – visit and support.

Raise awareness by designing posters.

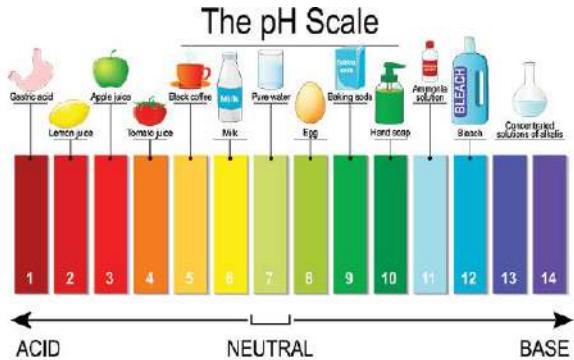
Read together: *It's a No Money Day* by Kate Milner.

"My mum works really hard and knows lots of fun things to do that don't cost any money. But when there's nothing left in the cupboards we have to go to the foodbank. Maybe one day things will be different..."



Plan to develop a community garden/allotment which the children manage and sell the produce back – so they understand economy. Pose questions about how you can share food – food supply. Use food products to demonstrate equitable food sharing – halve/quarter/slice a cake/pie.

Test your soil – thriving vegetables need a pH of 7-7.5. Use a simple soil testing kit. If the number is below 7 then it's acidic and the plants can't grow. If the number is above 7.5, then the soil is too alkaline, and the vegetables can't grow.



2.5 - Assess traditional knowledges of environment – sort and classify indigenous seeds – look at patterns, sizes, and textures – describe them.

How and what do they need to grow?

Make seed sharing a community aspect and encourage the children sell them. Design the packages and information about each type of seed.

Link to **SDG 15** Life on Land.



Development Matters (2021, p104) *Plan and introduce new vocabulary related to the exploration. Encourage children to use it in their discussions, as they care for living things.*

Have knowledge of the local bio-diversity – identify which plants/seeds are needed by birds/animals in their locality. Make seed balls for hungry birds and ensure water is readily available. <https://letsgrowwild.uk/make-homemade-fat-balls-birds/>

Which non-human living things are at risk of being hungry and why are they at risk?

Consider the importance of the bee: "An increase in urban developments and invasive farming methods has meant that many of the areas bees once called home no longer exist. These developments are as much a threat to bees as they are to trees and woodland. In the wild, several species of bee nest in hollow trees, so as more trees are destroyed so are the homes these bees live in. Wildflower meadows and other areas abundant in flowering plants are also in serious decline, meaning that bees lose an important food resource."

<https://www.woodlandtrust.org.uk/blog/2018/07/why-are-bees-important-and-how-you-can-help-them/>

Develop a research project about the bee. Why are bees so important to the food supply? Without bees, the produce section in the shops would be reduced by up to 50 percent and could pose a major threat to global agriculture. Some of the foods that are produced from pollinated plants include apples, lemons, carrots, onions, and broccoli.

Pose questions to the children about how they can help the bees. Why are bees in danger? Let the children lead. Design ways to tell their community of the importance of bees.

Examples:

- Engage in the local community with allotment participants
- Plant wildflower beds and observe
- Eat and classify honey
- In Physical Development, move like a bee and discuss their roles
- Design bee hotels for the outside space
- Dissect a dead bee if available and use a magnifying glass to examine it.



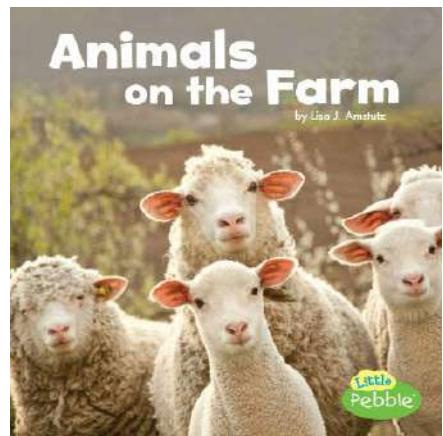
Simple bee hotel designs – and a 3D Save the Bee campaign poster!

Credit: Riverside Nursery, Edinburgh

Consider terminology "domesticated" versus "wild" animals. Classify animals – which animals do we eat/farm? Where does our food come from?

Read together: *Animals on the Farm* by Lisa Amstutz.

Introduce your beginner readers to seven of the most common animals on the farm with a hearty "Hello, cows!" and a "Hello, pigs!" Up-close photos and levelled text pair up for a fun meet-and-greet filled with facts, feathers, and fur.

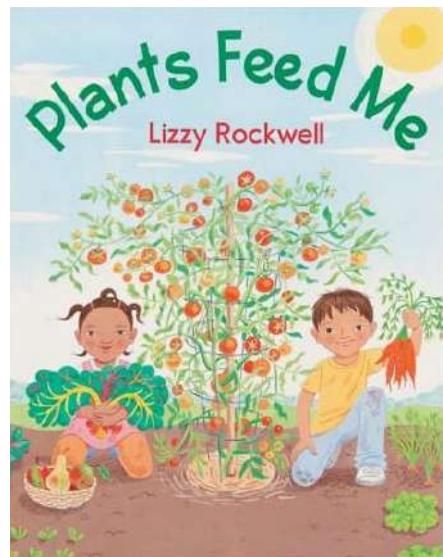


Some provocations for **SDG 2**. Follow the children's ideas and thinking.

Discuss with the children plant-based foods using this book as a provocation.

Read: *Plants Feed Me* by Lizzy Rockwell.

Reflect on the difference between plant-based food and animal food – what foods do they eat that is animal or plant?



Make an audit of the most popular plants eaten – and introduce them to new plant-based foods. Reflect upon the culture of the community too. Invite grandparents in to share traditional plant-based foods. Ensure children taste and feel the foods.

Highlight that eating too much animal /dairy-based food is not healthy for them and the planet (links to **SDG 13** and **SDG 15**).



Ensure healthy lives and promote wellbeing for all at all ages.

Possible STEM provocations for SDG 3.

3.3 - By 2030, end... water-borne diseases –

Experiment with different materials in water – ask questions about where diseases in water could come from. Look at images from other countries and the lack of clean drinking water (SDG 6). How far would you walk for your water? Set up a water walk challenge: <https://www.youtube.com/watch?v=iEyGZiLVQvM>

How can you clean water?

Experiment: https://www.youtube.com/watch?v=vh_63fV1gl

Can you undo water pollution? <https://www.youtube.com/watch?v=Wnn4CEpjBtk>

Record the results and use correct scientific terminology.

Discuss with children about the importance of staying healthy. What do they need to have energy? (**SDG 7**) Link back to SDG 1 and SDG 2 and revisit messages.

3.9 By 2030, substantially reduce the number of deaths and illnesses from water and soil pollution and contamination. Link back to **SDG 2** and soil testing. Soil needs to be strong and healthy.

3.4 By 2030 promote mental health and well-being.

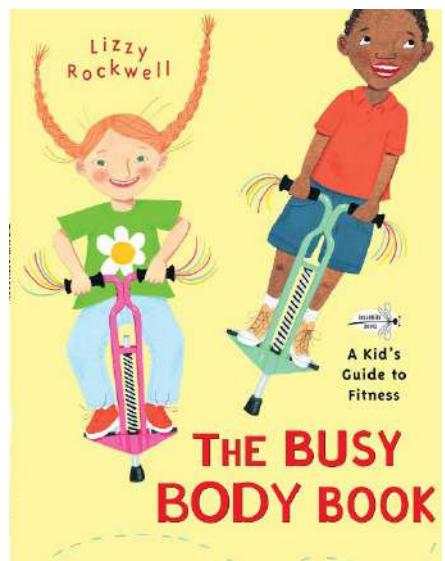
Define well-being and what that means. Think about the science behind their bodies.

Read together: *The Busy Body Book - A Kid's Guide to Fitness* by Lizzy Rockwell.

This book explains how your bones and muscles, heart and lungs, nerves and brain all work together to keep you on the go. Link to nature and how they feel outside.

Yoga/mindful/exercise sessions can be incorporated into the daily practice. Ensure children talk about their feelings together. Let the children monitor their progress as a science task – if they can do the poses – how do they feel before/after? Look for physical changes too – red faces, sweaty skin and the need for clean water!

Five Minute Move for Early Years with Joe Wicks:
<https://www.youtube.com/watch?v=Metvs871Azc>

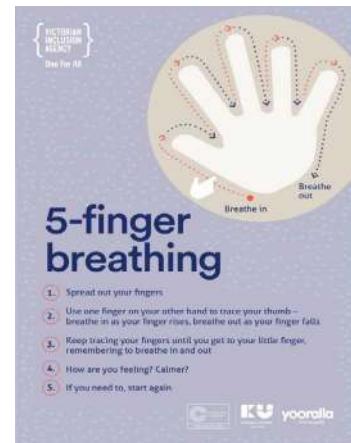


The 'early years' of educating children are critical for life at school and life in general. Part of this includes helping children to have good mental health.

The Government highlights here the importance of a child's holistic health:



Credit to: GOV.uk



Credit: the Victorian Inclusion Agency, Australia

This activity was developed to support early years children with their mental wellbeing.

Supporting children's anxiety issues could be included here – Emotionally Based School Avoidance (EBSA) and ways in which schools/settings/educators and parents could support children in gaining access to learning:

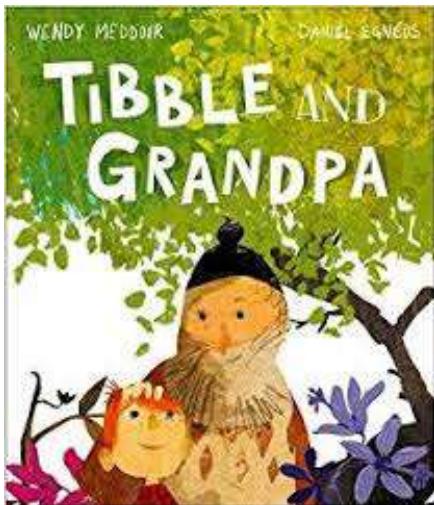
<https://www.supportservicesforeducation.co.uk/Page/20029>

Links to **SDG 4**

Introduce the term "eco-anxiety" and ask the children what they think it is.

An interesting read for educators on eco-anxiety: <https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642%2821%2900001-8/fulltext>

Talk with children about their fears about the planet. Discuss the wider implications of how Covid-19 impacted on the children - loss of friends, no school grief. Consider the research from Caroline Hickman about eco-anxiety, including recent articles for The Conversation: "I'm a psychotherapist, here's what I've learned from listening to children talk about climate change": <https://theconversation.com/im-a-psychotherapist-heres-what-ive-learned-from-listening-to-children-talk-about-climate-change-123183>



After Covid-19, children may need more support to discuss death and loss to help them overcome their grief. This book, *Tibble and Grandpa*, written by Wendy Meddour, supports children in this natural process. Grandpa is grieving, he hides away in his garden. He needs time. But he also needs love. Tibble is full of love and shows Grandpa that remembering the people we love can be a wonderful, funny, poignant thing.

Link here to **SDG 4** – enabling environments and how the natural world supported children through this time.

In Australia there is a website (Birdie's Tree) that supports children's wellbeing through disasters/emergencies such as Covid-19 too - link to **SDG 13 - see an example below**.

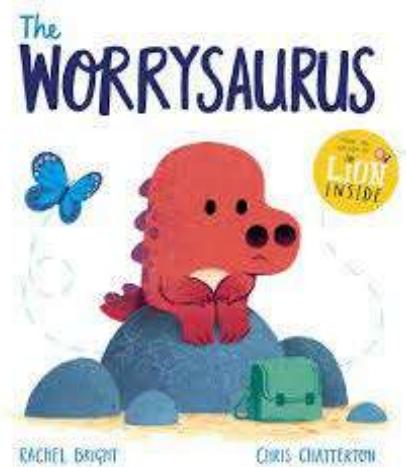
<https://www.childrens.health.qld.gov.au/wp-content/uploads/PDF/qcpimh/What-is-Birdies-Tree.pdf>

Credit: Australian and Queensland Government.

Birdie's Tree is a suite of resources to help families prepare for, cope with and recover from a natural disaster. Birdie's Tree particularly helps to support the mental health and emotional well-being of expectant and new parents, babies and young children.

After Covid it is really important to talk about any worries and not keep worries to yourself. A suitable book that could support this is:

The Worrysaurus by Rachel Bright – a fun and reassuring tale about dealing with worries.



3.6 By 2020, halve the number of injuries from road traffic accidents.

Watch together and discuss: <https://www.youtube.com/watch?v=MTJUBz6Rps0>

Plan simple road safety rules for your school/setting. Ask why are there so many road accidents? Go outside and look at the road markings outside the school/setting – design a poster to put up outside or a safety video to share with other classes. Look at road technology – traffic lights – in what order do the lights change? How long do you get to cross a pelican crossing? Pose questions about how different aged people will take longer/shorter time to cross the road.

Ask the local lollipop person to come in and share their rules.

Look at reflective materials and try them out in the dark.

Use small cars/lorries and different levels to see how cars can go faster or slower depending on gradient. Reflect upon the silence of the electric car and the fact it is so quiet; discuss the importance of looking carefully and their safety as a result. Statistics show more accidents occur as a result of the silent electric car.

3.B Support the research and development of vaccines. <https://www.pacey.org.uk/working-in-childcare/spotlight-on/coronavirus/supporting-children-in-your-setting-coronavirus/>

This is a significant target which is important to highlight – this is linked to their mental health/mindfulness. After Covid, children will know or be aware of terminology around about jabs, death, isolation and quarantine. Be open and talk about these and find out how children feel. Follow the line of enquiry.

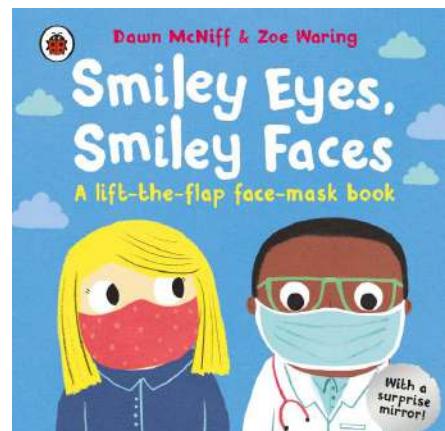
Read together: *Smiley Eyes, Smiley Faces* by Dawn McNiff.

Toddlers today are growing up in a world where adults wear face masks outside the house. Everyone is wearing them, from the bus driver to the shop assistant!

Design germ posters or a video to promote hand washing, cleanliness, and food preparation.

In Birth to Five Matters (2021, p 5) it acknowledges the importance of educators talking with children about Covid – "consider the impact" – analyse what impact means of the coronavirus pandemic. Discuss what this language means.

<https://nosycrow.com/wp-content/uploads/2020/04/Coronavirus-A-Book-for-Children.pdf>



Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.



Possible STEM provocations for SDG 4:

4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care, and pre-primary education so that they are ready for primary education.

4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples, and children in vulnerable situations.

EYFS (DfE, 2021, p5) The EYFS seeks to provide *quality and consistency in all early years settings, so that every child makes good progress, and no child gets left behind.*

What does "access" mean in this case? Discuss "access" as a right to all. Watch together and discuss "what is a right?" What does inclusive mean?

https://www.youtube.com/watch?v=y_2nA49p3yw

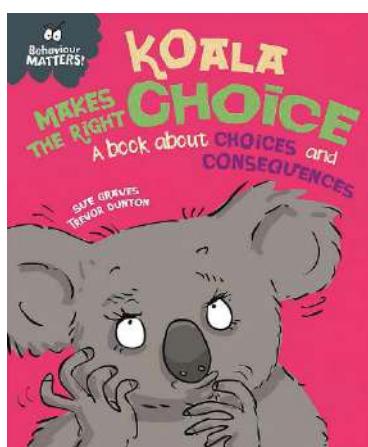
Brainstorm and discuss words/actions that offer choice – understand consequences/rules – linked to **SDG 3**, British Fundamental Values, and prime area PSED (EYFS, DfE, 2021). STEM is an aspect of quality education as it provides transferable problem solving, creativity and divergent thinking.

Link here to UNCRC (1989) articles 12 and 13 that children have a right to be heard and listened to.

The Convention on the Rights of the Child explains who children are, all their rights, and the responsibilities of governments. All the rights are connected, they are all equally important and they cannot be taken away from children.

Display the child-friendly UNCRC as a poster in your setting.

<https://www.unicef.org/media/56661/file>



Read together: *Koala Makes the Right Choice: A book about choices and consequences (Behaviour Matters)* by Sue Graves.

Reggio Emilia approach from Northern Italy recognises children as rights holders and decision makers. The practitioners and children are equal co-researchers following lines of enquiry through multimodal ways of learning, visible thinking, creativity, and projects. The Mosaic approach (Alison Clarke) also recognises the children as decision makers and through technologies provides the children with a voice. Research these approaches and consider how you can incorporate aspects of them through children's rights and empowerment into your practice.

Technology – Mosaic approach

Interesting read for students and practitioners: <https://learningaway.org.uk/wp-content/uploads/RL56-Extract-the-Mosaic-Approach-EARLY-YEARS.pdf>

4.4 By 2030, substantially increase.... relevant skills, including technical and vocational skills, for employment, decent jobs, and entrepreneurship.

4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development.

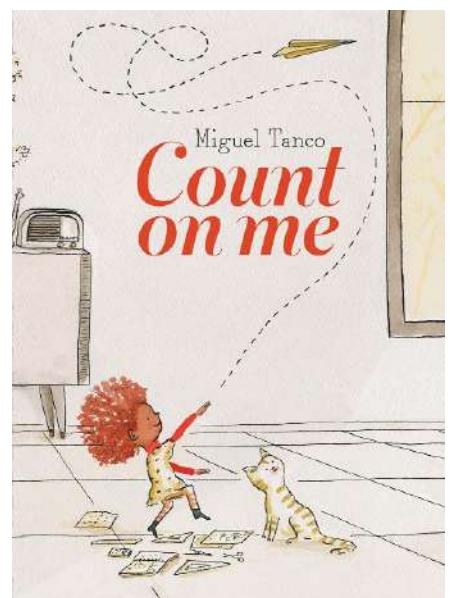
Research has shown that all fundamental values and attitudes are formed in early childhood. Children need to be prepared for the future world and that means providing them with opportunities that are both vocational (practical use of tools), technical (can utilise technology in multimodal ways of learning) and through the characteristics of effective learning can become creative, resilient, investigative, and prepared to have a go. STEM provides all these opportunities.

Share *Count on Me* by Miguel Tanco and help children to see that maths is about patterns. Look for patterns in their locality – place-based education. What patterns are on pavements, trees, leaves, tiles, and animals? Use the correct terminology – symmetry, spiral, concentric etc.

Development Matters (2021, p46) Personal, Social and Emotional Development: *Feel confident when taken out around the local neighbourhood and enjoy exploring new places with their key person.*

A young girl sees the world differently in this beautiful picture book celebration of maths. Everyone has a passion. For some, it's music. For others, it's art. For our heroine, it's maths. When she looks around the world, she sees maths in all the beautiful things: the concentric circles a stone makes in a lake, the curve of a slide, the geometric shapes in the playground. Others don't understand her passion, but she doesn't mind. There are infinite ways to see the world. And through maths is one of them.

Maths is not just numbers but shapes and patterns.

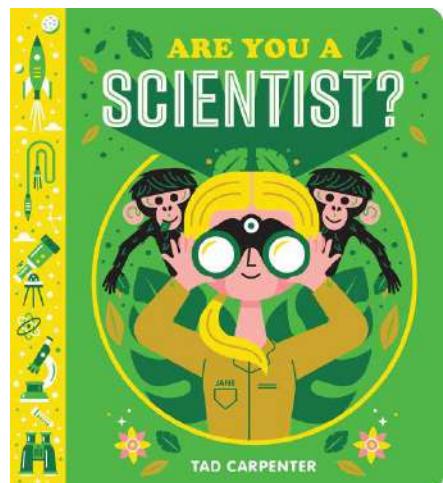


Development Matters (2021, p86)
 Provide patterned material – gingham, polka dots, stripes etc. – and small objects to arrange in patterns. Use words like "repeated" and "the same" over and over.



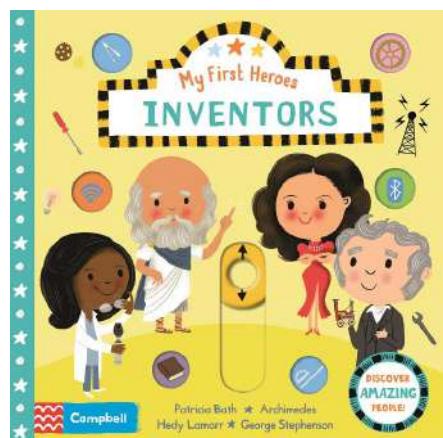
Read together and discuss: *Are You a Scientist?* by Tad Carpenter.

An engaging and super-cute STEM-themed lift-the-flap introduction to famous scientists like Jane Goodall, Stephen Hawking and Mae Jemison! Jane wants to watch the chimpanzees. What tool does she use? Binoculars! In this simple, boldly illustrated lift-the-flap board book, little readers will discover simple facts about five different scientists, each in a different field. Kids will meet: Jane Goodall, Marie Curie, Stephen Hawking, Mae Jemison and Charles K Kao. Each spread describes something scientists do or study, then includes a satisfying lift-the-flap that reveals a scientist in action using a familiar tool! A perfect introduction to exciting science role models. This links to SDG 5 on gender roles.



The *My First Heroes* set introduces children to artists (creativity), inventors (all aspects of STEM), explorers (science), eco-warriors (science), and space (STEM). Push, pull and slide the scenes to find out about Archimedes, Patricia Bath, George Stephenson and Hedy Lamarr, and be inspired by their incredible work.

With scenes to explore, fun facts to learn and bright, bold illustration by Nila Aye, this is the perfect introduction for inquisitive pre-schoolers to these amazing inventors.



Within Steiner Waldorf kindergartens, children are introduced to warm technology. These are everyday appliances which they must use, clean and mend when necessary. They learn sustainable skills such as wool felting, sewing, knitting, weaving and understand about responsibility to the planet. Examples of warm technology which you could also incorporate into practice are a corn grinder, mortar and pestle, and wool fleece brushes.

https://foundationyears.org.uk/wp-content/uploads/2011/10/Guide_to_the_EYFS_in_Steiner_Waldorf_settings1.pdf

Ensure both girls and boys are given equal access to engineering activities (SDG 5) within the setting. Consider your "enabling environments" and ensure children have the time and space to design, create and recreate buildings and structures.

Development Matters (2021, p70) *Create obstacle courses that demand a range of movements to complete...*

Development Matters (2021, p89) *Provide complex train tracks, with loops and bridges, or water-flowing challenges with guttering that direct the flow to a water tray, for children to play freely with.*

Encourage children to use a range of equipment. These might include: wheeled toys, wheelbarrows, tumbling mats, ropes to pull up on, spinning cones, tunnels, tyres, structures to jump on/off, den-making materials, logs and planks to balance on, A-frames and ladders, climbing walls, slides and monkey bars.

Use large scale materials to build their own towns.

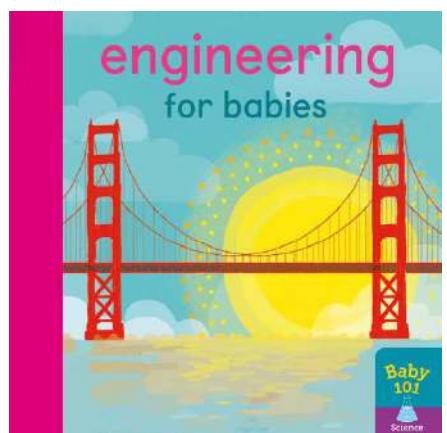


Resource the setting to provide different styles of building/construction materials that challenge both gross and fine motor skills.



Original early years pioneer Froebel's gifts inspired architect Frank Lloyd Wright: <https://www.froebelweb.org/web2000.html>

Ensure your library or reading basket has a variety of STEM texts to engage the children – such as *Engineering for Babies* by Jonathon Litton.



It's never too early to get an A* in engineering! Here's a fun new board book series that introduces a wide array of non-fiction subjects to babies and toddlers. Babies will love learning all about engines, bridges and tunnels, and how they are made.

4.6 By 2030, ensure that all.....achieve literacy and numeracy.

All learners need to have the basic competencies to read and count. See the prime areas of communication and language and the two specific areas, mathematics and literacy.

The Reggio Emilia approach advocated the use of child-initiated projects through multimodal ways of learning. Using thinking pads (A3 art pads) provides opportunities to document investigations/thinking visibly – but the children must make the marks. By encouraging children to articulate their thinking and see the visibility of it on paper, this will help them to make the connections between speech and literacy. Through the projects, children can engage in many ways of using both numeracy (audits/tallies/estimations) and literacy (posters, stories, experiments) in authentic ways. Literacy is not just about phonics.

Revisit Inspired Learning and utilise the ideas of facilitation.

[Project - Sharmed - Shared Memories and Dialogues](#)

SHARMED aims to promote new experiences of teaching and learning in multicultural classrooms, with specific consideration given to respect of cultural differences and promotion of intercultural dialogue.

The project promotes children's inclusion and learning, by encouraging children's work on their personal and cultural memories, and children's participation in dialogue in classroom, telling and negotiating stories of themselves and their background.

The project implements children's collection and production of visual materials on their own memories; involvement of children's families in this action; facilitation of description, comparison and sharing of materials and memories in classroom; a web platform including an archive with these materials. These actions can (1) give a voice to migrant-background children and their classmates (2) foster their motivation (3) provide personalised support for their learning (4) develop their participative approach to learning (5) strengthen collaboration between children's families and schools.

Development Matters (2021, p10) *Children are powerful learners. Every child can make progress in their learning, with the right help. Effective pedagogy is a mix of different approaches. Children learn through play, by adults modelling, by observing each other, and through guided learning and direct teaching.*

SDG 5: Achieve gender equality and empower all women and girls.



Achieve gender equality and empower all women and girls

Possible STEM provocations for SDG 5:

5.1 End all forms of discrimination against all women and girls everywhere.

5.3 Eliminate all harmful practices, such as female genital mutilation – in line with the Prevent Terrorism act (2015) – 3.6 EYFS (DfE, 2021, p22).

<https://www.gov.uk/government/publications/safeguarding-children-and-protecting-professionals-inearly-years-settings-online-safety-considerations>.

5.4 The promotion of shared responsibility within the household.

Whilst discussing shares/sharing – highlight participation is also equitable. Develop room/class rules and encourage all to think of how they could look after their shared space together. Emphasise the importance of community here – develop relationships with different groups, e.g. litter patrols.

5 b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of (girls) women.

Development Matters (2021, p104) *Plan and introduce new vocabulary related to the occupation, and encourage children to use it in their speech and play. Consider opportunities to challenge gender and other stereotypes.*

New terminology – empower – gender – equality.

This goal highlights the need for both boys and girls to recognise that equal opportunities must be offered to everyone. How do you demonstrate equality?

This is a maths problem – use practical means to demonstrate what is equal.

For example, a cake/pizza is cut into uneven slices – share out – discuss whether this is a fair distribution. If not, why not? How do we rectify it? Help children to understand that equal must mean shared for all. Ask them to talk about any times they felt something was not fair – or inequitable? Try to use the correct language.

Development Matters (2021, p19) *Help children to extend their ideas through sustained discussion that goes beyond what they, and you, have noticed. Consider "how" and "why" things happen.*

Watch together: Equal Parts: https://www.youtube.com/watch?v=MVzlbOK_vhU

Maths: Give me Half! by Stuart Murphy:

<https://www.youtube.com/watch?v=hVaxiJB6Fls>

Introduces the children through a story fractions of $\frac{1}{2}$ and a whole, plus symbols = and + – consolidates fair/equal/share – follow on activities:

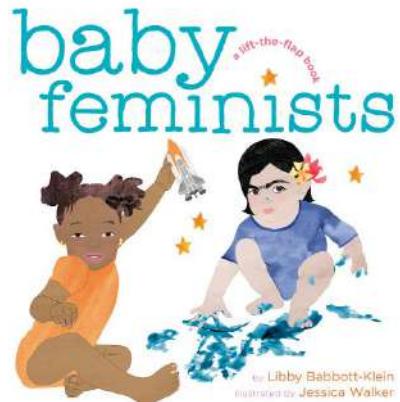
<https://www.mathstart.net/give-me-half.html>

Link to EYFS (DfE, 2021, p14): Numerical Patterns - Verbally count beyond 20, recognising the pattern of the counting system; - Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity; - Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Read a selection of books together that introduce new terminology to the children. Pose questions before you start.What is a feminist? What is gender?

Baby Feminists by Libby Babbot-Klein (ages 2-3).

What do Ruth Bader Ginsburg, Mae Jemison, Frida Kahlo, Barack and Michelle Obama, Gloria Steinem, Dorothy Pitman Hughes, Billie Jean King, Yoko Ono, and Malala Yousafzai have in common? They're all feminists, and they were all once babies! This irresistible and timely board book invites you to lift the flap and discover what your favourite feminist icons might have looked like as babies and toddlers, with an inspiring message that any baby can grow up to make the world a better place for all genders.



You need to emphasise that all girls can do whatever they want (as can boys) - try to have a gender-reduced setting with boys allowed to freely draw/dress up in dresses and girls to build.

Development Matters (2021, p90) *Provide a variety of construction materials like blocks and interlocking bricks. Provide den-making materials. Allow children to play freely with these materials, outdoors and inside. When appropriate, talk about the shapes and how their properties suit the purpose.*

Occasionally suggest challenges, so that children build increasingly more complex constructions.



Credit: Evie Boyd

Development Matters (2021, p106) *Ensure that resources reflect the diversity of life in modern Britain.*

Barack and Michelle Obama are the executive producers introducing you to Ada Twist the scientist – challenging stereotyping of roles and gender.

<https://www.youtube.com/watch?v=OM3sfjTGkkM>

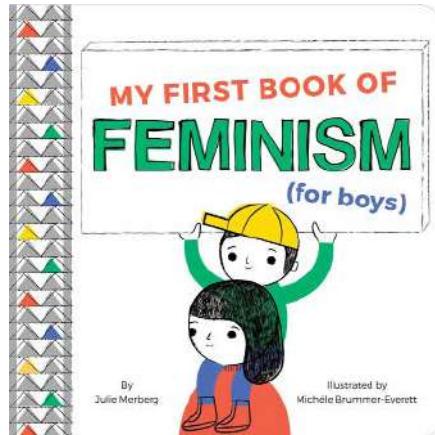
Avoid colour gender issues too - encourage boys to like pink and girls to like blue. Find out favourite colours in the room/class - mix and make colours in experiments. Look at catalogues and discuss the colours in toys for boys and girls. Audit favourite toys of boys and girls. Ask why they are their favourite. Unpick the idea of boy toys and girl toys. Find out if there are toys they would like in the setting too.

Boys used to wear pink – here's when it changed:

<https://www.thevintagenews.com/2019/05/01/pink-blue/>

My First Book of Feminism (for Boys) by Julie Merberg (preschool and up).

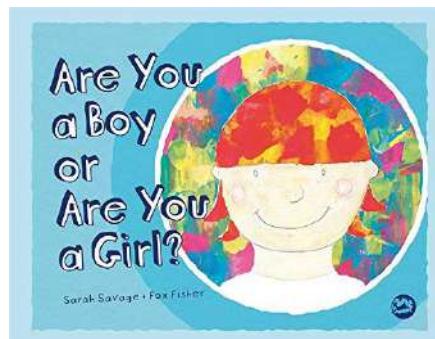
Simple illustrations paired with engaging, rhyming text make the compelling, age-appropriate argument that girls and boys are equal, plain and simple. Humorous scenarios are treated as teachable moments for very young boys (ages 0-3) who will ideally grow up without ever questioning women's equality.



Before/afterwards, talk with the children and find out roles/occupations of parents/family. Invite family members in to talk about their jobs.

Discuss with the children what jobs/activities they like and why. Develop a questioning ethos.

Read: *Are You a Boy or Are You a Girl?* by Sarah Savage and Fox Fisher (ages 3+).



This colourful picture book follows Tiny, a child who likes dressing up and playing games, but doesn't like telling nosy people whether they're a boy or a girl. This book is a great starting point for parents to address the idea of gender identity with their children.

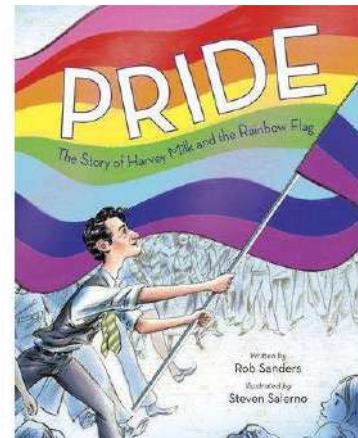
Before/afterwards, record with the children what they consider to be the differences or similarities of a boy and a girl. Pose questions for testing – are boys quicker at putting on their shoes? Can girls build a higher tower? All questions can have a STEM theme – but record/time and demonstrate how to visibly share results.

Link here to rainbows in **SDG 13** but consider it from a LGBTQ perspective.

This text supports the discussion:

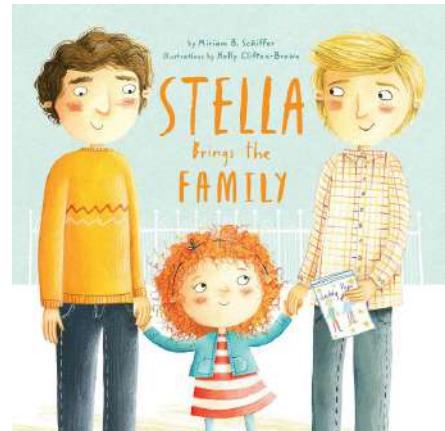
The very first picture book about the remarkable and inspiring story of the Gay Pride Flag! By Rob Sanders. In this deeply moving and empowering true story, young readers will trace the life of the Gay Pride Flag, from its beginnings in 1978 with social activist Harvey Milk and designer Gilbert Baker to its spanning of the globe and its role in today's world.

Reflect upon how there are different parenting and family dynamics.



Text: *Stella Brings the Family* by Miriam Schiffere.

Stella's class is having a Mother's Day celebration, but what's a girl with two daddies to do? It's not that she doesn't have someone who helps her with her homework, or tucks her in at night. Stella has her Papa and Daddy who take care of her, and a whole gaggle of other loved ones who make her feel special and supported every day. She just doesn't have a mom to invite to the party. Fortunately, Stella finds a unique solution to her party problem in this sweet story about love, acceptance, and the true meaning of family.



Northern Ireland has developed an anti-bias curriculum – this may offer some useful thinking to support SDG 5:

<https://www.nicie.org/schools/anti-bias/>

It is important children learn to think critically and challenge. To be empowered, children have to be resilient, prepared to have a go and confident – see characteristics of effective learning EYFS (DfE, 2021, p16).

Playing and exploring – children investigate and experience things, and "have a go"

Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements

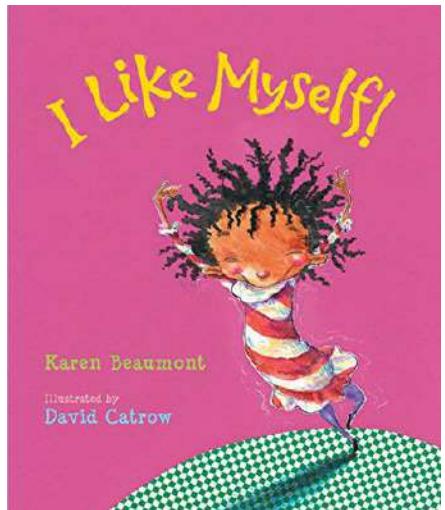
Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things.

Read together: I Like Myself! By Karen Beaumont.

High on energy and imagination, this ode to self-esteem encourages children to appreciate everything about themselves – inside and out.

Activity to follow – ask each child to say something they like about themself and another child in their group. Decide how to record it – make a class book using different multimodal ways/technology and call it **We like ourselves!**

The message must be about empowerment and that we are all the same. Develop an ethos of kindness and listening.



Development Matters (2021, p48) Be open to what children say about differences and answer their questions straightforwardly. Help children develop positive attitudes towards diversity and inclusion.

Help all children to feel that they are valued, and they belong.

(Development Matters, 2021, p102) Model positive attitudes about the differences between people, including differences in race and religion. Support children's acceptance of difference. Have resources which include:

- Positive images of people who are disabled
- Books and play materials that reflect the diversity of life in modern Britain including racial and religious diversity
- Materials which confront gender stereotypes.

SDG 6: Ensure availability and sustainable management of water and sanitation for all.

Possible STEM provocations for SDG 6:

Terminology – sanitation – pollution – conserve – contamination.

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Discuss with the children ways to collect rainwater.

Have a rainwater butt outside to collect water for use – water plants or water play.

Discuss with the children that not everyone can have access to lots of water – in Kenya the children made tippy taps to use outside. Make your own and help children to see how hard it is when water is restricted.

<https://www.wateraid.org/uk/sites/g/files/jkxoof211/files/schools-challenge-ks1-tippy-tap-instructions.pdf>

Development Matters (2021, p104) *Provide mechanical equipment for children to play with and investigate.*

Suggestions: wind-up toys, pulleys, sets of cogs with pegs and boards.

Children in Australia must conserve water too as it is scarce. Discuss what 'conserve' means and why it may be scarce. Reflect upon the impact of no water.

At this nursery, children had to use their co-ordination to limit the amount of water they took – one ladle of water each. Try this out and discuss how this feels – compare life here and in Kenya/Australia. Record mathematically how long your water butt lasts.

Development Matters (2021, p106) *Know that there are different countries in the world and talk about the differences they have experienced or seen in photos.*

Encourage children to talk about the differences they notice between people, whilst also drawing their attention to similarities between different families and communities. Discuss how to keep their gardens watered – question which is best? Hose, sprinkler or watering can? Experiment with the amount of water used. Revisit "conserve".



Tippy taps – credit: Lilian Arieno Oloo, OMEP, Kenya



Credit: Sharon Kemp, Brisbane, Australia

EYFS (DfE, p16) Understanding the World: know some similarities and differences between the natural world around them and contrasting environments.

Children might pose the question: "why should I conserve water?" They can turn a tap on and water flows. This book by Jen Green is a starting point for developing strategies with the children on things they can do at school and home to conserve water.

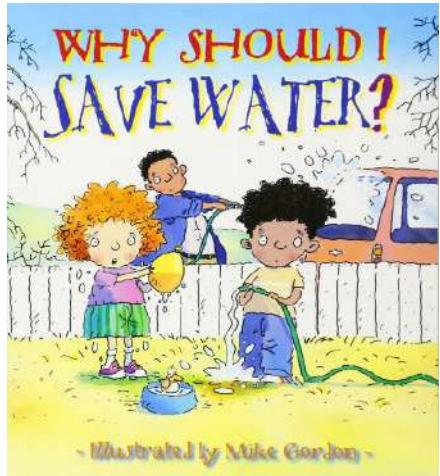
Look at images of dried up lands and think about how animals/plants can manage - conduct basic water experiments with plants.

EYFS (DfE, 2021, p16) Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

What is water pollution video:

<https://www.youtube.com/watch?v=Om42Lppkd9w>



Read: We Need Water by Charles Ghigna. This explores the world of water, reminding readers that it is important to keep water clean together and discuss what makes water dirty. Why should we not drink dirty water – what might happen to us? Who else needs water besides us? Experiment with different sieves to "clean" water.

Turn Dirty Water into Clean Water! https://www.youtube.com/watch?v=vh_63fV1gl

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

Read I Am Water by Jean Marzollo. A review for this highlights that this book "is a simple read about all the purposes and forms of water. The book talks about water being home for the fish, rain for the earth, humans drink it, plants use it grow, etc".

Watch together and discuss what words like 'contamination' mean.

The Water. Looking after our Planet / Educational Video for Kids.
<https://www.youtube.com/watch?v=bGWr5jXJfbs>



6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all.....

6b Support and strengthen the participation of local communities in improving water and sanitation management.

Encourage children in their own understanding of keeping clean and healthy – link back to discussions on Covid. Remind children of the importance of hand washing. Sing the hand washing song and wash for over 20 seconds.

Like pioneer Margaret McMillan in 1919, give each child their own brush/face cloth to use and care for.

Remind children not to use wipes (and management of settings) as they block drains and kill sea life (**SDG 14**).



<http://www.wateraidgames.org/>

<https://www.wateraid.org/uk/sites/g/files/jkxoof211/files/handwashing-activities-for-under-5s-clean-hands-healthy-bodies.pdf>

To help children understand water, use physical development sessions to "be" water – develop water dances – tumble, roll, splash, in and out. Source water music or ask the children to make their own water music/instruments to go with their dance. Use all forms of technology to support this process.

Link to indigenous thinking dances to bring the rain.

Water Dance: <https://www.youtube.com/watch?v=xa9DxWqsfPE>

EYFS (DfE, 2021, p15) *Perform songs, rhymes, poems and stories with others, and – when appropriate – try to move in time with music.*

Development Matters (2021, p115) Expressive Arts and Design: *Move and Dance to Music.*

Development Matters (2021, p75) Literacy: *You could learn songs and rhymes from parents. You could also teach parents the songs and rhymes you use in the setting, to support learning at home.*

Help children to understand the science of water. Watch the Water Cycle Video to understand water and why to conserve it. Ensure texts are available for children to reflect afterwards on the water cycle in the reading corner.

<https://www.youtube.com/watch?v=y5gFl3pMvoI>

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all.

7 AFFORDABLE AND CLEAN ENERGY



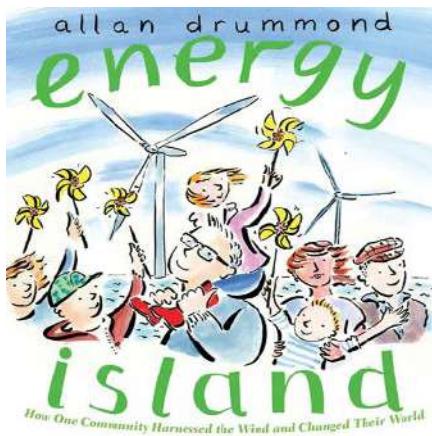
Possible STEM provocations for SDG 7:

7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.

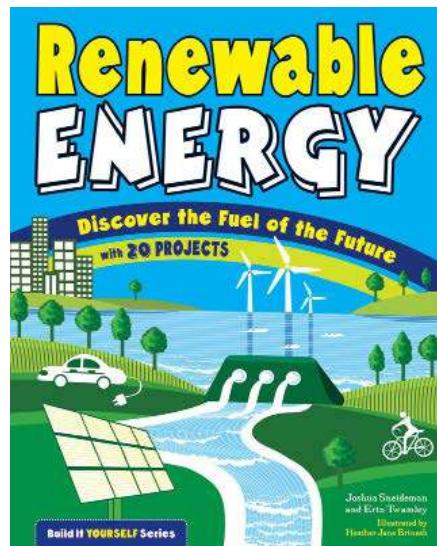
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.

7.3 By 2030, double the global rate of improvement in energy efficiency.

Terminology – energy – wind – power – wind turbines – renewable.



This book by Allan Drummond, *Energy Island*, considers how a community utilised the wind and changed their world.



This book on *Renewable Energy* by Erin Twamley introduces children to the diverse renewable energy sources.

Development Matters (2021, p105) *Explore and talk about different forces they can feel. Plan and introduce new vocabulary related to the exploration and encourage children to use it.*

To help them understand energy, use their bodies to help. What energy do they need to move? Discuss (link to SDG 1 and 2 and 3).

Get them to feel their heart beat – look at each other's faces after running – feel the sweat on their brow.

Development Matters (2021, p86) *Physical Development: Encourage children to be highly active and get out of breath several times every day.*

Energy makes things move – brainstorm things that move and consider how? Make a list of different types of energy – which are man-made and which are natural – introduce the idea of renewable energy.

Look at images of old windmills and how they worked. Make a water wheel and discuss how water is pushed through. Look at wind turbines – if you have some near you, go on a trip to look at them.

Let's look at Air and Wind:

<https://www.youtube.com/watch?v=A02GNVy115E>

Develop a wind box for outside play, filled with different textured materials to run with.

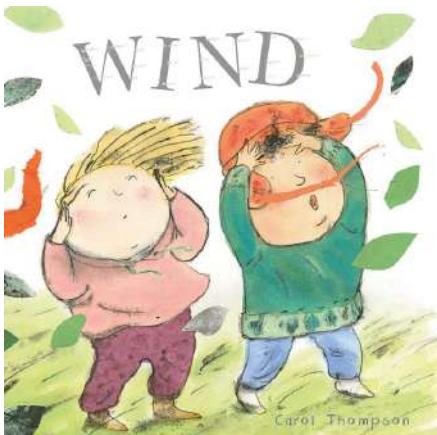
Make a windchime using recycled materials – experiment as to where is the best place to hang them for the "wind noise effect".

Look at this windchime on Rainy Day Mum:

Credit: <https://rainydaymum.co.uk/simple-wind-chime/>



Reflect on the materials used and the different sounds made.



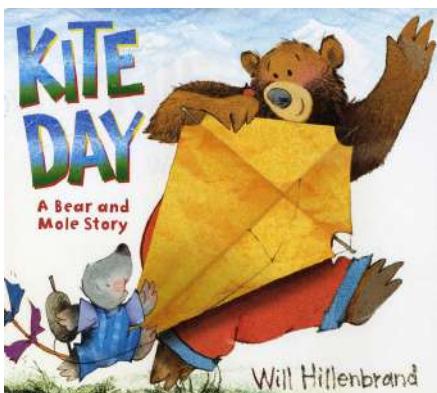
Read: *Wind: (Whatever the Weather)* by Carol Thompson.
Let's play out in the wind! There's a wealth of sights, sounds, smells, tastes and textures to discover and enjoy. In this series of richly illustrated books, Carol Thompson celebrates the immediate and sensory response of children to the natural world.

Go on a wind walk and listen to the sounds that the wind makes in the trees or windows rattling.

Read together: *Kite Day: A Bear and Mole Story* by Will Hillenbrand. Rushing home, he tells Mole, and the two fast friends get to work building a kite of their own. They study, and collect, and measure, and construct – and soon, their kite is flying high above the meadow.

But when a storm rumbles in – SNAP! – the kite string breaks, and all their hard work soars away. Chasing after it, Mole and Bear discover all is not lost – wedged in the branches of a tree, their kite protects a nest of baby birds from the pouring rain.

Make kites to use outside – trial/discuss why they may not work.



ELG Speaking Communication and Language: *Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary* (2021, p11).

Understand how the tilting of the kite makes it stay up in the air!

https://www.youtube.com/watch?v=mc3AUuu9_1

Make a windmill using recycled materials – again trial them – discuss if and how they work (or not).

How to make a windmill with 2 paper cups:

<https://www.youtube.com/watch?v=AWaOM3uDP80>

Example of windmills made using recycled plastic milk cartons.



Credit: Sharon Kemp,
Brisbane, Australia

Which source is more powerful, and which provides more energy – wind or sun? Read together the Aesop tale – watch the story: <https://www.youtube.com/watch?v=OGGvRtuxglM>

Create an energy plan with parents and children. Switch off lights – classroom temperatures – windows open if heating is on – monitor clothes that are worn inside and outside – awareness of seasonal temperatures.

Access utility reduction and energy monitoring for schools – monitors positioned so children can see the data. The software may be used in the classroom with children from the age of 4 upwards. Teachers are using the system in Maths, Science and PSHE to engage pupils with real-world energy awareness. With real-time, data actions and consumption can be directly linked.

Brainstorm what sources of energy can be used in a home – mains electricity – battery powered – solar panels – windmills. In the science area, have a tray of electrical components available for the children to investigate. Use the correct terminology at all times.

How to make a bulb light up with potatoes:

<https://www.youtube.com/watch?v=wZcQyTZJlzs>

Development matters (2021, p105): *Plan and introduce new vocabulary related to the exploration and encourage children to use it.*

Batteries can be recycled (alongside other items) – make this a community effort with a recycling trolley in the office space for families to donate. However, please be mindful that dead batteries must not be left unattended as they are a danger to children.



SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

8 DECENT WORK AND ECONOMIC GROWTH



Possible STEM provocations for SDG 8:

8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.

8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.

EYFS (DfE, 2021, p10) Understanding the World: *The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters.*

Terminology – economics – entrepreneurship, creativity and innovation.

Define what these words mean – with the children write your own definition in their language.

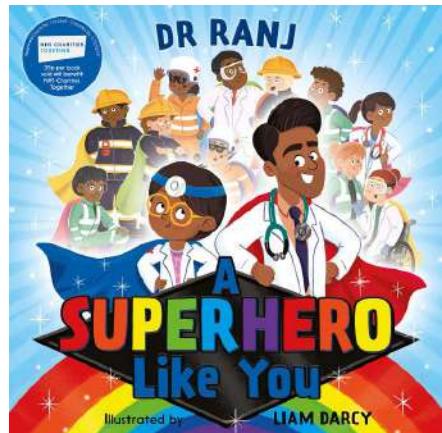
As noted, a key element of education for sustainability is creativity and divergent thinking. Children need to be able to contribute to their future and the planet, and therefore practitioners must provide a wide range of opportunities that challenge, provoke, and support children's characteristics of effective learning. This goal represents children developing not just creativity but practical transferable skills, which also impact upon their physical development too.

Reflect upon different jobs/titles – use the correct terminology – greengrocers – cobblers – butchers.

Link to economic sustainability – take a walk down your local high street – look at the shops and go inside to meet the workers. Use money and buy snack materials at the greengrocers so children experience real money (Maths) in the locality. Link to economic sustainability.

Read together: A *Superhero Like You* paperback by Dr Ranj Singh – links to SDG 5 – anyone can be.... whatever.

Join Lily as she meets the extraordinary superheroes all around us, from doctors, teachers and air ambulance paramedics to scientists, recycling truck drivers and carers. Discover the amazing work these real-life heroes do using their incredible superpowers of kindness, care and love. This uplifting picture book celebrates key workers, and shows little readers that we all have the potential within us to be superheroes.



EYFS (DfE, 2021, p9) Physical Development: *Gross motor skills provide the foundation for developing healthy bodies and social and emotional well-being. Fine motor control and precision helps with hand-eye co-ordination, which is later linked to early literacy.*

Provide children with lost skills that represent their culture such as weaving, knitting, sewing and woodwork. Let the children design their own sewing pattern – the adult will need to make the sewing hole, but little fingers can use large needles.



Credit: The following 3 images are credited to Everton Children and Family Centre.



Encourage intergenerational learning – invite elders from the local community to share traditions, such as knitting clubs.

Purchase large wooden weaving frames and support both cultural skills as well as fine motor abilities.

Either use a commercial lucet or knitting fork:
https://www.youtube.com/watch?v=GqZktcC_2NU

Or alternatively make your own recycled knitting forks (from toilet rolls and lolly sticks) and support their fine motor skills.



By involving the local elders, the children will hear their stories from their community – e.g. pom poms hanging from prams by safety pins. Reflect on the different pram toys available now. Children also like to make pom poms – but rather than use a cardboard template, wind the wool around three fingers, peel off slowly, tie together and snip both ends to make a 3-minute one! Watch the pom pom video: <https://www.youtube.com/watch?v=zok9hqyhTQ4>

Bring generations together – young and old to share skills and stories. This is a lovely BBC film that shows how bringing intergenerational learning into early years is so successful. Thanks to Everton Children and Family Centre (Dr Lesley Curtis) and Jessie Philips of the BBC.

The Legacy Cafes (Boyd, 2018):

<https://www.facebook.com/BBCFamilyNews/videos/1858192130910512/>



Ensure children use real tools, not plastic imitations – mending punctures teaches children about science as well as sustainability. Link here to SDG 5 and 10 to demonstrate that all skills/modelling mending is by both male and female practitioners/parents.

Teach children how to mend and sustain their toys and items and encourage parents to support these ventures and learn new skills.

Do an audit of parents/carers/grandparents to see what skills they have they can share. Invite them into the setting to support the development of sustainable mending skills!

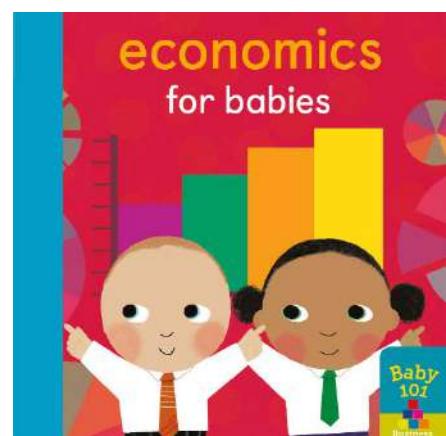
Development Matters (2021, p69) *Offer children activities to develop and further refine their small motor skills.*

Suggestions: threading and sewing, woodwork, pouring, stirring, dancing with scarves, using spray bottles, dressing, and undressing dolls, planting and caring for plants, playing with small world toys, and making models with junk materials, construction kits and malleable materials like clay.



Engage in community economics – children can make items or grow food, either in school or at home. – Sell them to raise money, and as a group the children decide what to buy that they need. Start to teach about the economy – use the right language – talk about how everyone is entitled to work in a fair world. Brainstorm what is a fair world. Examples could be cake sales – Christmas cards – but help children to understand the economy.

Read together: *Economics for Babies* by Jonathon Litton – children will love to read about economics and how it affects their daily lives.



SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Possible STEM provocations for SDG 9:

New/key terminology – industry – infrastructure. Revisit – creativity – entrepreneurial – innovation.

Revisit previous thinking around creativity and research – a key element of not just future living but education for sustainability. Link back to SDG 8 and revisit economy – jobs.

9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.

Discuss with the children what infrastructure means and brainstorm different methods of travel/transport. Read useful information books that highlight different transport vehicles.

Things That Go! by Stephen Lomp is an exciting way to introduce babies to the many different vehicles that fly, drive, sail, race, dig, and dump. What an exciting, fast-moving world we live in.

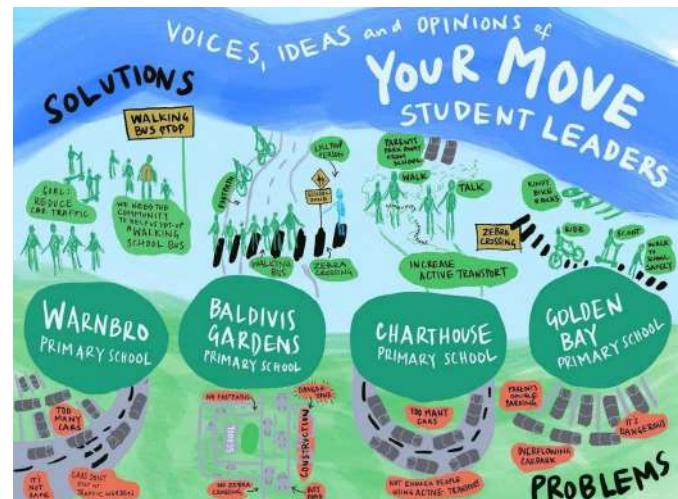


Do an audit and make a graph to see which modes of transport are used the most frequently. Pose questions about potential link to renewable energy, **SDG 7**, ask if children have seen any electric cars/buses.

Development Matters (2021, p93) Discuss the different ways children might record quantities (for example, scores in games), such as tallies, dots and using numeral cards.

Have a walk to school or nursery week – emphasis how it is not just good for the planet but health-wise too. Design a poster about ways of helping their environment and coming to school.

This example was designed by Zoe Street: Your Move and Millennium Kids, Perth, Australia.



Do an audit of how many types of transport vehicles go past each day.

Listen to the different noises they make. Record them and discuss. Electric cars are quieter – is that good?

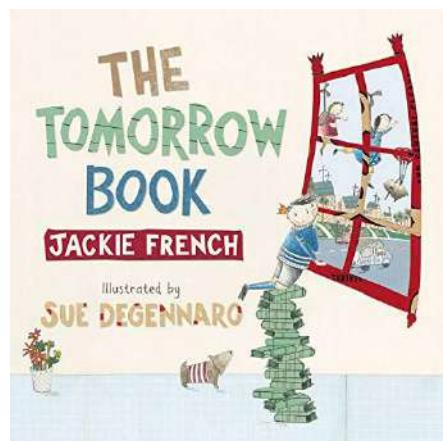
Place-based – **SDG 4** – take a group/class bus/ferry trip and use real money. Use your locality to support children's understanding of their community.

Carbon footprint – highlight to the children how simple actions are having an impact upon the living world. Twinkle provides free downloadable resources to help understand your carbon footprint: <https://www.twinkl.co.uk/resource/t2-g-3762-earth-day-what-is-your-carbon-footprint-powerpoint>

Ask the children what they think their town needs? Does it have a railway station, bus stops or an airport? Do an audit of what is there. Look on Google Earth and see the resources that are available.

Read *The Tomorrow Book* By Jackie French.

This is a book about the possibilities from the greener world of tomorrow and is suitable for ages 4-8. It's a timely picture book about a young prince who is determined to rule over a country where the future is filled with environmental hope – and practical solutions, such as common usage of solar and wind power. Lively, fun and positive, this book serves to give young people information about their world and shows them that a lot of environmental solutions are simple and relatively easy to put in place. Produced on recycled paper to reflect the message within, this is a beautiful book. Winner of the Wilderness Society's Environment Award for Children's Literature.



The image below is from a Tomorrow Town Project in a kindergarten in Sydney, Australia.

Credit: Rebecca Bonar, Belrose Public School, Sydney, Australia

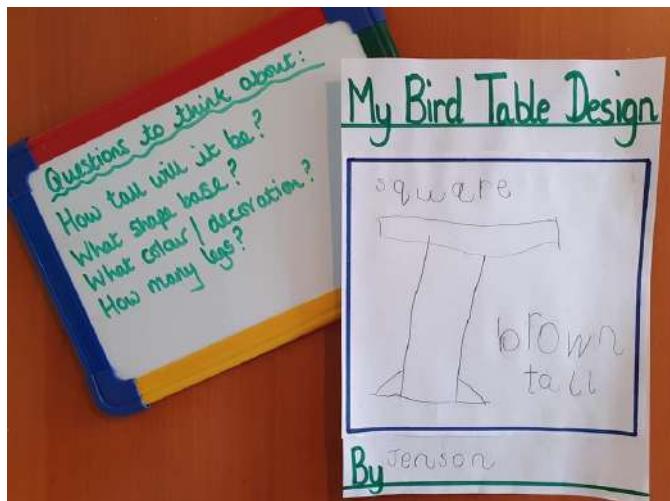
Use multimodal ways of thinking (**SDG 4** Reggio Emilia) and develop a town with infrastructure and energy (**SDG 7**). Take time – it can be added to – involve parents/grandparents and the local community. Provide resources that support children's understanding of transport systems.

EYFS (DfE, 2021, p15) Creating with materials: *Share their creations, explaining the process they have used.*



Development Matters (2021, p97) Mathematics: *Select, rotate, and manipulate shapes in order to develop spatial reasoning skills.*

As noted, creativity is crucial for sustainability and children need opportunities to design structures.



Credit: Jenson Boyd

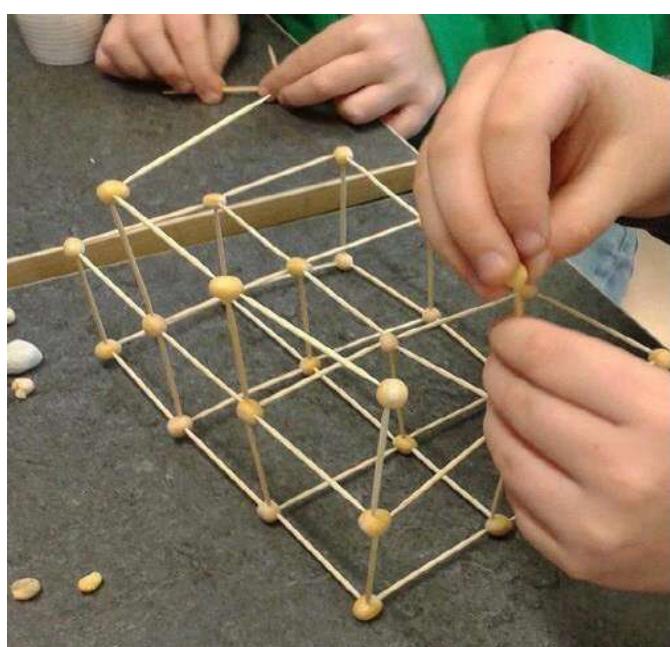
This is an example of the early design of a bird table. When designing items, pose questions about design – about materials to use. Question and evaluate the process as the children develop and make their creations. Link here to Froebel again with the idea of evaluating and amending designs rather than just starting again. This example is a combination of all aspects of STEM.



Another example shows a design for a Tomorrow Town home.

Credit: Rebecca Bonar, Sydney

Let the children share and celebrate their town – make a video (technology). Froebel's gifts introduced children to construction – use different materials such as his "pinpoints" to understand structures.



Development Matters (2021, p89)
Mathematics: *Talk with children about their everyday ways of comparing size, length, weight, and capacity. Model more specific techniques, such as lining up ends of lengths and straightening ribbons, discussing accuracy: "Is it exactly...?"*

Intergenerational learning – ask grandparents/elders of community to talk about transport in their early years. Compare images and energy use – carbon footprint.

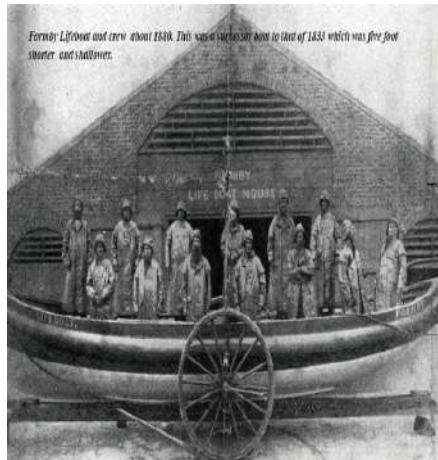
Consider all forms of transport – cars, bicycles, aeroplanes, boats. Visit museums that have transport through the ages displays.

Development Matters (2021, p108) Present children with pictures, stories, artefacts, and accounts from the past, explaining similarities and differences.

Offer hands-on experiences that deepen children's understanding, such as visiting a local area that has historical importance. Include a focus on the lives of both women and men.

Show images of familiar situations in the past, such as homes, schools, and transport.

Look for opportunities to observe children talking about experiences that are familiar to them and how these may have differed in the past.



Ask children to compare old and new transport systems – how are they different? How do they move?

EYFS (DfE, 2021, p10) Understanding the World: *The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries, and museums to meeting important members of society – such as Lifeboat men.*

Discuss issues of safety in water using Royal National Lifeboat Institution resources:
<https://rnli.org/youth-education/education-resources/lower-primary>

Design a map of their community – add the pathways and access points. Look at old maps and compare how it has changed.

Design towns of tomorrow (see earlier) and make maps of their designs. Use map terminology – this example was from the Tomorrow Town Project highlighted.

Credit: Rebecca Bonar, Belrose Public School, Sydney, Australia



9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries – in particular developing countries – including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.

When starting these projects, remember to follow the children's thinking rather than your own. Encourage researching at home, work with parents and grandparents to develop co-researching – local libraries – as well as in the setting/nursery. Group collaboration encourages conversations and sustained shared thinking.

EYFS (DfE, 2021, p16) *Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things.*

Interesting read about creativity in the universe:

<https://creativesystemsthinking.wordpress.com/2014/10/16/how-we-participate-in-the-creative-experience-of-the-universe/>

Listen to the children – this image reflected their view of a lack of beach bins and poor adult choices in where they threw away their rubbish – "adults don't care" (Rosie, aged 4). This was their voice about the resources in their community.

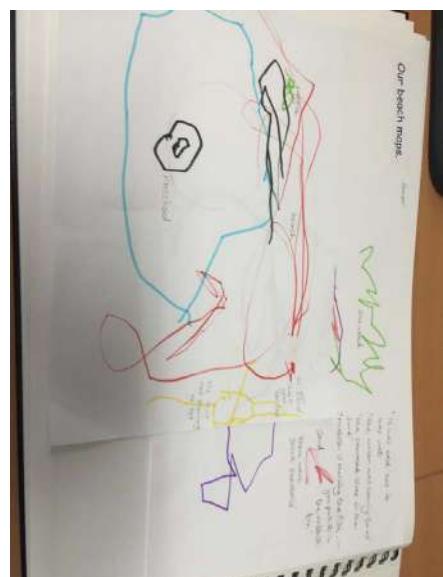
Develop a beach bin campaign and engage the community – links to all three pillars of sustainability.

EYFS (DfE, 2021, p9) *Literacy: Language comprehension (necessary for both reading and writing) starts from birth. It only develops when adults talk with children about the world around them and the books (stories and non-fiction) they read with them.*

This is why the books you choose to share are important.



Credit: Jenson Boyd



10 REDUCED INEQUALITIES



SDG 10: Reduce inequality within and among countries.

Possible STEM provocations for SDG 10:

New terminology – refugee – migration.

10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.

Link back to **SDG 5** – revisit equality – fairness and choices made.

EYFS (DfE, 2021, p12) Building Relationships: *Show sensitivity to their own and to others' needs.*

Links to British Fundamental Values: <https://foundationyears.org.uk/wp-content/uploads/2017/08/Fundamental-British-Values-in-the-Early-Years-2017.pdf>

Reflect on the Black Lives Matter campaign. Discuss what it means to them? Consider the community/locality. Consider images of players "taking the knee".

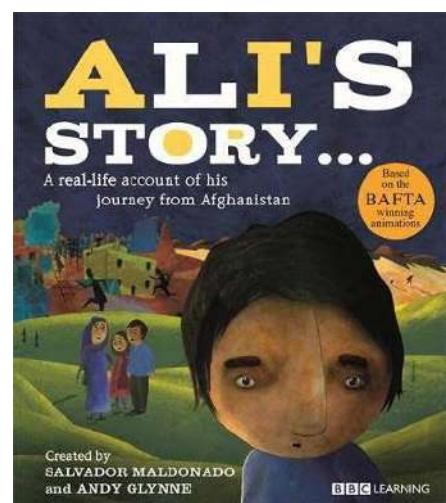
Wales is the firsty country in the UK to embed Black Lives Matter into their curriculum (2022) – it is a mandatory "statement of what matters".

Birth to Five Matters (2021, p5) notes Black Lives as an example of "contemporary issues" that must be discussed. Links to UNCRC (1989).

Discuss what "matters" means and ask what matters to them? Reflect on both human and non-human matters.

Reflect upon different children through provocations, such as:

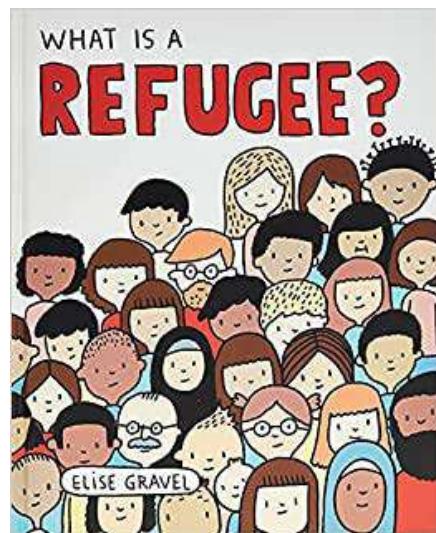
A documentary that could be shared with young children. This is an animated documentary following the plight of a young ten-year-old boy and his grandmother during the war in Afghanistan- BBC.co.uk Seeking Refuge Series.



Read together and discuss: *What is a Refugee?* by Elise Gravel.

This illustrated, accessible book introduces young readers to the term "refugee." This timely picture book answers questions children may have about refugees, including who they are, why they leave their own country, and why they are sometimes not welcome in their new country. (Ages 3-7)

Brainstorm how they felt when they did not feel comfortable. Look at maps and see where refugee children have travelled from. Revisit transport and consider how dangerous it can be. Please be mindful of the community you are in – are there refugee children in your setting/nursery?



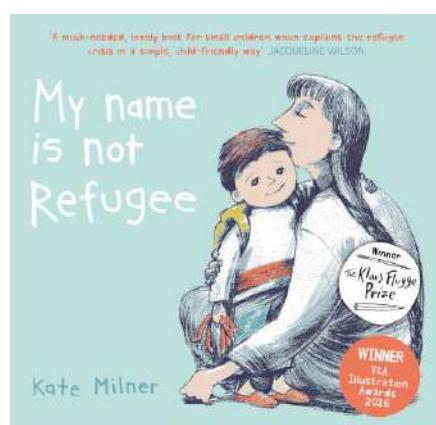
CHILD-UP focuses on migrant children with the aim of fostering the understanding of their social integration within schools and their active participation for a successful inclusion. This objective is achieved through an innovative research approach focused on the concept of children's agency.

[Child UP \(child-up.eu\)](http://child-up.eu)

10.7 Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies.

Read together and discuss: *My Name is Not Refugee* by Kate Milner.

A young boy discusses the journey he is about to make with his mother. They will leave their town, she explains, and it will be sad but also a little bit exciting. They will have to say goodbye to friends and loved ones, and that will be difficult. They will have to walk and walk and walk, and although they will see many new and interesting things, it will be hard at times too.



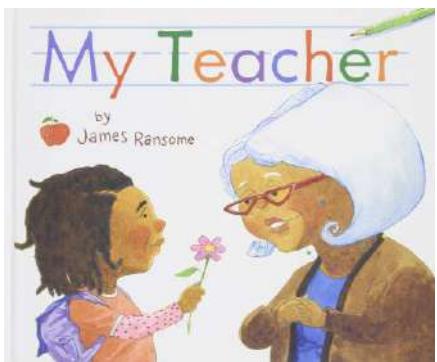
A powerful and moving exploration that draws the young reader into each stage of the journey, inviting the chance to imagine the decisions he or she would make.

Watch and listen:

<https://www.youtube.com/watch?v=q9n1plse2K4>

Reflect upon ageism – discuss with the children what does old age mean? Do children have stereotypes of the elderly? Challenge these biases.

Read together: *My Teacher* by James Ransome.



With your developing relationship with the community elders, reflect upon that not all children will have a grandparent – they may live far away and this initiative will support intergenerational learning.

Another example of working together across the generations:

https://www.youtube.com/watch?v=VSG_FCQ10fA

Useful reading – Global Dignity report /SDGs:

<https://datareportal.com/reports/digital-2021-global-overview-report>

EYFS (DfE, 2021, p14) Understanding the World – *People, Culture and Communities*: Explain some similarities and differences between life in this country and life in other countries, drawing on knowledge from stories, non-fiction texts and – when appropriate – maps.

It is important to remember to consider the non-human world – what and who else migrates?



Reflect upon how habitats are being destroyed and as a consequence birds and animals are losing their homes. Think about foxes coming into towns looking for food – houses being built on green spaces. Research campaigns about different habitats and get involved – for example, hedgerows.

Why and how do birds migrate? Look at the patterns (Maths) birds make as they fly together.

Familiarise yourselves with the native birds that live in your locality over the year. Observe their migration patterns and use picture charts to help the children observe them in their bird hides. Recognise the seasonal changes that occur in the garden/setting. Devise a tally system to support their understanding of counting observations. Discuss how you could help birds during this period and notice any birds that seem to not be returning – keep year-by-year tallies to analyse as a group. Pose questions – what does this mean and why?



Bird Watch Tally		
Name	Tallies	Total
Pinkfeet		
Blue Tit		
Chaffinch		
Great Tit		
Hedge Sparrow		
Mistle Thrush		
Robin		
Siskin		
Wood Pigeon		
Linnets		

Credit: Jenson Boyd

Read together this lovely migration story: *Coming Home* by Michael Morpurgo.

EYFS (DfE, 2021, p15) Understanding the World – The Natural World: *Understand some important processes and changes in the natural world around them, including the seasons (patterns of seasonal migration).*

A plucky little robin sets out on an epic journey. Through dark forests, driving rain, clapping thunder and flashing lightning. Across frozen wastes, huge mountains and stormy seas he flies. And all the while he's dreaming of home. Of her. But will he ever get there? Find out in this wonderfully lyrical Christmas story from the brilliant Michael Morpurgo.



Talk about how birds migrate at different times of the year and why.

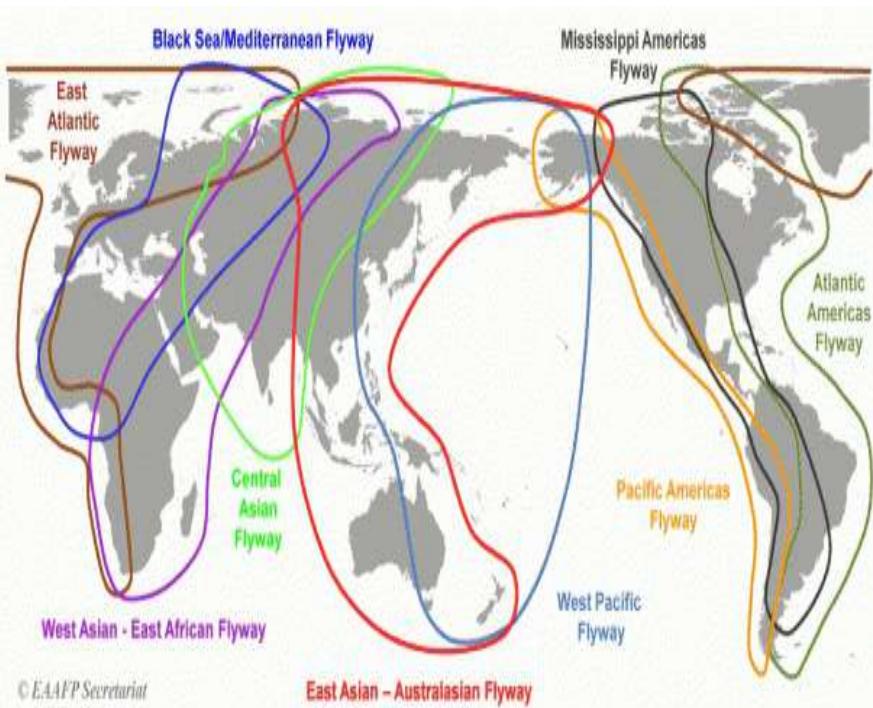
Migration of Birds: <https://www.youtube.com/watch?v=mfbIPJMQr8Y>

<https://www.youtube.com/watch?v=hMAS4SdPj-w>

Development Matters (2021, p110) Understanding the World: *Use images, video clips, shared texts and other resources to bring the wider world into the classroom. Listen to what children say about what they see.*

Audit birds in the garden at home or school/nursery – when do they arrive and leave? Link to **SDG 13** and **SDG 15** – how do we care for our birds in the winter months?

Make bird feeders – observe the garden/outside and discuss where is best to place them. What else do birds need?





SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable.

Possible STEM provocations for SDG 11:

New terminology – culture – inclusive.

Revisit – safe – sustainable.

11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.

11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage.

11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.

Brainstorm how you can design parks or towns that are accessible to all – how can someone in a wheelchair navigate a town? See if you can borrow a wheelchair for the children to try and use. Reflect on how life would be different. What structures are needed to help? Can you build structures to test out?

An example of how businesses are now trying to be more sustainable:

<https://www.property.nhs.uk/news-insight/insights/striving-towards-the-nhs-net-zero-vision/>

Audit the community and generate information on how different businesses are aiming for 2030. Invite community businesses in to talk or be interviewed by the children on changes they are making. Audit your own practice and ensure you are as sustainable as you can be.

Make connections with the community allotments – invite gardeners in to talk about how to grow plants/vegetables.

Design a garden area in the setting – involve parents/grandparents. Make regular trips to the local park – watch how the seasons change – look at the natural habitats of all living things.

Remind children that trees/green spaces are important for us – we need the trees:

<https://thekidshouldseethis.com/post/city-trees-important-green-spaces-essential>

Try to reuse/recycle materials to develop your area, for example, toilet rolls for seedlings, plastic bottles make a fabulous greenhouse!

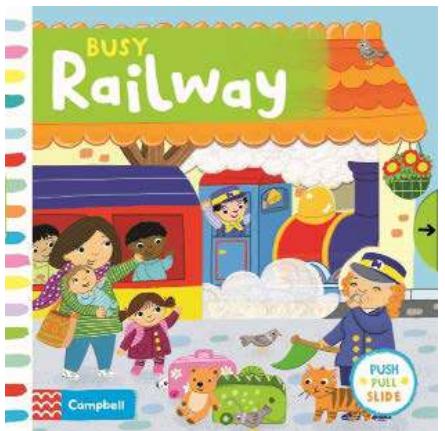
Build sustainable walls using old milk cartons – then concrete over them! Always emphasise the term "sustainability". Ensure the children are 100% involved in the building work.



Development Matters (2021, p89) *Use spatial words in play, including "in", "on", "under", "up", "down", "besides" and "between".*

EYFS (DfE, 2021, p15) Expressive Arts and Design:
Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.

The 'Busy' books provide an early introduction to aspects of city life and revisit **SDG 9** – busy garages, parks, airports, towns, boats, parks.

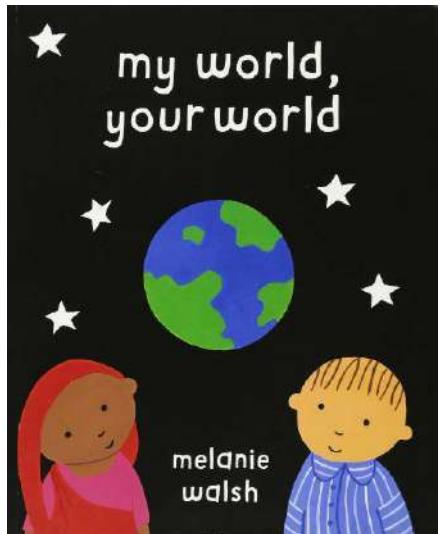


Compare different cities in different countries – look at images – how do they differ? Reflect on **SDG 6** with water. Reflect upon bins in a city – bins in a town – in a forest – what waste might be thrown away? Can it be recycled? How is waste different in different places?

Read *My World, Your World*, which emphasises both differences and similarities:

<https://www.youtube.com/watch?v=K3ffnj80hIU>

EYFS (DfE, 2021, p14) Understanding the World: *Know some similarities and differences between the natural world around them and contrasting environments.*



Utilise a range of maps of cities and discuss the images shown. Highlight roads, man made/natural structures, rivers and homes. Introduce children to map terminology – gradients etc.

Revisit *The Tomorrow Book* by Jackie French – building your town needs structure, not just infrastructure (SDG 9) but using sustainable attributes such as solar (SDG 7) and thinking of our other living species (SDG 15).



This example shows what children want in their future towns – windmill power, trees, gardens and spaces for non-humans to live alongside humans together.

Credit: Rebecca Bonar,
Sydney, Australia

Birth to Five Matters (2021, p110): *Provide stimuli and resources for children to create maps and plans.*

EYFS (DfE, 2021, p15) Expressive Arts and Design: *Share their creations, explaining the process they have used.*

Reflect upon previous discussions about their locality – remember the old life – boats and the new? Discuss what "culture" means – highlight different cultural aspects.

Place-based **SDG 4** – on your regular trips into the community, what landmarks reflect culture? Discuss, feel, and take photographs. Remember the Mosaic approach – use iPads to discover their town/parks.

Examples to look out for: statues – architecture – roofs – churches – flags – football teams – clothes – shops – food. Reflect on culturally different styles of homes.

Revisit the Legacy Cafe's ethos (SDG 9) of involving intergenerational learning and sharing of cultures that reflect the community. This could be sharing stories whilst cooking national dishes over a fire or inviting parents/grandparents in to highlight traditions from their family.

In the Education Inspection Framework (EIF), it states that your curriculum should give all learners – including the disadvantaged and students with SEND needs – the "*cultural capital they need to succeed in life*". (**SDG4**)

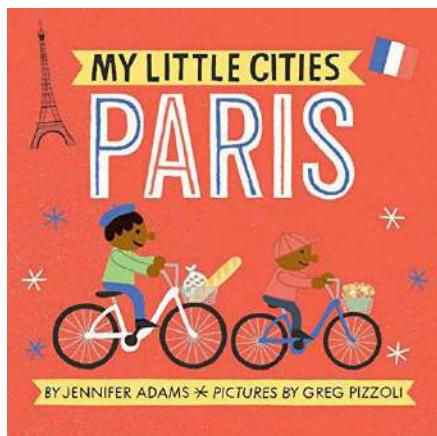
What is cultural capital?

Read this interesting article that explains for practitioners:

<https://www.nurseryworld.co.uk/features/article/eyfs-best-practice-an-essential-guide-to-cultural-capital>

The Early Years Inspection handbook says: "It is the role of the setting to help children experience the awe and wonder of the world in which they live, through the seven areas of learning."

EYFS (DfE, 2021, p14) People, Culture and Communities: Know some similarities and differences between different religious and cultural communities in this country, drawing on their experiences and what has been read in class.



Look at cultural icons from international cities – what do they recognise? What is it? Try and make a cultural icon for their town (STEM all aspects).

Read through *My Little Cities (London, New York, Paris, San Francisco)* and find the cities on a world map. Discuss how they would get there – reflect on SDG 9.

Use different multimodal materials/resources to recreate these iconic images – use all aspects of STEM.

Development Matters (2021, p97) Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can.

Investigate how shapes can be combined to make new shapes: for example, two triangles can be put together to make a square.

Provide high-quality pattern and building sets, including pattern blocks, tangrams, building blocks and magnetic construction tiles, as well as found materials.

Record the process from beginning to end in a thinking pad – demonstrate all the issues of building it – reflect upon Froebel's original gifts which encouraged children to build and evaluate. He did not allow children to knock structures down but encouraged a re-evaluation of what was needed and then adapt the structure further. So, this was the beginning of engineering thinking and practice.

His "pinpoints" are another way to encourage children to create and build and understand structures.

Read this to understand the origins of structural and mathematical thinking in Froebel's kindergarten: <https://www.froebel.org.uk/uploads/documents/Froebels-gifts-and-block-play-today.pdf>

Froebel block play: https://www.communityplaythings.co.uk/learning-library/articles/froebels-gifts-and-block-play-today?pk_campaign=bi-weekly&pk_kwd=266&pk_source=newsletter&pk_medium=email

Development Matters (2021, p91) Provide a range of natural and everyday objects and materials, as well as blocks and shapes, for children to play with freely and to make patterns with. When appropriate, encourage children to continue patterns and spot mistakes.

SDG 12: Ensure sustainable consumption and production patterns.



Possible STEM provocations for SDG 12:

New terminology – ecosystems – waste – consumption – classification.

12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimise their adverse impacts on human health and the environment.

Link to previous – SDG – soil testing.

12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

First step is to raising their awareness of recycling (**SDG 13**).

Brainstorm together what they think recycling means. Ask them what they do at home, if they recycle rubbish at home can they explain how and why they do this? Ask them to photograph and detail (with parental support) about the recycling bins at home both inside and out, and what goes in the different coloured bins. Place-based learning (**SDG 4**) – on your daily/weekly walks look for any large recycling bins. How are they different to the bins at home/school? Potentially research local waste centres and what's recycled there.

Ask them to look at some packaging in their home and ask if it can be recycled or not. How can you tell?

Science experiment – have a selection of paper, plastic and metal. Ask how they know if it is recyclable. Some packaging may have a recycling logo on it. Help them to find the logo or see where it says the packaging can be recycled.

Technology – research examples of recycling logos online. Use different materials, both artistic and technological, and make a poster for the setting/class reminding everyone to recycle their waste.

Link to recycling logos: <https://www.pureplanetrecycling.co.uk/recycling-symbols/>

Watch and discuss what colour bins are applicable for different materials:

<https://www.youtube.com/watch?v=R50RJ2EbznQ>



Encourage children to recycle their snack waste – invite parents/grandparents in to build a compost bin with recycled materials and utilise this in your gardening process. Encourage them to understand how it supports the soil's nutrition. Discuss different types of waste – food, plastic, etc.

If in a larger school setting, ask the children to sign up for a compost team – collecting fruit/scraps from each classroom. Have plenty of compost bins around to use. Design compost signs to hang above the bins.

As you add new food scraps, cover with dry carbon materials like straw, sawdust and fallen leaves, as this will help the compost process to develop nicely.

Another type of compost to make! During the autumn, collect all the fallen leaves – mix them with used coffee grounds and wet thoroughly. It provides nutrition for the soil but also recycles!



Make a wheelie wonderful worm farm:

<https://hes32-ctp.trendmicro.com/wis/clicktime/v1/query?url=https%3a%2f%2fvimeo.com%2f415426011&umid=15f3a14e-7179-40db-8a67-32e963fe729c&auth=768f192bba830b801fed4f40fb360f4d1374fa7c-80bbe6e4801762ae0cb05cf998f1ed41b5b42f8>

Credit: Phil Pettitt, Community Greening Manager, Botanic Gardens, Greater Sydney, Australia.

Reflect on how worms are part of our ecological systems. Consider them as equal participants in our world – discuss this with the children.

<http://www.ccc.govt.nz/assets/Documents/Services/Rubbish-recycling/Kerbside2013-2014GuidetoWormComposting.pdf>

Development Matters (2021, p101) *Encourage children's exploration, curiosity, appreciation, and respect for living things.*

Suggestions:

- *Sharing the fascination of a child who finds woodlice teeming under an old log*
- *Modelling the careful handling of a worm and helping children return it to the dug-up soil*
- *Carefully planting, watering, and looking after plants they have grown from seeds.*

Do a science experiment and compare the different 3 examples above of compost making. Which seems to be the most nutritious? How do you measure this?

Peter Rabbit has become a Food Hero – the United Nations, FAO, and UN Foundation have teamed up with Peter Rabbit and his friends on a digital campaign to encourage their fans to be Food Heroes.

<https://www.un.org/sustainabledevelopment/blog/2021/06/peter-rabbit-teams-up-with-the-united-nations-fao-and-the-un-foundation-on-global-campaign-to-mobilize-more-food-heroes/>



As a school, nursery or setting, become part of this campaign. This campaign wants to encourage youth and their families to become #FoodHeroes like Peter and his friends, by choosing healthy food, reducing food waste, and celebrating other Food Heroes who work hard to get food to our plate every day.

An activity that is linked to Mathematics – classification/sorting – sorting waste to introduce them to recycling. What items seem to be thrown away a lot? For example, plastic bottles.

Have a school policy that each child has their own water bottle to discourage waste.

EYFS (DfE, 2021, p14) Numerical Patterns: *Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.*

Development Matters (2021, p94) Use vocabulary: "more than", "less than", "fewer", "the same as", "equal to". Encourage children to use these words as well.

Development Matters (2021, p96) Mathematics: *Place objects into a five frame and talk about how many spaces are filled and unfilled.*

Ask children/parents to bring in items of waste from home. Ask them to save any empty boxes, paper, plastic containers or tins in the bin. Recommend that you always wash out tins and plastic containers.

When washed, place a selection of objects of each material out, making sure none of the objects have ragged or sharp edges or corners. This is perhaps better to do outside.

Look at the waste – talk about all of these objects being suitable for recycling and why. Explain that recycling is the process of waste being made into something new that can be used again. Give examples.



Check to see if they can identify from which material each object is made. For example, paper, plastic, metal – use correct terminology. Use all senses to examine materials. Encourage the children to sort the objects into three groups of paper, plastic and metal.

Do a waste audit of the bins at school/nursery – this will need parental support/gloves – but ask the children to reflect upon the items found. Are there materials that keep reappearing? How can you reduce rubbish?

12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

Introduce the children to the language "ecosystem". Watch together – pause and discuss the language. Make small world trays of different ecosystems. Remind the children we are part of the ecosystem. <https://www.youtube.com/watch?v=SNF8b7KKJ2I>

Development Matters (2021, p104) Understanding the World: *Begin to understand the need to respect and care for the natural environment and all living things.*

Encourage focused observation of the natural world.

Start to develop an understanding of environmental rights – we are aware of the UNCRC article 12 Rights of the child – but remember to consider our environment too. In New Zealand for instance, rights have been awarded to rivers, mountains and land. Discuss this – what rights do children feel they have? How do they see their relationship with living things in their world?

Become part of a rights perspective – Rights of Nature is the recognition and honoring that nature has rights. It is the recognition that our ecosystems – including trees, oceans, animals, mountains – have rights just as human beings have rights. Rights of Nature is about balancing what is good for human beings against what is good for other species, what is good for the planet. It is the holistic recognition that all life, all ecosystems on our planet are deeply intertwined in a global ecosystem.

<https://www.therightsofnature.org/what-is-rights-of-nature/>

Develop your own set of Environmental rights for the non-human world- remind them all lives matters (**SDG 5**)

This target is key overall – 12.8.1 – Extent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment.

Development Matters (2021, p19) Open-ended questions like "I wonder what would happen if....?" encourage more thinking and longer responses. Sustained shared thinking is especially powerful. This is when two or more individuals (adult and child, or children) "work together" in an intellectual way to solve a problem, clarify a concept, evaluate activities, extend a narrative etc.

SDG 13: Take urgent action to combat climate change and its impacts.

13 CLIMATE ACTION



Possible STEM provocations for SDG 13:

New terminology – climate – crisis – weather.

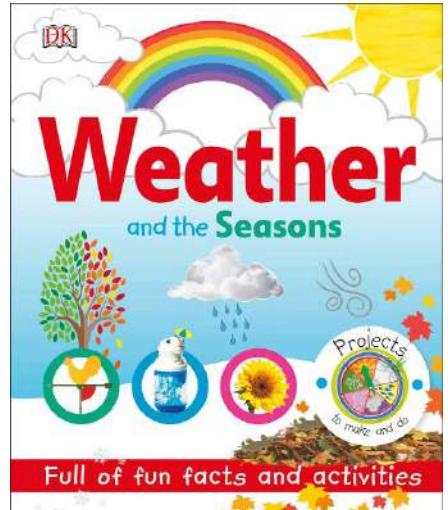
13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

Ensure you have a good selection of texts in the reading area that encourages choice, investigation and interest. Introduce the children to the rainbow – how does it form? What colours are in the rainbow? Use mathematical language: before, next, between etc. Make the colours of the rainbow.

Sing along to the I Can Sing A Rainbow song:
<https://www.youtube.com/watch?v=mXtpjBzPMeY>

Nature-loving and crafty 3-5 year olds will love finding out all about weather in this charming crafty science book. From sun and snow, to thunder and lightning, children will find out what goes on up in the sky, and why. They'll discover simple answers to difficult questions – what makes a rainbow?



Go on weather walks – try to ensure children experience rain, wind, snow, fog and sun. Ask questions – for example, do they notice how fog changes perceptions of space. How does the weather affect our feelings? How does the weather affect our bodies (sweat, goosebumps) clothes and actions? Can we walk on ice? How does snow feel?

Encourage children to listen to a range of weather music and in PD dance and move to it. Link back to rain dances **SDG 6**.

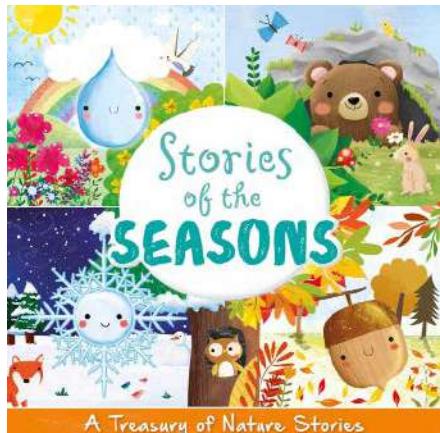
Listen to the sound of rain if you are able to in your setting – if you have a glass roof! Splash in puddles – ensure they use all of their senses to experience the weather.

Sing and make music to weather songs such as *It's Raining, It's Pouring* and *Doctor Foster* and *Incy Wincy Spider*. Whilst listening to weather music – thunder/lightning/rain – make paintings to reflect the mood. Use multimodal ways of doing, making and recording.

EYFS (DfE, 2021, p15) Expressive Arts and Design: *Being imaginative and expressive – Invent, adapt....*

Discuss the 4 seasons and how they are different. Make a video of the seasons in the setting garden over a year – highlight significant changes. Introduce terminology "hibernation" – what does it mean? Link back to **SDG 10**.

This book explores the seasons through 4 different eyes – learn how the world changes as the year goes by with Little Acorn, Little Raindrop, Little Snowflake, and Little Bear. Identify and gather key elements of each season – conkers.



Make conker soap:

Smash up your conkers into small bits – add to a pan of hot water on the fire (adult supervision) – watch how the material changes into a soap texture. Add ground lavender flowers for their smell and put into recycled hand canisters and use!

Revisit rights of nature **SDG 12** and that an acorn and a snowdrop are living things too!

EYFS(DfE, 2021, p15) The Natural World: *Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.*

Discuss the difference between weather and climate.

Make a weather chart for a week/month. Can you notice that the weather changes – how can we record different weathers? Look at the TV weather symbols.

Make links back to **SDG 7** – energy.

Watch climate change and discuss:

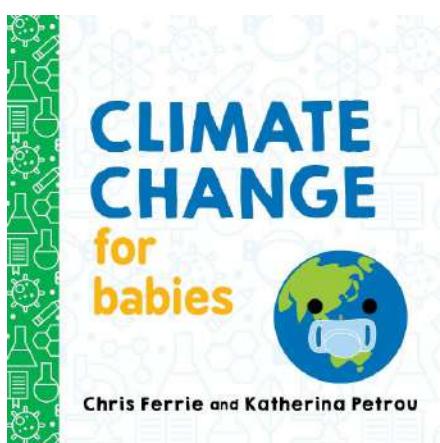
<https://www.youtube.com/watch?v=v8unGCTWUWI>

Development Matters (2021, p112) Understanding the World: *Understand the effect of changing seasons on the natural world around them.*

Watch how the earth is heating up:

https://earthobservatory.nasa.gov/ContentWOC/images/globaltemp/global_gis_1935-1939_lrg.png

Read together and reflect on what they have already heard and seen: *Climate Change for Babies* by Chris Ferrie and Katherine Petrou



Climate Change for Babies is an engaging, basic introduction for youngsters (and grown-ups) to the complex questions of what climate change is and what we can do about it. Full of scientific information and written by experts, this timely instalment of the Baby University board book series is perfect for enlightening the next generation of geniuses. After all, it's never too early to become a scientist!

Brainstorm what "crisis" means.

Share provocative images of a world in crisis. For example, the terrible bush fires of Australia in 2019.

Discuss this image of Australia burning from space, then show the next image and ask the children why they think the earth is getting hotter. Why are there more fires/droughts etc? How can humans stop this and help the animals live happily?

Research images of flooding across the world or melting ice caps. Do an experiment to see how and why ice melts. Make small world areas outside and use water to see how flooding occurs.

Development Matters (2021, p103) Understanding the World: Provide equipment to support these investigations. Suggestions: Magnifying glasses or a tablet with a magnifying app. Encourage children to talk about what they see. Model observational and investigational skills. Ask out loud: "I wonder if...?" Plan and introduce new vocabulary, encouraging children to use it to discuss their findings and ideas.

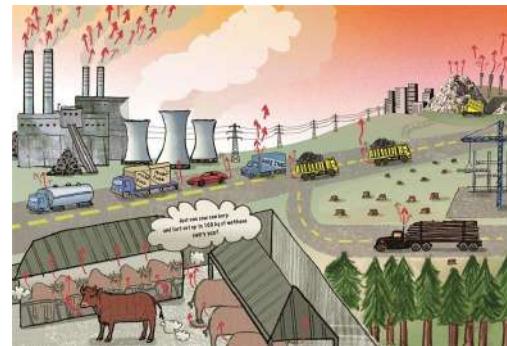
Observe and interact with natural processes.

Development Matters (2021, p105) Understanding the World: melting – leave ice cubes out in the sun, see what happens when you shake salt onto them (children should not touch to avoid danger of frostbite).



Read together: *A Climate in Crisis* by Neal Layton – and discuss issues as they turn each page.

Our world is warming up, and it's a big problem. Award-winning author-illustrator Neal Layton is here to explain what climate change is, what's causing it and why it's dangerous for animals and humans alike. But he's also full of ideas for how you can help! From eating lots more veggies to walking and cycling and thinking carefully about what we need to buy. There is also an opportunity to open discussion around electric cars and greenhouse gases.



Make a class climate change project – discuss ways that you can help support the planet. Make links with the community and the ecosystems.

Reflect upon nature's rights – how can animals speak? Who will care for them?

Again, use provocative images – ask the children – what do you think these kangaroos are thinking/feeling?

Brainstorm native animals that might be in danger – ask why? Discuss how you can help.

Interesting read for practitioners to use:
<https://nbn.org.uk/stateofnature2019/>

For example, it says: "The species are those deemed most important and threatened, and include hedgehogs, hares and bats, many birds such as the willow tit and the turtle dove, and insects such as the high brown fritillary butterfly".

<https://www.theguardian.com/environment/2019/oct/03/populations-of-uks-most-important-wildlife-have-plummeted-since-1970>



Also see the following link about the inspirational work of Wangari Maathai:

<https://hes32-ctp.trendmicro.com:443/wis/clicktime/v1/query?url=https%3a%2f%2fwww.youtube.com%2fwatch%3fv%3dIGMW6YWjMxw&umid=8ad650c7-e974-4663-b90b-e6f8872887bd&auth=768f192bba830b801fed4f40fb360f4d1374fa7c-93feae21d39cb9b02a7bc0edf74aadf52852150b>

The United Nations is asking children to become Climate Action Superheroes – there are eight different heroes with downloads and certificates to gain:
<https://www.un.org/sustainabledevelopment/climate-action-superheroes/>

For example – Veggie Vindicator!
https://www.un.org/sustainabledevelopment/wp-content/uploads/2020/10/UN_Climate-Action-Superheroes_VEGGIE-VINDICATOR.pdf



SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.



Possible STEM provocations for SDG 14:

New terminology – conserve – marine life.

14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

If you are able, take regular trips to the beach/coast line and observe the debris that has come in on the tide. Link back to your waste audits (**SDG 12**).

Discuss how these items come in on the tide. Where could they have come from? How can we stop this happening? Brainstorm ideas – invite local community members in and let the children share their ideas.

Watch – pause – discuss – Plastic Oceans – reflect on plastic bags in shops. On a neighbourhood walk look for evidence of plastic thrown away. How does it reach the sea? What happens when plastic gets into the ocean?

- https://www.youtube.com/watch?v=ju_2NuK5O-E

Design litter posters and reminders of the damage debris in the sea does to marine life. Reflect on balloons and how can you celebrate a birthday without balloons.

Development Matters (2021, p79) Literacy: *Motivate children to write by providing opportunities in a wide range of ways. Suggestions: clipboards outdoors, chalks for paving stones, boards, and notepads in the home corner. Children enjoy having a range of pencils, crayons, chalk, and pens to choose from. Apps on tablets enable children to mix marks, photos, and video to express meanings and tell their own stories. Children are also motivated by simple home-made books, different coloured paper and paper decorated with fancy frames.*

This example was on the local beach – a settee cushion – the children found it hard to understand how.

Use images again to provoke discussions – what damage is this waste doing to our marine life?



14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.

Revisit ecosystems. Has their thinking changed as a result of previous conversations?

Reflect on the difference between sea water and fresh water. Experiment with the density of the two types of water.

Watch Marine Ecosystems: <https://www.youtube.com/watch?v=-wrUrOes0lO>

Explore coral reefs: <https://www.youtube.com/watch?v=J2BKd5e15Jc>

Development Matters (2020, p67) Understanding the World: *Encourage interactions with the outdoors to foster curiosity and give children freedom to touch, smell and hear the natural world around them during hands-on experiences.*

EYFS (DfE, 2021, p11) Communication and Language: *Offer explanations for why things might happen, making use of recently introduced vocabulary.*

14a Increase scientific knowledge, develop research capacity....

Ensure that you utilise the correct terminology when introducing aspects of marine life – this could be a co-researching opportunity like in Reggio Emilia where the child and teacher are equal participants.

Consider marine life that lives under water (Maths, Language) and also those that can surface.

Be a baby scientist! Baby Oceanographer explores the oceans. With his snorkel and mask, he looks at the animals and plants under the sea.

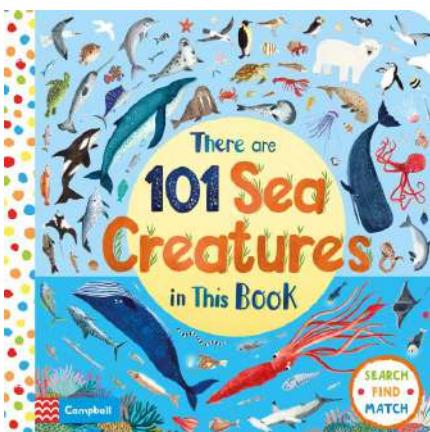
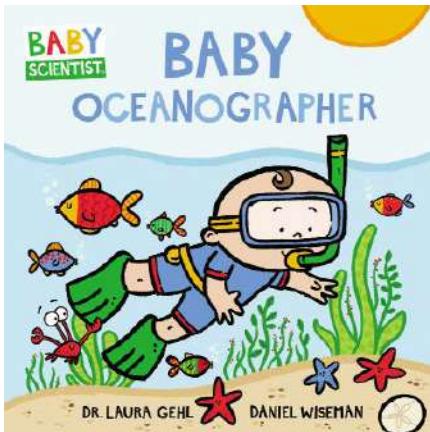
What creatures are found deep down?

Are waves in the ocean like waves in the bathtub?

Find out with Baby Oceanographer!

Ensure children and practitioners can name common ocean creatures. How and where they live/eat.

Provide a healthy choice of books to either read or use as research.

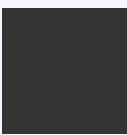


This book – *There Are 101 Sea Creatures in This Book* is perfect for children 2 years+ who are discovering the world around them. Split flip-flap pages encourage spotting and finding skills as little ones match up each set of sea creatures with their correct environment and learn the animal names.

Research shells and marine life and using art to recreate them. For example using dough.

Make sea related play dough – You will need:

2 cups plain flour
 2 tablespoons vegetable oil
 1/2 cup salt
 2 tablespoons cream of tartar
 1 to 1.5 cups boiling water - add until it feels just right
 Blue gel food colouring or whatever colour the marine life is you are making
 A few drops glycerine



Adult supervision for safety when using boiling water and glycerine.

How to make it:

Mix together the flour, salt, cream of tartar and oil in a large mixing bowl.
 Slowly add food colouring to the boiling water then add into the dry ingredients.
 Keep stirring continuously until the dough becomes a sticky, combined material.
 Add the glycerine.
 When it has cooled, the most important part of the process is to knead it vigorously for a couple of minutes until all of the stickiness has gone.
 Add a touch more flour until just right.
 Decorate with materials from the beach, or shape into sea horses, seaweeds, shells etc.

Development Matters (2021, p100) Understanding the World: *Offer lots of different textures for exploration with fingers, feet, and whole body. Suggestions: wet and dry sand, water, paint, and playdough.*

Watch and rap alongside Andy with his music related to the sea/animals:

<https://www.bbc.co.uk/teach/bring-the-noise/andys-raps-under-the-sea/z4hwgwx/>

Develop your small world area with marine life materials and a large tray for play. Provide real materials – seaweed, pebbles, sand to create the environment. Take regular visits to the beach if you live near the water. Aim to become familiar with changes over the year. Know the names of the biodiversity (fauna/species) so you can share this knowledge with the children.



Research the seaweed on your local beach as parts of the UK have different species. Seaweed lives in the sea, dependent on the temperature. Notice if seaweed from southern waters moves up into northern seas – what does this mean? Make seaweed/fauna cards to search for on the beach – do not laminate as this is not biodegradable.

Let the children use iPads to record changes in the environment.

Take the biodiversity collected back to the setting – paint their observations.

EYFS (DfE, 2021, p11) Communication and Language: *Make comments about what they have heard and ask questions to clarify their understanding.*

Visit the beach during all 4 seasons so children do not just play and build sandcastles or think picnics!

Let the children experience the beach in winter and see the ice coming in on the tide. By doing this you will constantly build on their understanding of ecosystems and highlight marine ones. **SDG 13** can be introduced here, considering effects of climate change on our waters and ocean pollutants.

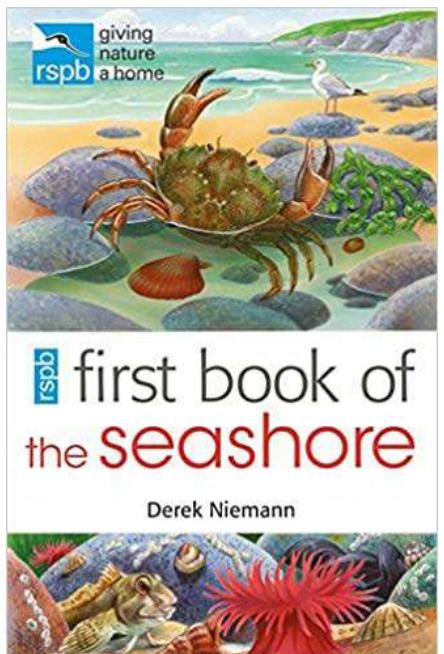


Safety warning when close to open water.

Development Matters (2021, p115) Expressive Arts and Design: *Ensure (Utilise) that the physical environment includes objects and materials with different patterns, colours, tones and textures for babies and young children to explore.*

Development Matters (2021, p21) Communication and Language: *Through conversation, storytelling and role play, where children share their ideas with support and modelling from their teacher, and sensitive questioning that invites them to elaborate, children become comfortable using a rich range of vocabulary and language structures.*

Encourage trips to the local library to look for research books – ask the librarians to share books with them. For example, The First Book of the Seashore. Ensure children realise there is plant life/bird life/insect life at the beach as well as creatures that live in the sea water.



Learn all about identifying nature at the seaside with this beautifully illustrated spotter's guide, with 35 seashore creatures and plants to learn about, the RSPB book is perfect for budding wildlife explorers and naturalists.

SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.



Possible STEM provocations for SDG 15:

New terminology – mountain ecosystems (revisit ecosystems) – degradation – desertification – conservation.

It is really important that quality education recognises the enabling environment – as stated in **SDG 4** place-based embraces all of the locality that your school/setting is located in. That locality embraces culture, geography, history, culture, and community. Life on land is the enabling environment – protect and care for it and all living/non-living organisms within it.

EYFS (DfE, 2021, p6) *children learn and develop well in enabling environments with teaching and support from adults, who respond to their individual interests and needs and help them to build their learning over time.*

15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.

15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.

It is important to introduce children to the correct terminology alongside provoking images (degradation – desertification – reforestation).

Brainstorm how this could be happening and why? What are the consequences of the earth drying up or trees being chopped down? Link back to **SDG 13** and melting ice caps.



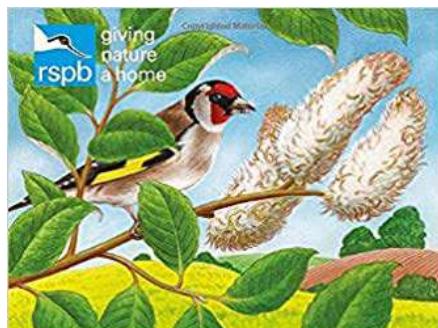
Design experiments to recreate these images and test out by planting seeds/plants. Monitor and see how they survive.

Watch: Why we need trees:

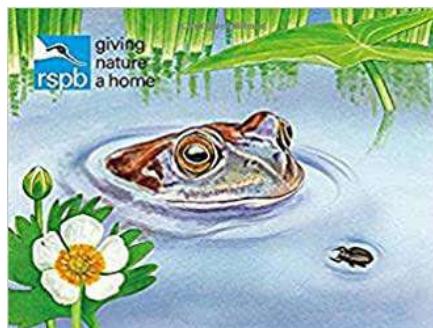
<https://www.youtube.com/watch?v=5I7u5FMQxHA>

Design posters/make videos to demonstrate why we need trees.

The Woodland Trust encourages schools and nurseries to get involved in planting more trees: <https://www.woodlandtrust.org.uk/support-us/act/your-school/plant-trees-with-your-school/>



RSPB first book of trees
Derek Niemann



RSPB first book of pond life
Derek Niemann



RSPB first book of butterflies and moths
Derek Niemann



RSPB First Book Of Trees by Derek Niemann (and others)

Each RSPB spotter's guide comprises 35 common garden creatures for beginner naturalists. Through beautiful full-page illustration accompanied by key information about each creature, the books are designed to encourage young children's interest in the outside world and the wildlife around them. A spotter's chart for children to fill in, and links to internet-based activities in each book, mean that children can extend the fun.

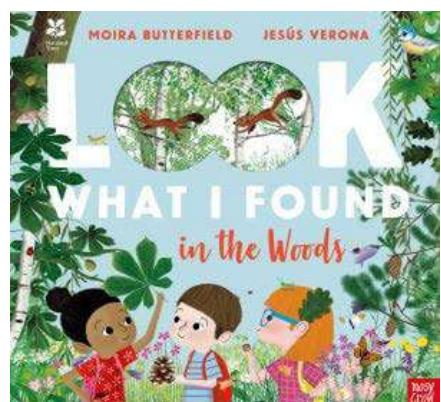
Children need to understand their world, but so must the practitioners who support them. That involves naming of trees, recognition of leaves, flowers, birds and insects.

Become nature detectives, courtesy of the Woodland Trust:

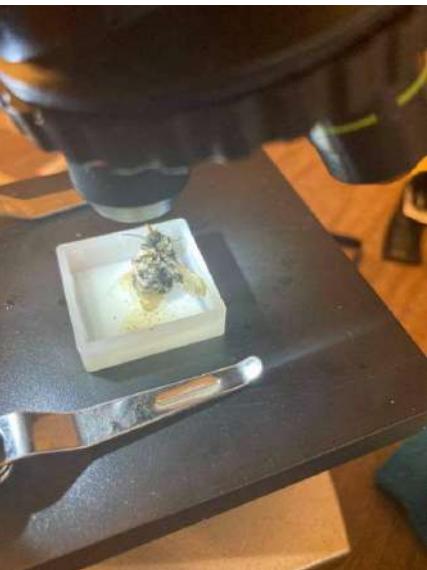
<https://www.woodlandtrust.org.uk/blog/2020/03/nature-detectives/>

Go on woodland walks – place-based (**SDG 4**) to develop a regular relationship with the locality. Observe the seasonal changes and habitats. Introduce terminology – evergreen and deciduous trees.

Open your senses to a world of wonder by taking a walk through the woods! Set off on an outdoor adventure and find natural treasures, from prickly pine cones to swirly snail shells, then learn more about the plants and creatures of the forest in this fact-filled guide to the outdoors, book by Moira Butterfield.



Set up opportunities for scientific exploration – magnifying glasses and research books to help understand how to care for our planet. Ensure you have enough tools and materials – this was a dead bee being scrutinised.



Credit: Gemma and Kenton Plumb investigating home-based learning.

Development Matters (2021, p110) Listen to children describing and commenting on things they have seen whilst outside, including plants and animals.

Development Matters (2021, p110) Encourage interactions with the outdoors to foster curiosity and give children freedom to touch, smell and hear the natural world around them during hands-on experiences.



Ensure all plants/trees/animal/insect parts are labelled.

As noted earlier, it is important to recognise both human and non-human elements of the environment. Rather than focusing on a humancentric approach, develop an awareness of relational ethics where the environment has rights too.

In the EYFS (DfE, 2021) importance is placed on "positive relationships" but this must be across non-human environmental aspects too.

Introduce the idea to children that trees have feelings – they breathe – like us they need water, sun, and relationships.

Do trees have feelings?

https://www.youtube.com/watch?v=7kHZ0a_6TxY

Read together: *Be a Tree!*

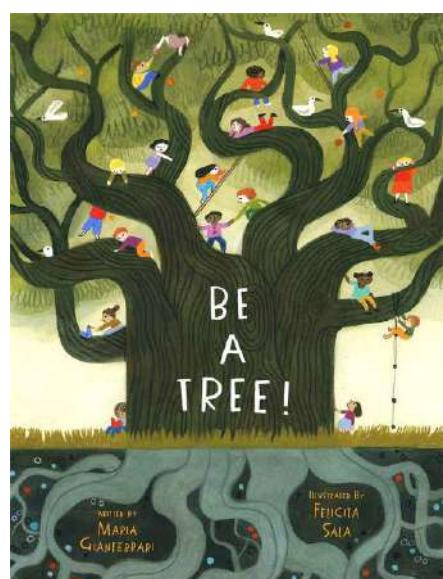
Stand tall.

Stretch your branches to the sun.

Be a tree!

We are all like trees: our spines, trunks; our skin, bark; our hearts giving us strength and support, like heartwood. We are fuelled by air and sun.

And, like humans, trees are social. They "talk" to spread information; they share food and resources. They shelter and take care of one another. They are stronger together.



EYFS (DfE, 2021, p9) Prime area – Personal, social and emotional development:
Children's personal, social and emotional development (PSED) is crucial for children to lead healthy and happy lives, and is fundamental to their cognitive development. Underpinning their personal development are the important attachments that shape their social world.

The Rights of Nature embrace the Indigenous thinking from thousands of years of living alongside and in harmony with nature. Be aware of the environment by noticing – a noticing approach. "Do not pass by unseeing" (Boyd, 2018).

When walking on the beach with children, ask them to reflect upon the footprints in the sand. Pose the question – whose beach is it? Do we consider the ecological life of the beach – who has more rights? Horses – children – dogs – birds? Pose this question. Link to **SDG 14**, life below water, why is the beach important to marine life? Consider the importance of clean beaches. What could we do as a community to ensure this?



Start to recognise whose "feet" are these?

Record who has been on the sand? Analyse the prints – discuss length and weight – pressure of print suggests how heavy the animal/bird is.

Consider other places you can see prints – on walks in earth in woodlands. Pose questions about changes in materials, for example, wet and dry sand/earth/river banks in relation to the prints made.

Development Matters (2021, p86) Provide patterned material – gingham, polka dots, stripes etc. – and small objects to arrange in patterns. Use words like "repeated" and "the same" over and over.

As well as noticing prints, look at colours within the environment. There is not one shade of green and helping children to discriminate shades will help their pre-literacy and numeracy skills. In Montessori classrooms they use tiles showing different shades of the same colour – possibly a resource to get, or go to the local hardware store and get paint samples and make your own. This activity sharpens children's observational capacities; vital in science experiments.



Go on colour walks and get the children to find as many different shades as possible, of greens/browns etc that they can. Make a colour board with pegs (as seen) – this will also help fine motor control as well as science observational skills.

Make your own shades of colours – this is not just art but again it's a skill to be able to discriminate.

Set up a creative area so children can be autonomous learners trying out shades themselves.



Making environmental colours – understand colours. For example there are complementary colours, which are:

- Red and green
- Yellow and purple
- Blue and orange.

In a 6-hue colour wheel, they can always be found opposite from one another:

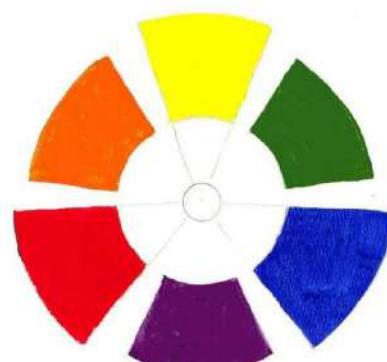
Let the children experiment and make up their own colours and name them.



EYFS (DfE, 2021, p10) Expressive Arts and Design: *It is important that children have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials. The quality and variety of what children see, hear, and participate in is crucial for developing their understanding, self-expression, vocabulary, and ability to communicate through the arts.*

Development Matters (2021, p120) Expressive Arts and Design: *Talk to children about the differences between colours. Help them to explore and refine their colour mixing – for example: "How does blue become green?"*

Credit: Riverside Nursery, Edinburgh





Credit: Karen Broomfield Tugulawa, Early Education, Brisbane, Australia

This example shows the children investigating everything about volcanoes – the thinking book went to the sandpit as an information source and record keeping tool.

Consider natural elements in the world such as mountains, rivers, valleys, forests, volcanoes – discuss with the children their (non-living) place in our shared world. Reflect upon how human activity is impacting. Understand about their creation. Transfer the learning outside in the natural world to support concrete thinking. Use the thinking books (**SDG 4**) as a visible aid.

SDG 16: Promote peaceful and inclusive societies for sustainable development, provide access for justice for all and build effective, accountable and inclusive institutions at all levels.



Possible STEM provocations for SDG 16:

New terminology – peace – justice – strong – revisit inclusive (SDG 5 and 10).

16.1 Significantly reduce all forms of violence and related death rates everywhere (including non living and other living things not just human).

16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all- link here to **British Fundamental Values explicit in the EYFS**.

16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels.

Define peace – what does it mean to the children? Peace as in quiet? Introduce the idea of conflict versus peace.

Develop peace rules – how the children can learn and play together in harmony.

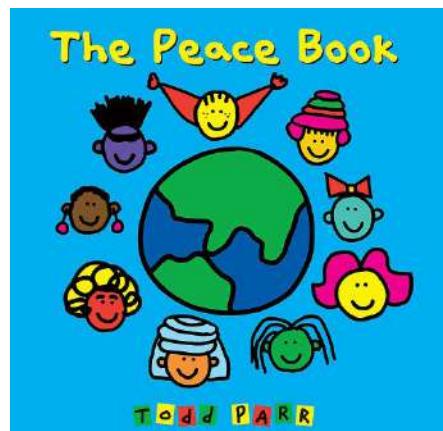
EYFS (DfE, 2021, p12) Managing Self: *Explain the reasons for rules, know right from wrong and try to behave accordingly.*

Circle time and story chair also provide opportunities for children to have a voice.

Development Matters (2020, p20) *Help children to elaborate on how they are feeling.*

Read informative books about what is peace – *The Peace Book* by Todd Parr.

This provides positive and hopeful messages of peace in an accessible, child-friendly format. This book delivers a timely and timeless message about the importance of friendship, caring and acceptance.



Watch together/read the book:

What Is Peace by Etan Boritzer:

https://www.youtube.com/watch?v=U-k08r_EnDc

A book that gently teaches the true essence and workings of peace.

EYFS (DfE, 2021, p12) Building Relationships: *Work and play cooperatively and take turns with other.*

Link to Early Years Pioneer **Maria Montessori**

This curriculum gives teachers (of any age children) concrete activities to use for the continuing transformation of themselves, their children, and their classrooms on the path of peace.

It presents a year-long (or lifelong) curriculum of peace work using environmental activities, music, cultural activities from Native American tradition, storytelling, and children's books, along with extensions and resources. (Suitable for ages 3-9. Extensive resource section included).

Interesting read – Montessori's contribution to peace:

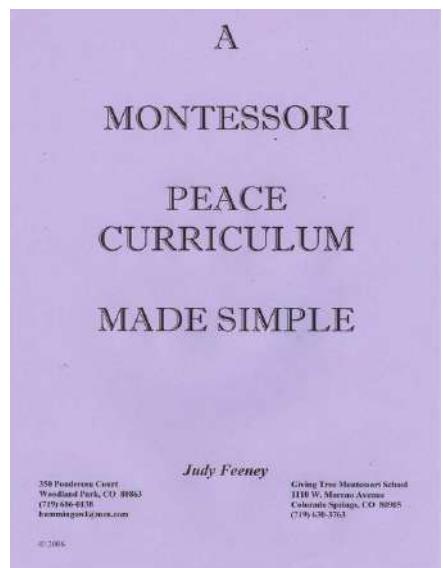
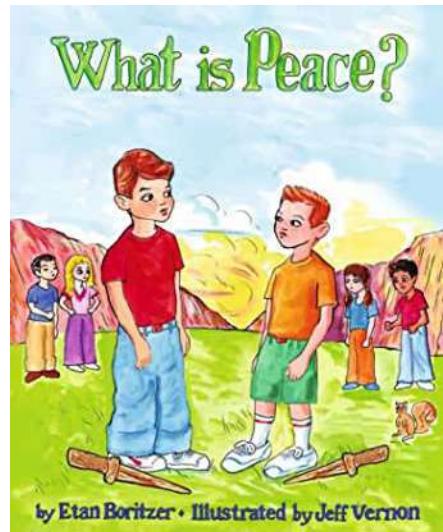
<https://www.tc.columbia.edu/epe/epe-entries/>

[Duckworth_ch4_22feb08.pdf](#)

Democracy is linked with peace and justice – ensure all children feel they are part of the decision making. Consider how you could record mathematically results from polls/discussion groups?

One example – use tubes/balls to represent themselves.

Link back to justice – slavery – no voices/rights at all.





EYFS (DfE, 2021, p14) Numerical patterns: *Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. This is an example of how one kindergarten used the Olympics 2020 (a real event that is both cultural and global) to support children's understanding of number quantities. The children are recording the medals won by their athletes, so it is contextual and meaningful.*

Credit: Karen Broomfield Tugulawa, Early Education, Brisbane, Australia

Brainstorm the definition of justice – link back to **SDG 4** and **5** (fairness). Justice and equity is not just a human perspective but consider the rights of nature. Who will stand up and shout up for trees/rivers etc? Pose questions to include conversations around building on greenbelt land – **SDG 11** and **SDG 15**.



How many birds/insects/animals will have to migrate as a result of this housing development? Justice is about reflecting all living things. Who speaks for the non-humans?

Draw on your community and reflect the thinking around culture.

In the Legacy cafes for Liverpool F.C, the children were lucky enough to meet Margaret Aspinall, the leader of the Hillsborough Justice Campaign.

She was thrilled to meet a new generation of children and to share the intergenerational trauma. The children returned to their school and shared the story with their peers.

Discuss with parents/grandparents to draw upon local stories. How could you showcase culture? Revisit cultural icons of the community **SDG 11**.



Credit: Margaret Aspinall

Use images again to highlight injustices – draw on the locality – street names/statues – links to slave trade for example. Discuss the idea of a "slave".

Introduce words such as "choice" and "rights" again.

How would they feel if they had to work for nothing? Do they get pocket money? Do they have to do chores to get it or not? What rights do they think they have now?

Link again to UNCRC article 12.

EYFS (DfE, 2021, p14) People, Culture and Communities: *know some similarities and differences between different religious and cultural communities in this country.*

Watch /discuss – this could be as a teachers' discussion and consider how to raise this issue:

<https://www.youtube.com/watch?v=WYtGcLyMOlo>

Use persona dolls

It is recognised through the British Fundamental Values that Ofsted inspectors always consider the ethos of the school. They look to see the effect this has on enabling them to grow and flourish, to become confident children and appreciate themselves and others.

Using persona dolls can support schools to promote pupils' spiritual, moral, social and cultural development by providing opportunities to build self-esteem and confidence. It will also develop an understanding and appreciation of the cultural influences of the community/locality that have shaped their experiences of life. Through developing an interest in culture, pupils can explore, understand and learn to respect diversity, even in settings with little or no cultural diversity.



Interesting read – storytelling with persona dolls: [https://www.teachingforchange.org/
wp-content/uploads/2012/08/ec_personadolls_english.pdf](https://www.teachingforchange.org/wp-content/uploads/2012/08/ec_personadolls_english.pdf)

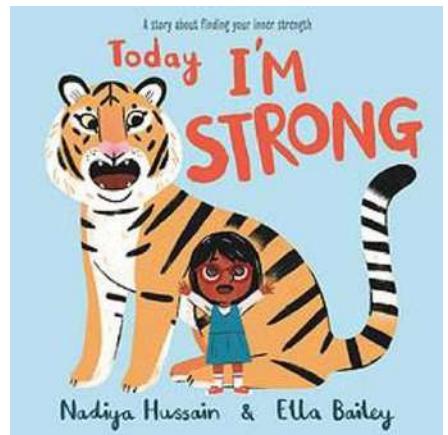
Another element of this goal is "strong institutions" – brainstorm the meaning behind "strong".

How do they define strength – do experiments to reflect strength; this could be a science test.

How can a place be strong? Link back to justice – fairness – peace.

Read: *Today I'm Strong*, which focuses on inner strength. A touching story about building the courage to overcome bullying, with a powerful reminder to always **be kind**.

Reflect upon the difference between strength as a physical attribute and strength of character. Highlight that strength of character means standing up for yourself- or others or nature. Reflect again on justice – fairness and peace.



SDG 17: Strengthen the means of implementation and revitalise the global partnership for sustainable development.

17 PARTNERSHIPS FOR THE GOALS



Possible STEM provocations for SDG 17:

17.14 Enhance policy coherence for sustainable development – this resource is about supporting the EYFS statutory policy on early childhood in England.

17.16 Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilise and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries.

17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships, data, monitoring and accountability.

Terminology – community – neighbourhood – locality – partnerships.

This final goal literally brings everything together – reflect on the interconnectedness of all 17 goals. As a school, develop a policy to reflect education for sustainability/SDGs. Share this with the parents and ask them to sign/agree this collaborative/co-operative way forward.

EYFS (DfE, 2021, p5) What the EYFS seeks to provide:

- Partnership working between practitioners and with parents and/or carers
- Equality of opportunity and anti-discriminatory practice, ensuring that every child is included and supported.

EYFS (DfE, 2021, p6): children learn to be strong and independent through positive relationships.

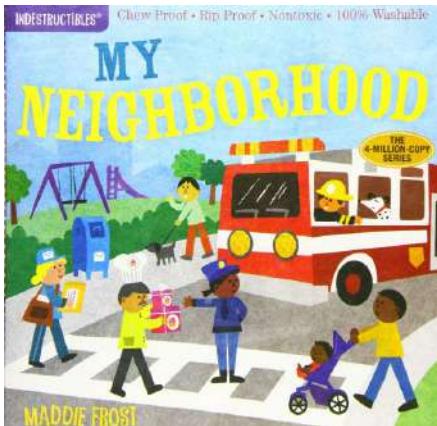
Reflect upon how community is democracy, socio-cultural sustainability and partnership in action. Encourage parents and children to engage with and be part of all discussions reflecting their locality. To listen and to recognise everyone can have equal contributions through action and communication.

Discuss with children the meanings behind the new terminology.

Watch communities for kids: <https://www.youtube.com/watch?v=lGCOzxgRNJQ>

Read text to support their understanding: *My Neighbourhood* by Maddie Frost.

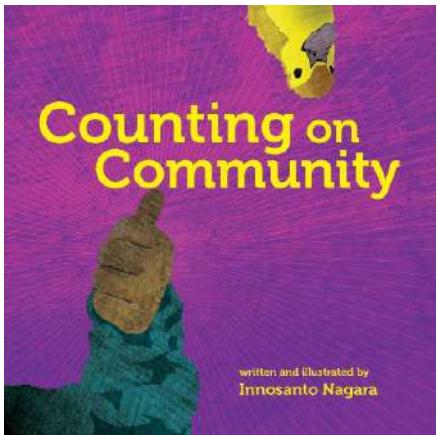
My Neighbourhood introduces babies to the concept of community as they meet the friendly people in their neighbourhood. Delightful for babies to page through on their own or with mum, dad or an older sibling, this book, with its bright pictures and minimal text, is ideal for young readers.



It is important that practitioners have knowledge of your locality/place/community through geography, history, and culture (**SDG 4**).

Read together: *Counting on Community* by Innosanto Nagara, which looks at community through a socio-cultural lens.

Introduce the word "agency". What does this mean in practice? How are the children's views/thoughts reflected in your setting/class? Link here to socio-cultural pillar with all voices heard – link to **SDG 10**.



Counting on Community is Innosanto Nagara's follow-up to his hit ABC book, *A is for Activist*. Counting from one stuffed piñata to ten hefty hens – and always counting on each other – children are encouraged to recognise the value of their community, the joys inherent in healthy eco-friendly activities, and the agency they possess to make change. A broad and inspiring vision of diversity is told through stories in words and pictures. And of course, there is a duck to find on every page!

This image reflects a local meeting point (moot) where the town came together to talk and vote. Reflect on how over time cultures use spaces and non-living aspects of their environment as a bringing together of community.

This image from the Wirral (Merseyside) highlights an aspect of culture pre-Parliament. Knowledge of area, and culture develops a strong sense of belonging. Discuss differences in places to talk/reflect/share ideas and to listen to each other.



Development Matters (2021, p109) *Understand that some places are special to members of their community.*

Identify key symbolic structures of places where community makes decisions, e.g. Houses of Parliament in London, England and the United Nations building in New York, USA.



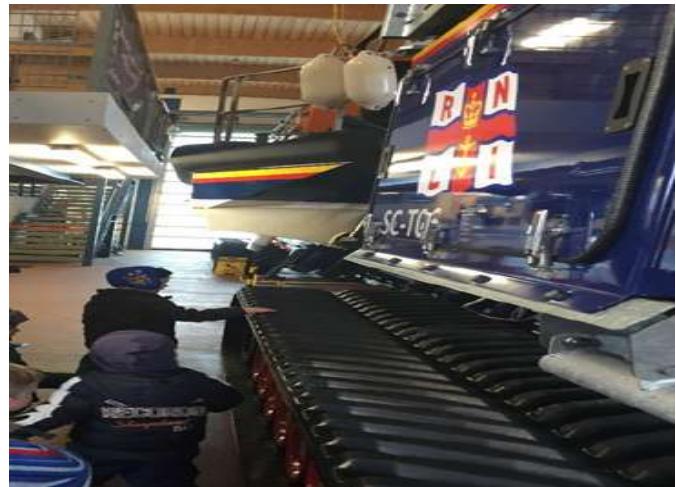
Circle time is a traditional early years activity but consider different ways of listening. In First Nation ways of listening in Australia they use a yarning circle:

<file:///C:/Users/Diane/Downloads/About-Yarning-Circles-A-Guide-for-Participants.pdf>

Invite cultural/intergenerational partners into the setting to share stories – for example, lifeboat men and take the children to visit regularly.

Place-based learning – reflect on the community groups you can engage with as a setting – walk past and say hello, become involved, so you move away from a one-off visit and it becomes embedded and relational.

Understand why community is important – reflect upon different collective groups in the community or volunteer groups, such as lifeboat personnel or gardening groups. Audit community groups – library/allotment/parks etc and invite discussions with the children/parents on how to co-operate.



Development Matters (2021, p107) *Understanding the World: Talk about (and with) members of their immediate family and community.*

SDG 17 is crucial as the world must unite in partnership and work towards the SDGs. This resource will hopefully enable you to develop an understanding of them and be part of the global partnership of children around the world working towards caring for the planet.

Remember again the inspirational work of Wangari Maathai

<https://hes32-ctp.trendmicro.com:443/wis/clicktime/v1/query?url=https%3a%2f%2fwww.youtube.com%2fwatch%3fv%3dIGMW6YWjMxw&umid=8ad650c7-e974-4663-b90b-e6f8872887bd&auth=768f192bba830b801fed4f40fb360f4d1374fa7c-93feae21d39cb9b02a7bc0edf74aadf52852150b>

We can all do our best to make a difference!

Section 2

Linking to development matters: Ideas incorporating STEM

Fig.2 Development matters [2]

Birth to three - babies, toddlers and young children will be learning to:	Examples of how to support this:
Repeat actions that have an effect.	Encourage babies' explorations and movements, such as touching their fingers and toes. Show delight at their kicking and waving.
Explore materials with different properties.	Provide open-ended play materials inside and outdoors. Suggestion: Treasure Baskets for repeated exploration of textures, sounds, smells and tastes.
Explore natural materials, indoors and outside.	Offer lots of different textures for exploration with fingers, feet and whole body. Suggestions: wet and dry sand, water, paint and playdough.

This is Science – investigation and exploring.

Fig.3 Development matters [2]

Explore and respond to different natural phenomena in their setting and on trips.	<p>Encourage toddlers and young children to enjoy and explore the natural world. Suggestions:</p> <ul style="list-style-type: none"> - standing in the rain with wellies and umbrellas - walking through tall grass - splashing in puddles - seeing the spring daffodils and cherry blossom - looking for worms and minibeasts - visiting the beach and exploring the sand, pebbles and paddling in the sea <p>Encourage children's exploration, curiosity, appreciation and respect for living things.</p>
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Links to Sustainable Development Goals:

SDG 12 Ensure sustainable consumption and production patterns: see the work around the worm farm.

SDG 4 and 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss:

It is important that quality education recognises the enabling environment – as stated in **SDG 4** place – based embraces all of the locality that your school/setting is located in. That locality embraces culture, geography, history, culture, and community. Life on land is the enabling environment – protect and care for it and all living/non-living organisms within it.

Fig.4 Development matters [2]

Birth to three - babies, toddlers and young children will be learning to:	Examples of how to support this:
	<ul style="list-style-type: none"> - sharing the fascination of a child who finds woodlice teeming under an old log - modelling the careful handling of a worm and helping children return it to the dug-up soil - carefully planting, watering and looking after plants they have grown from seeds <p>Encourage children to bring natural materials into the setting, such as leaves and conkers picked up from the pavement or park during autumn.</p>

At this development stage, there can be a big focus on children's **scientific observation skills**. There is obviously no need for science-specific vocabulary, but observation skills can be built through questions such as how are the woodlice and the worm different? Responses can be the worm is wriggly – this is still building their scientific observation skills.

Fig.5 Development matters [2]

3 & 4-year-olds will be learning to:	Examples of how to support this:
Use all their senses in hands-on exploration of natural materials.	Provide interesting natural environments for children to explore freely outdoors.
Explore collections of materials with similar and/or different properties.	Make collections of natural materials to investigate and talk about. Suggestions: <ul style="list-style-type: none"> - contrasting pieces of bark - different types of leaves and seeds - different types of rocks - different shells and pebbles from the beach
Talk about what they see, using a wide vocabulary.	Provide equipment to support these investigations. Suggestions: magnifying glasses or a tablet with a magnifying app.

This links more to the original ideas within this document. Here learners can start to officially begin different **investigations**. Investigating different natural materials can be linked to investigating water and properties. For example, each of these materials collected could be tested to see whether they float. This could then be linked to asking children why we use different materials for different jobs.

In terms of vocabulary, **solid, liquid and gas** could be introduced to help children build their scientific observations. Gas may be a difficult concept at this stage, but children would be able to apply the idea of solids and liquids. Again, this could be linked to investigations involving water. Leaving ice to melt and then evaporate is a great way of observing solid, liquid and gas in action. Furthermore, this could equally be linked to the weather (water cycle at reception level).

Links to Sustainable Development Goals

SDG 6 Ensure availability and sustainable management of water and sanitation for all:

Terminology – sanitation – pollution – conserve – contamination.

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Have a rainwater butt outside to collect water for use – water plants or water play.

SDG 7 Ensure access to affordable, reliable, sustainable, and modern energy for all: 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.

7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.

7.3 By 2030, double the global rate of improvement in energy efficiency.

Terminology – energy – wind – power – wind turbines – renewable.

Development Matters (2021, p105) *Explore and talk about different forces they can feel.*

Plan and introduce new vocabulary related to the exploration and encourage children to use it. To help children understand energy – use their bodies to help. What energy do they need to move? Discuss. (Link to **SDG 1 and 2 and 3**)

Encourage children to feel their heartbeat and to look at each other's faces after running – feel the sweat on their brow. Experiment walking into the wind/against the wind. Go forwards and backwards.

Fig.6 Development matters [2]

Explore how things work.	Provide mechanical equipment for children to play with and investigate. Suggestions: wind-up toys, pulleys, sets of cogs with pegs and boards.
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This is a great chance to explore some **physics**. Children could investigate using a pulley to pull a toy car over different surfaces such as wood, carpets, concrete etc. Although children wouldn't be expected to talk about friction, this would introduce them to the idea that it takes more force to pull the car along rougher surfaces. This links to the idea of forces shown below. Wind-up toys are another great example. Children could investigate how far the toy travels depending on the number of times they wind it up.

Terminology – energy – wind – power – wind turbines – renewable.

Development Matters (2021, p105) *Explore and talk about different forces they can feel.*

Fig.7 Development matters [2]

<p>Explore and talk about different forces they can feel.</p>	<p>Draw children's attention to forces. Suggestions:</p> <ul style="list-style-type: none"> - how the water pushes up when they try to push a plastic boat under it - how they can stretch elastic, snap a twig, but can't bend a metal rod - magnetic attraction and repulsion <p>Plan and introduce new vocabulary related to the exploration, and encourage children to use it.</p>
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As described above, there are lots of links between these different activities that produce a clearer and more streamlined approach to science in early years.

Terminology – energy – wind – power – wind turbines – renewable.

Fig.8 Development matters [2]

<p>Plant seeds and care for growing plants.</p> <p>Understand the key features of the life cycle of a plant and an animal.</p> <p>Begin to understand the need to respect and care for the natural environment and all living things.</p>	<p>Show and explain the concepts of growth, change and decay with natural materials.</p> <p>Suggestions:</p> <ul style="list-style-type: none"> - plant seeds and bulbs so children observe growth and decay over time - observe an apple core going brown and mouldy over time - help children to care for animals and take part in first-hand scientific explorations of animal life cycles, such as caterpillars or chick eggs. <p>Plan and introduce new vocabulary related to the exploration. Encourage children to use it in their discussions, as they care for living things.</p>
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Links to Sustainable Development Goals

SDG 15 Children could build this into an investigation into what affects plant growth. This could involve keeping plants in direct sunlight and in a dark area or varying the amount of water given.

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Design experiments to recreate these images and test out by planting seeds/plants. Monitor and see how they survive.

Fig.9 Development matters [2]

<p>Talk about the differences between materials and changes they notice.</p>	<p>Provide children with opportunities to change materials from one state to another. Suggestions:</p> <ul style="list-style-type: none"> - cooking – combining different ingredients, and then cooling or heating (cooking) them - melting – leave ice cubes out in the sun, see what happens when you shake salt onto them (children should not touch to avoid danger of frostbite) <p>Explore how different materials sink and float.</p> <p>Explore how you can shine light through some materials, but not others. Investigate shadows.</p> <p>Plan and introduce new vocabulary related to the exploration, and encourage children to use it.</p>
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Melting and evaporation. Leaving the water from the melted ice cube over a period of time will result in evaporation occurring. This can help understanding of solid, liquid and gas.

Links to Sustainable Development Goals

SDG 6 Ensure availability and sustainable management of water and sanitation for all.
Possible STEM provocations for SDG 6

Terminology – sanitation – pollution – conserve – contamination.

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Development Matters (2021, p103) Understanding the world: Provide equipment to support these investigations.

Suggestions: magnifying glasses or a tablet with a magnifying app. Encourage children to talk about what they see. Model observational and investigational skills. Ask out loud: "I wonder if...?" Plan and introduce new vocabulary, encouraging children to use it to discuss their findings and ideas.

Observe and interact with natural processes.

Development Matters (2021, p105) Understanding the World: melting – leave ice cubes out in the sun, see what happens when you shake salt onto them (children should not touch to avoid danger of frostbite).

Take urgent action to combat climate change and its impacts.

Fig.10 Development matters [2]

Children in reception will be learning to:	Examples of how to support this:
<p>Understand the effect of changing seasons on the natural world around them.</p>	<p>Guide children's understanding by draw children's attention to the weather and seasonal features.</p> <p>Provide opportunities for children to note and record the weather. Select texts to share with the children about the changing seasons.</p> <p>Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change.</p> <p>Look for children incorporating their understanding of the seasons and weather in their play.</p>

Links to Sustainable Development Goals

SDG 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Children need to understand their world – but so must the practitioners who support them. That involves naming of trees, recognition of leaves, flowers, birds and insects.

Go on woodland walks – place-based (**SDG 4**) to develop a regular relationship with the locality. Observe the seasonal changes and habitats. Introduce terminology – evergreen and deciduous trees. Collect different types of leaves – compare and analyse the textures.

Section 3

Early Years and STEM

Statutory framework in Early Years (most applicable to STEM):

Fig.1 Early Learning Goal: The Natural world [1]

SDG 15 Life on Land

ELG: The Natural World

Children at the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants;

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- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Sustainability Development Goal 1 and 2 idea – investigate different habitats (where plants and animals live). For example, what are the differences between animals living in trees, compared with animals living in fields. Record ideas and labelling key features (for example wings, fur, number of legs etc). This provides an opportunity for investigation and observation – to go out and spot these features, contribute to a display or listen to sounds as appropriate.

Some other initial early years ideas:

- **Physics** – Creating parachutes to prevent eggs in a basket from breaking (the bigger the parachute, the slower the basket will fall).
- **Physics** – Create weather-measuring devices: wind chimes, measuring buckets, sun dials etc.
- **Chemistry** – Milk, food colouring and washing up liquid. Adding food colouring to milk and then placing washing up liquid in a specific place causes the milk to 'dance'.
- **Chemistry** – Testing different substances in water to see if they dissolve.
- **Biology** – Investigating how different factors affect how plants grow. Put some in direct sunlight, some not. Give different amounts of water.
- **Biology** – Investigating how water moves up through a plant. Place celery sticks in water and add different coloured dyes. After a short period of time, you can see the solution moving up through the celery (can be done with white-petalled flowers too).



Credit: Jenson Boyd

Some links containing brilliant ideas are below:

- <https://www.science-sparks.com/early-years-science-themed-activities/>
- <https://www.firstdiscoverers.co.uk/early-years-science-activities-eyfs/>
- <https://funlearningforkids.com/science-activities-preschoolers/>

At reception level, there are fewer clear examples of science within the 'Understanding the World' content. However, based on previous examples, learners could try and link rain fall and snow to the experiment they will have completed into water melting and then evaporating.

However, children could build their investigations further at reception level as detailed below.

Summary: STEM ideas

Based on the Development Matters document, the experiment ideas could be arranged as follows:

Birth to three:

At this stage, mainly observational skills will be focused on:

- Comparing differences in plant and animals
- Asking open-ended observation questions to motivate children's interest in their natural environment
- Matching shapes, colours, jigsaws all help build these observation skills.

3- & 4-year-olds:

Children can start doing slightly more complex investigations building their science skills.

- Talk about differences in natural materials. This can link to investigations with water – do the different materials float. Children could compare natural with man-made materials
- Investigating states of matter: solid, liquid and gases. Especially solids and liquids. Involve students in discussions around ice melting and what happens next. This can be extended to observing the water evaporate and talk about it turning into a gas. Children could also investigate the differences between ice and water using their observation skills – does it flow, can it be squashed etc
- Use a pulley to investigate the effect of weight on the car, type of surface etc. Gives children opportunities to explore what makes it easier/hard to push and pull
- Wind-up toy cars – how does the number of times the car is wound affect how far it goes (this could be linked to the previous experiment)
- Investigating factors that affect plant growth – varying amount of sunlight and amount of water
- Adding food colouring to milk and then placing washing up liquid in a specific place causes the milk to 'dance'
- Testing different substances in water to see if they dissolve.

Reception:

Children can build up previous experiments and complete more complex investigations:

- **Physics** - Melting and evaporating water – similar to previous experiment but linking to the water cycle in terms of the weather
- **Physics** - Create weather-measuring devices: wind chimes, measuring buckets, sun dials etc
- **Physics** - Creating parachutes to prevent eggs in a basket from breaking (the bigger the parachute, the slower the basket will fall)
- **Chemistry** - As an extension to the dissolving experiment, when they dissolve salt in a small amount of water, they can leave it on the side. After a period, the water will evaporate, leaving behind the salt crystals
- **Biology** - Investigating how water moves up through a plant. Place celery sticks in water and add different coloured dyes. After a short period of time, you can see the solution moving up through the celery (can be done with white-petaled flowers too).

References

- [1] Department for Education (March 2021) Statutory framework for the early years foundation stage, London: Crown copyright 2021.
 [2] Department for Education (Sep 2020) Development Matters, London: Crown copyright 2020.

Activities and experiences with young children

Let's investigate!	
Title of activity	H2Whoa!
Age range	3-5 years
Link to learning and development	ELG Natural world Understanding the world
Link to Sustainability Development Goal	4 Quality education 6 Clean water and sanitation 14 Life below water
Resources	Cups Cold water (H ₂ O) Hot water Salt T teaspoons
Health and safety considerations	Be careful handling the hot water – make sure it's not too hot! Keep the salt away from your mouth. Don't drink the solution!
Investigation 1	<ol style="list-style-type: none"> 1. Half fill a cup with cold water. 2. Add 1 teaspoon of salt into the water and stir 3. Once the salt has dissolved, add another teaspoon and stir 4. Count how many teaspoons went in before the salt stopped dissolving. <ol style="list-style-type: none"> 1. Half fill a cup with hot water 2. Add 1 teaspoon of salt into the water and stir 3. Once the salt has dissolved, add another teaspoon and stir 4. Count how many teaspoons went in before the salt stopped dissolving.
What will happen? Which cup will be able to dissolve the most salt?	
Investigation 2	<ol style="list-style-type: none"> 1. Put a small amount of water in a cup (1cm-2cm above the bottom) 2. Dissolve half a teaspoon of salt in the water. 3. Leave the cup on the side 4. Observe what's left in the cup once the water evaporates
Next steps, reflection and opportunities	

Let's investigate!	
Title of activity	Magic moo-ving milk
Age range	3-5 years
Link to learning and development	ELG Natural world Understanding the world
Link to Sustainability Development Goal	SDG 4 Quality education
Resources	Milk Washing up liquid Food colouring Shallow bowl/plate Cotton buds
Health and safety considerations	Don't drink any of the mixtures being used in the investigation! Clean up any spills. Careful when carrying the bowl and bottle of milk.
Method	<ol style="list-style-type: none"> 1. Gently pour milk into the bowl, until it covers the bottom 2. Gently drop food colouring into the milk in different locations around the centre 3. Put a drop of washing up liquid in the centre and see what happens 4. Dip a cotton bud in the washing up liquid. Place it in different locations around the bowl and see what happens!
Next steps, reflection and opportunities	

Let's investigate!	
Title of activity	Ready, steady, let's grow!
Age range	3-4 year olds
Link to learning and development	ELG Natural world Understanding the world
Link to Sustainability Development Goal	SDG 2: zero hunger SDG 4: quality education
Resources	Cress seeds Soil Cardboard pot Coloured felt tips
Health and safety considerations	Make sure you wash your hands after handling the soil. Keep your hands away from your mouth when planting the seeds. Don't try and lift the pot above your head!
Decorating your cardboard pots	<ol style="list-style-type: none"> 1. On the first cardboard pot, draw a sun with surrounded by some rain clouds 2. On the second pot, draw a nice big sun 3. On the third pot, draw a night sky full of stars. 4. On the final pot, draw the night sky with some rain clouds. 5. Get you 4 cardboard pots full of soil packed with lots of nutrients 6. Over the top of the soil, spread out some cress seeds 7. Press the seeds gently into the soil (don't be afraid of mucky fingertips!) 8. Place two of the pots with the sun drawn, onto the windowsill 9. Place the two pots with the night sky drawn on, in a dark place like a cupboard 10. Over a period of four weeks, make sure you water the pots with rain clouds on 11. Observe what's happened, which one's grown the most? (Answer in the reflection section below)
What will happen? Which pots do you think the cress will grow in? Why do you think this?	
Next steps, reflection and opportunities	

Section 4

Links to wider educational learning

Using this resource during training for students at Level 2 and Level 3 and up to Level 7 using the early childhood degree benchmark standards and the teaching qualifications (L4-7) in early years and childcare.

We would strongly encourage students are made aware of the opportunities to educate children about the Sustainable Development Goals and would love to see a Sustainability Champion in every Early Years setting. Use this resource for teaching, for practical activity and experience development and in class to have fun, to learn and to be pioneers for the workforce.

Training opportunities at Level 2 and Level 3. Please use alongside the training of Level 2 and Level 3 students to raise awareness in this critical work.

Name of Qualification	Qualification reference number	Unit title
Level 2 Diploma for the Early Years Practitioner	603/3723/0	EYP5 Understand how to support children's development EYP7 Support the planning and delivery of activities, purposeful play opportunities and educational programmes EYP8 Promote play in an Early Years setting EYP14 Support the needs of the child in preparing for school
Level 3 Diploma in Early Years Education and Care	601/2147/6	Unit 1.1 Support healthy lifestyles for children through the provision of food and nutrition Unit 3.1 Understand the value of play in Early Years Unit 3.2 Plan, lead and review play opportunities which support children's learning and development in relation to assessment frameworks Unit 3.4 Contribute to enabling play environments Unit 3.7 Understand the needs of the child in preparing for school
Level 3 Technical Diploma in Early Years Education and Care	601/8438/3	Unit 1.1 Support healthy lifestyles for children through the provision of food and nutrition Unit 3.1 Understand the value of play in Early Years Unit 3.2 Plan, lead and review play opportunities which support children's learning and development in relation to assessment frameworks Unit 3.4 Contribute to enabling play environments Unit 3.7 Understand the needs of the child in preparing for school

Level 3 Diploma in Childcare and Education	601/4000/8	Unit 5 Play and learning Unit 8 Professional Practice Portfolio 1 Unit 11 Preparing for school readiness Unit 15 Professional Practice Portfolio 2
Level 3 Technical Diploma in Childcare and Education	601/8437/1	Unit 5 Play and learning Unit 8 Professional Practice Portfolio 1 Unit 11 Preparing for school readiness Unit 15 Professional Practice Portfolio 2
Level 3 Diploma for the Early Years Workforce	601/2629/2	Unit 1.1 Support healthy lifestyles for children through the provision of food and nutrition Unit 3.1 Understand the value of play in Early Years Unit 3.2WB Plan, lead and review play opportunities which support children's learning and development in relation to assessment frameworks Unit 3.4WB Contribute to enabling play environments Unit 3.7WB Support children's transition to school
T Level Technical qualification in Education and Childcare (Level 3) (Delivered by NCFE)	603/5829/4	Core Element 2 Supporting Education Occupational Specialism: Early Years: PO1 Support and promote children's play, development and early education PO3 Plan, provide and review care and educational opportunities to enable children to progress Occupational Specialism: Assisting Teaching: PO1 Support the class teacher to enhance children's education, individually and in groups PO2 Plan, provide and review educational opportunities in collaboration with teachers and other adults Occupational Specialism: Supporting and mentoring in educational settings: PO2 Work with education providers and workplace colleagues to plan and implement structured and meaningful education and workplace opportunities PO4 Promote students' motivation, aspiration and engagement
Level 2 Certificate in Supporting Teaching and Learning	603/2476/4	STL2C10 Promote an effective learning environment
Level 3 Diploma in Supporting Teaching and Learning	603/2496/X	STL3C7 Support children and young people during learning activities STL3D16 Support the role of play, leisure and extra-curricular activities for children and young people

QAA and Advance HE executive summary: education for sustainability in HE

In 2021, QAA and Advance HE published an executive summary to support Higher Education (HE) in implementing education for sustainability into their curriculum design, and course management and delivery. The Education for Sustainable Development Guidance is intended to help UK higher education institutions incorporate Education for Sustainable Development (ESD) within their curricula. QAA and Advance HE, together with a group of experts representing academic, business and student communities, published a new version of the guidance for 2021, with the aim of supporting students from any discipline to acquire the knowledge, understanding and skills necessary to develop values and take actions to transition society towards sustainable futures. The executive summary highlights the importance of the Sustainable Development Goals (SDGs):

"It outlines the role of higher education in supporting the knowledge, skills, and competencies that students and staff develop to contribute to a more sustainable future, encouraging providers to embrace ESD and demonstrate leadership. It recognises that transforming curricula can be daunting and frames the SDGs as a starting point" (2021, p4).

See executive summary – [education-for-sustainable-development-guidance-executive-summary.pdf](#)

Any student or practitioner working in the area of early childhood needs to be aware of the importance of critical reflection. This tool was developed by Naomi McLeod to support students and practitioners to understand and implement reflection in practice.

A key aspect of quality education is the ability to be critically reflexive in your approach. This critical reflexivity is also part of socio – cultural – political sustainability using the provocations to question and critique any unconscious bias. A useful tool (see below) for students and practitioners to utilise in early childhood was developed by Naomi McLeod with nine steps from being ready and open to remembering why it's important.

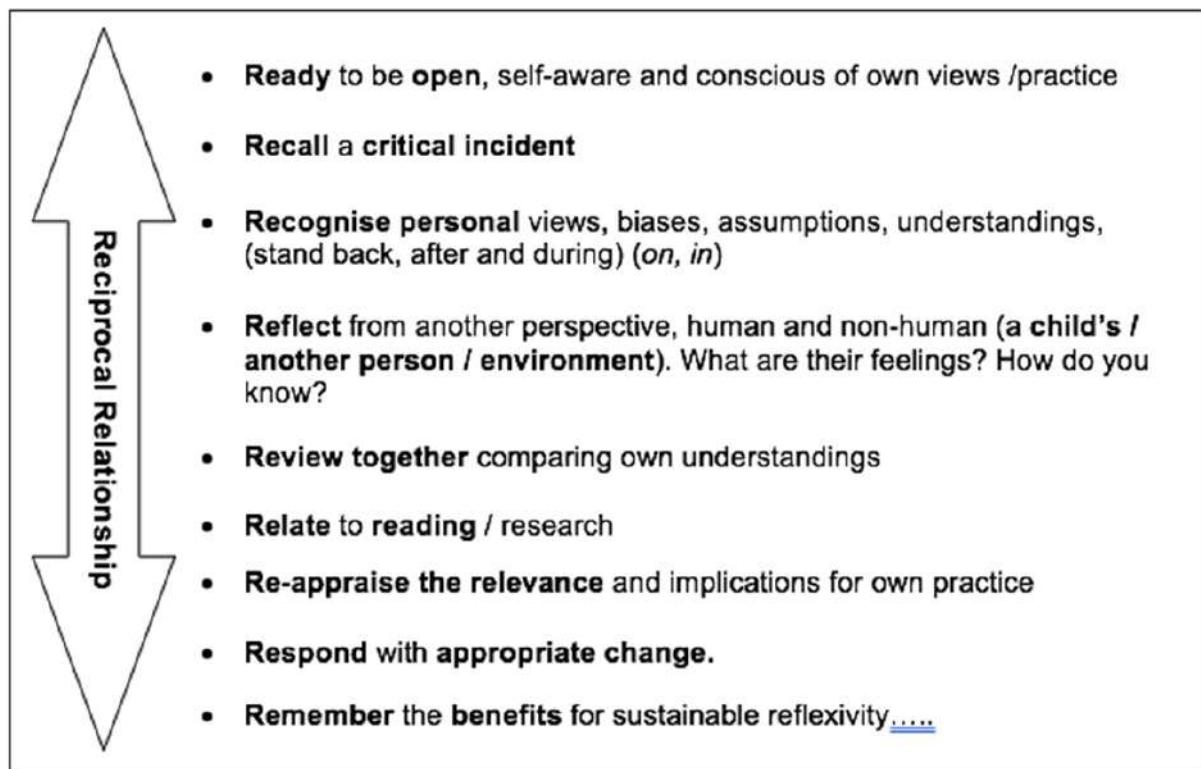
In relation to early years practice, knowing why a particular approach to learning and teaching is taken, is a starting point for determining the meaning and value of education and taking responsibility. This can be empowering for educators and also for children as educators see and understand the value of children's engagement and participation in their learning.

In the current climate of an early years curriculum (DfE, 2021) that focuses very narrowly on high stakes testing of pre-determined outcomes, where there is often no room for creativity and experimentation, little thought is given to how appropriate this is for preparing children for the 21st century and the need to be self-determined, critical thinkers, and independent decision makers.

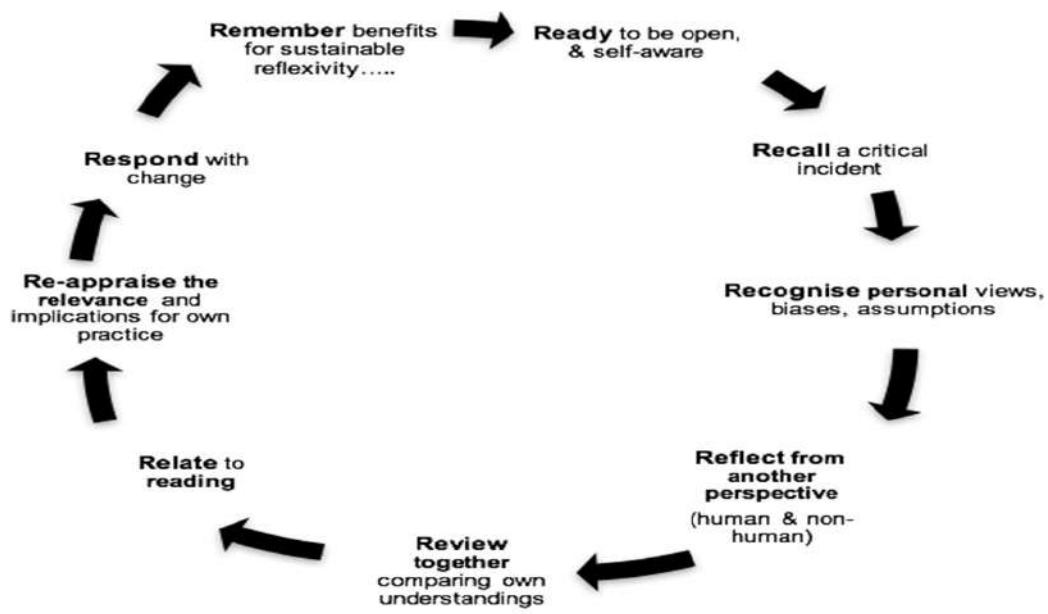
More than ever, is the need to be critically reflective or reflexive, which starts with a readiness to question personal practice, underpinned by personal values, beliefs and assumptions.

McLeod's Reflexivity framework below is offered as a practical set of principles for applying critical reflection in a meaningful and sustainable way.

It draws on different theories such as Schön, Dewey's attitudes (1933) and Brookfield's lenses (2017). By examining different scenarios or incidents (as part of practice) and valuing different perspectives (particularly children's) a conscious change can be made.



(In: McLeod, N. and Giardiello, P. (Eds) (2019) *Empowering Early Childhood Educators: International Pedagogies as Provocation*. Abingdon: Routledge)



Embedding the Early Childhood Studies Benchmark standards (QAA,2019) into the resource

The purpose of Early Childhood Studies degrees was with the aim of providing better lives for children, families, and communities, and importantly to challenge gender and other inequalities. "Early childhood studies graduates are therefore effective advocates for babies and young children; in whatever capacity they work, they facilitate the recognition of the rights of children to actively participate in their world, recognising children's needs, developmental tasks, diversity, and differences" (2019, p6). Key to the degrees are the defining principles with 2.1 clearly highlighting a sustainable lens.

"Aim to give students an understanding of the ecology of early childhood from conception, and of children in an ecological context. Ecological context is understood as encompassing both time and geographical space, and encompassing the contexts of family and community, and children's and family services. The focus is on the development of the child in context and the implications for practice. Studying children and early childhood ecologically means that it would be inappropriate to specify an age at which early childhood ends because this will differ according to societal and cultural contexts, practices, and customs. The attention to child development in an ecological context also situates young children as active participants in the lives and practices of families, societies, and cultures."

Additionally, 2.4 notes: "an understanding of the contested and changing nature of the concept of childhood, ethical principles and children's rights" (2019, p7). Sustainability is acknowledged as fundamental to the nature of early childhood, with 3.4 highlighting the following.

3.4 A critical analysis of children as active participants, their rights and an antibias approach which considers early childhood as a site for democracy, sustainability and social justice underpins and permeates the subject (p9).

The ECS benchmark standards are divided into three categories:

- Threshold standards are the minimum standards necessary for a student to graduate with a single bachelor's degree with honours in early childhood studies
- Typical standards are those that a typical early childhood studies student would be expected to attain
- Excellent standards are those that the highest attaining early childhood studies student would be expected to achieve.

These are some of the benchmark standards that align with the 17 SDGs (UNESCO 2015) – Subject Knowledge Skills.

Threshold standard	Typical standard	Excellent standard
Awareness of issues in relation to rights, diversity, equity, and inclusion in relation to working with babies and young children, families, and communities.	A good knowledge of issues in relation to rights, diversity, equity, and inclusion in relation to working with babies and young children, families, and communities.	Excellent knowledge of issues in relation to rights, diversity, equity, and inclusion in relation to working with babies and young children, families, and communities.
Reflect upon a range of psychological, sociological, health, welfare, educational, cultural, philosophical, legal, historical, political, and economic perspectives, and consider how these underpin different understandings of babies, young children, and childhood, nationally and globally.	Have a well-developed ability to reflect upon a range of psychological, sociological, health, welfare, educational, cultural, philosophical, legal, historical, political, and economic perspectives, and consider how these underpin different understandings of babies, young children, and childhood, nationally and globally.	Have a high-level ability to reflect upon a range of psychological, sociological, health, welfare, educational, cultural, philosophical, legal, historical, political, and economic perspectives and consider how these underpin different understandings of babies, young children, and childhood, nationally and globally.
Evaluate competing positions in relation to the construction of babies and young children and childhood by different subjects, societal agents and time, place, and culture	Analyse and evaluate competing positions in relation to the construction of babies and young children, and childhood by different subjects, societal agents and time, place, and culture.	Have a high-level ability to analyse and evaluate competing positions in relation to the construction of babies and young children and childhood by different subjects, societal agents and time, place, and culture.
Demonstrate the ability to plan for, and where appropriate implement, meeting and promoting children's health, well-being, protection and safety, and the conditions that enable them to flourish.	Have a well-developed ability to plan for, and where appropriate implement, meeting and promoting children's health, well-being, protection and safety, and the conditions which enable them to flourish.	Have a highly developed ability to plan for, and where appropriate implement, meeting and promoting children's health, well-being, protection and safety, and the conditions that enable them to flourish.
Explore critically the interrelationship between political, economic, cultural, and ideological contexts in the lives of babies and young children.	Have a well-developed ability to explore critically the interrelationships between political, economic, cultural, and ideological contexts in the lives of babies and young children.	Have a highly developed ability to explore critically the interrelationships between political, economic, cultural, and ideological contexts in the lives of babies and young children.
Demonstrate the ability to give voice to and, where appropriate, act as an advocate for babies and young children, families, and communities.	Have a well-developed ability to give voice to and, where appropriate, act as an advocate for babies and young children, families, and communities.	Have a highly developed ability to give voice to and, where appropriate, act as an advocate for babies and young children, families, and communities.
Demonstrate the ability to recognise and challenge inequalities in society and to embrace an antibias approach.	Have a well-developed ability to recognise and challenge inequalities in society and to embrace an antibias approach.	Have a highly developed ability to recognise and challenge inequalities in society and to embrace an antibias approach.

The generic skills offer a range of grading criteria that reflects research, academic writing, communication, and interpersonal skills. These examples can be aligned to supporting work/ research on the SDGs.

Threshold standard	Typical standard	Excellent standard
Communicate ideas and research findings by written, oral and visual means.	Communicate ideas and research findings both effectively and fluently by written, oral and visual means.	Communicate ideas and research findings effectively, clearly, and fluently by written, oral and visual means.
Use a range of sources of information.	Use a range of sources of information critically.	Use a wide range of sources of information critically and with insight.
Use the communication skills necessary to converse, debate, negotiate, persuade, and challenge the ideas of others.	Use the communication skills necessary to effectively converse, debate, negotiate, persuade, and challenge the ideas of others.	Use sophisticated communication skills necessary to effectively converse, debate, negotiate, persuade, and challenge the ideas of others.

Full QAA benchmark standards can be found here:

<https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-early-childhood-studies.pdf>

Teachers' Standards Guidance for school leaders, school staff and governing bodies. (DfE, 2011, p5)

The Teachers' Standards were for use in schools in England from September 2012. The standards define the minimum level of practice expected of trainees and teachers from the point of being awarded qualified teacher status (QTS). The Teachers' Standards are used to assess all trainees working towards QTS, and all those completing their statutory induction period. They are also used to assess the performance of all teachers with QTS who are subject to The Education (School Teachers' Appraisal) (England) Regulations 2012 and may additionally be used to assess the performance of teachers who are subject to these regulations and who hold qualified teacher learning and skills (QTLS) status.

The Teachers' Standards apply to:

- Trainees working towards QTS
- All teachers completing their statutory induction period (newly qualified teachers [NQTs])
- Teachers in maintained schools, including maintained special schools, who are covered by the 2012 appraisal regulations.

The standards define the minimum level of practice expected of trainees and teachers from the point of being awarded QTS. The standards set out in this document constitute the 'specified standards' within the meaning given to that phrase in Schedule 2 of The Education (School Teachers' Qualifications) (England) Regulations 20032.

Part one: Teaching (2011, p10) (Relates to SDG 4 Quality Education)

A teacher must:

1. Set high expectations which inspire, motivate and challenge pupils
2. Promote good progress and outcomes by pupils
3. Demonstrate good subject and curriculum knowledge
4. Plan and teach well-structured lessons. (This includes – contribute to the design and provision of an engaging curriculum....all 17 SDGs)
5. Adapt teaching to respond to the strengths and needs of all pupils
6. Make accurate and productive use of assessment
7. Manage behaviour effectively to ensure a good and safe learning environment
8. Fulfil wider professional responsibilities (which includes - take responsibility for improving teaching through appropriate professional development....all 17 SDGs).

Part two: Personal and professional conduct (2011, p14) (specifically relates to SDG 1, 2, 3, 4, 5, 6, 10, 16 and 17)

A teacher is expected to demonstrate consistently high standards of personal and professional conduct. The following statements define the behaviour and attitudes which set the required standard for conduct throughout a teacher's career.

Teachers uphold public trust in the profession and maintain high standards of ethics and behaviour, within and outside school, by:

- Treating pupils with dignity, building relationships rooted in mutual respect, and at all times observing proper boundaries appropriate to a teacher's professional position
- Having regard for the need to safeguard pupils' well-being, in accordance with statutory provisions
- Showing tolerance of and respect for the rights of others
- Not undermining fundamental British values, including democracy, the rule of law, individual liberty and mutual respect, and tolerance of those with different faiths and beliefs
- Ensuring that personal beliefs are not expressed in ways which exploit pupils' vulnerability or might lead them to break the law
- Teachers must have proper and professional regard for the ethos, policies, and practices of the school in which they teach and maintain high standards in their own attendance and punctuality
- Teachers must understand, and always act within, the statutory frameworks which set out their professional duties and responsibilities.

Teaching Standards (DfE, 2011): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/665520/Teachers_Standards.pdf

Professional networking

We would love to hear how this resource is being used as part of delivery and assessment. This will help us to measure any impact. We would especially love to hear about case studies, reflections and stories about how the resource has been used. Please email Dr Diane Boyd, D.J.Boyd@lmu.ac.uk, as she would like to gather evidence and feedback around the resource, in particular how it has increased an understanding of sustainability and the SDGs.

If you would like to discuss pedagogical and practical opportunities in more detail, please contact janetking@ncfe.org.uk or stacymann@ncfe.org.uk and we will be delighted to hear from you and support you in any way we can. We especially welcome feedback from delivery staff, mentors, and workforce practitioners and students.

Thank you for taking time to consider this resource. We hope that you find it useful in your work with babies and children. Enjoy, have fun and create magical quality interactions!

Section 5

Supporting documentation

Sustainable Development Goals:

<https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

<https://www.youtube.com/watch?v=qfOgdj4Okdw>

<https://www.youtube.com/watch?v=2f5m-jBf81Q>

<https://www.science-sparks.com/early-years-science-themed-activities/>

<https://www.firstdiscoverers.co.uk/early-years-science-activities-eyfs/>

<https://funlearningforkids.com/science-activities-preschoolers/>

Early Years Foundation Stage (DfE, 2021) -

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/974907/EYFS_framework_-_March_2021.pdf

Development Matters (DfE, 2021) Non Statutory guidance

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004234/Development_Matters_Non-statutory_Curriculum_Guidance_Revised_July_2021.pdf

Birth to Five Matters (2021)

The Contribution of Early Childhood Education to a Sustainable Society - Pramling Samuelsson and Katz.

https://www.researchgate.net/publication/265435095_The_Contribution_of_Early_Childhood_Education_to_a_Sustainable_Society

Understanding Sustainability in Early Childhood Education

Case Studies and Approaches from Across the UK London Routledge - Boyd, Hirst and Siraj - Blatchford.

Boyd, D. and McLeod, N (2021) chapter 3: Using an arts based, flexible approach to evaluate student's interconnected learning of education for sustainability in Early Childhood

<<https://www.e-elgar.com/shop/gbp/handbook-on-teaching-and-learning-for-sustainable-development-9781839104640.html>>. In Leal Filho, W., Salvia, A.L.,

Frankenberger, F. (Eds) (2021) Handbook on Teaching and Learning for Sustainable Development. Edward Elgar Publishing, Cheltenham.

Hindmarch, T., and Boyd, D. (Eds.) (2021) A Path Made in the Walking: Forest Schools in Norway and in England, An OMEP Special Report, OMEP (UK) and SchemaPlay Publications

Kernan, M and Cortellsi, G. (2019) *Intergenerational Learning In Practice* London ; Routledge.

https://www.routledge.com/Intergenerational-Learning-in-Practice-Together-Old-and-Young/Kernan-Cortellesi/p/book/9781138363465?utm_source=shared_link&utm_medium=post&utm_campaign=B191113163

The Mosaic Approach:

<https://www.nicole-brown.co.uk/the-mosaic-approach-according-to-clark-and-moss/>

The worm farm:

<https://vimeo.com/415426011<https://hes32-ctp.trendmicro.com:443/wis/clicktime/v1/query?url=https%3a%2f%2fvimeo.com%2f415426011&umid=15f3a14e-7179-40db-8a67-32e963fe729c&auth=768f192bba830b801fed4f40fb360f4d1374fa7c-80bbe6e4801762ae0cb05cf998f1ed41b5b42f8>

Tippy Tap:

<https://www.wateraid.org/uk/sites/g/files/jkxoof211/files/schools-challenge-ks1-tippy-tap-instructions.pdf>

Steiner Waldorf

https://foundationyears.org.uk/wp-content/uploads/2011/10/Guide_to_the_EYFS_in_Steiner_Waldorf_settings1.pdf

Play in Early Childhood: The Role of Play in Any Setting

https://developingchild.harvard.edu/resources/play-in-early-childhood-the-role-of-play-in-any-setting/?utm_source=newsletter&utm_medium=newsletter&utm_campaign=August2021

Emotionally Based School Avoidance (EBSA) <https://www.supportservicesforeducation.co.uk/Page/20029>

Farini, F. & Scollan, A. (eds) (2019) *Children's Self-determination in the Context of Early Childhood Education and Services. Discourses, Policies and Practices*. Amsterdam: Springer.

Farini, F. (2019). *The paradox of citizenship education in early years (and beyond): The case of education to fundamental British values*. Journal of Early Childhood Research. Sage. 1-15.

Scollan, A. & Farini, F. (2021) *From enabling environments to environments that enable: notes for theoretical innovation at the intersection between environment and learning*. OMEP Irish Journal of Early Childhood Studies. Vol 14.

Baraldi, C., Joslyn, E. & Farini, F. (2021) *The SHARMED Project: The Conceptual Framework*. London: Bloomsbury.

Horizon 2020 Child-UP, Children Hybrid Integration: Learning Dialogue as a way of Upgrading policies of Participation. Partnership meeting and international workshop 15 Feb 2021 → 16 Feb 2021. Federico Farini (Participant), Claudio Baraldi (Participant), Dympna Devine (Participant), Adrian Holliday (Participant), Helen Avery (Participant), Per Mouritsen (Participant), Angela Scollan (Participant), Jane Murray (Participant) & Evangelia Prokopiou (Participant) [Child UP \(child-up.eu\)](http://Child UP (child-up.eu))

Evolving Dialogues in Multiculturalism and Multicultural Education Edited Collection by Richard Race (In press) Open University Press. Chapter 'Facilitating narratives of cultural identity in the classroom'. Baraldi, C. Farini, F., Scollan, A.

'SHARMED Training: Design and Practice'. Scollan, A., and Joslyn, E. (2021) In: Farini, F., Baraldi, C., Joslyn, E. (Eds). 2021. Promoting Children's Rights in European Schools. Intercultural Dialogue and Facilitative Pedagogy (pp.). London: Bloomsbury

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Farini, F. & Scollan, A. (2021) From enabling environments to environments that enable: Notes for theoretical innovation at the intersection between environments, learning and children's agency. *An Leanbh Óg: The OMEP Ireland Journal of Early Childhood Studies*, 14

Scollan, A. (2009). Academic and vocational progression routes for early years practitioners working towards 'Early Years Professional Status' (EYPS). London Borough of Sutton: Extended Services and Early Years Conference, 23rd January 2009

Boyd, D (2018) Early childhood education for sustainability and the legacies of two pioneering giants
Diane Boyd

<https://www.tandfonline.com/doi/abs/10.1080/09575146.2018.1442422>

Allen, S., Maureen, L., Whalley, M. E. & A. Scollan (2019) Developing professional practice in the early years. Maidenhead: Open University Press

Ryan, R. M., & Deci, E. L. (2002). *Handbook of self-determination research*. Rochester: University of Rochester Press.

Stoecklin, D. (2013). Theories of action in the field of child participation: In search of explicit frameworks. *Childhood*, 20 (4): 443-457