

LEARNING THROUGH RELATIONS

Glasgow's Green Transition
– Nature based Solution

**Project
Documentation**

Carlos Fernandez Mac Gregor

Index

Preface - 2

- My Connection - 3

Stage 1 - 4

- Nature Based Solutions - 5
- Initial Research - 6
- Scope - 7

Stage 2 - 8

- Biophilic Design - 9
- Case Studies - 10
- Ideating Solutions - 11
- Interviews - 12
- Key Takeaways - 13
- Retrospective - 14

Stage 3 - 15

- Pivot - 16
- Why Curriculum? - 17
- Living Education - 19
- Feedback and Critique - 20
- Retrospective - 21

Stage 4 - 22

- Step Back - 23
- Case Studies - 24
- Beginning of Cards - 25
- Our Goal - 26
- Low and High Fidelity - 27
- Co-Design Insights - 29
- Storyboard - 30
- Retrospective - 31
- Next Steps - 33
- Final Reflection - 34
- References - 35
- Appendix - 37

Preface

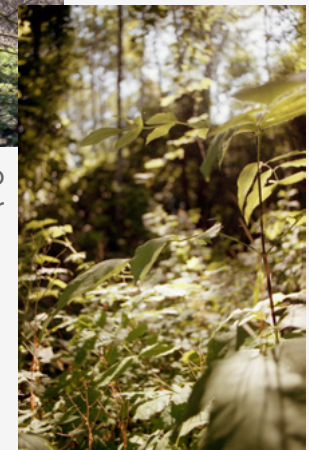
- Connection

My Connection

The topic of including nature based learning within schools is something that I closely relate with. When my family and I immigrated into Canada, we were lucky enough to have moved into a community with a lot of natural areas surrounding it.

My primary school had a large forest behind it and there was a natural reserve only a 5-10 minute walk away from my home and the school. This proximity enabled my teachers to educate us a lot about the environment, all of the living creatures within that environment, and attend outdoor learning days at the reserve where we interacted with nature.

Due to this, I became very close with the outer environment and it has lead me to be more passionate about protecting our earth and everything on it. These values motivated me throughout this whole project towards creating an outcome that I believe will have a positive and major impact on current young students.



Images of Laurel Creek, Waterloo, Ontario
by Carlos Fernandez Mac Gregor

Stage 1

- Nature Based Solutions
- Initial Research
- Scope

Nature Based Solutions

Nature based solutions is a broad topic with a many points of interest, as can be seen in the included graphic from the World Business Council for Sustainable Development. When performing our initial research, we kept in mind this graph in mind.



World Business Council for Sustainable Development. (2024).

Initial Research

Looking into gaps in sustainable solutions within Glasgow, much of the information that was found spoke about how schools within Glasgow need a major change within their buildings.

These old and outdated buildings, which are producing high quantities of emissions and lack modern sustainable construction practices, have been ignored as a major problem area in the city.

50%

Of local emissions stem from
Schools - (Education Scotland)

78%

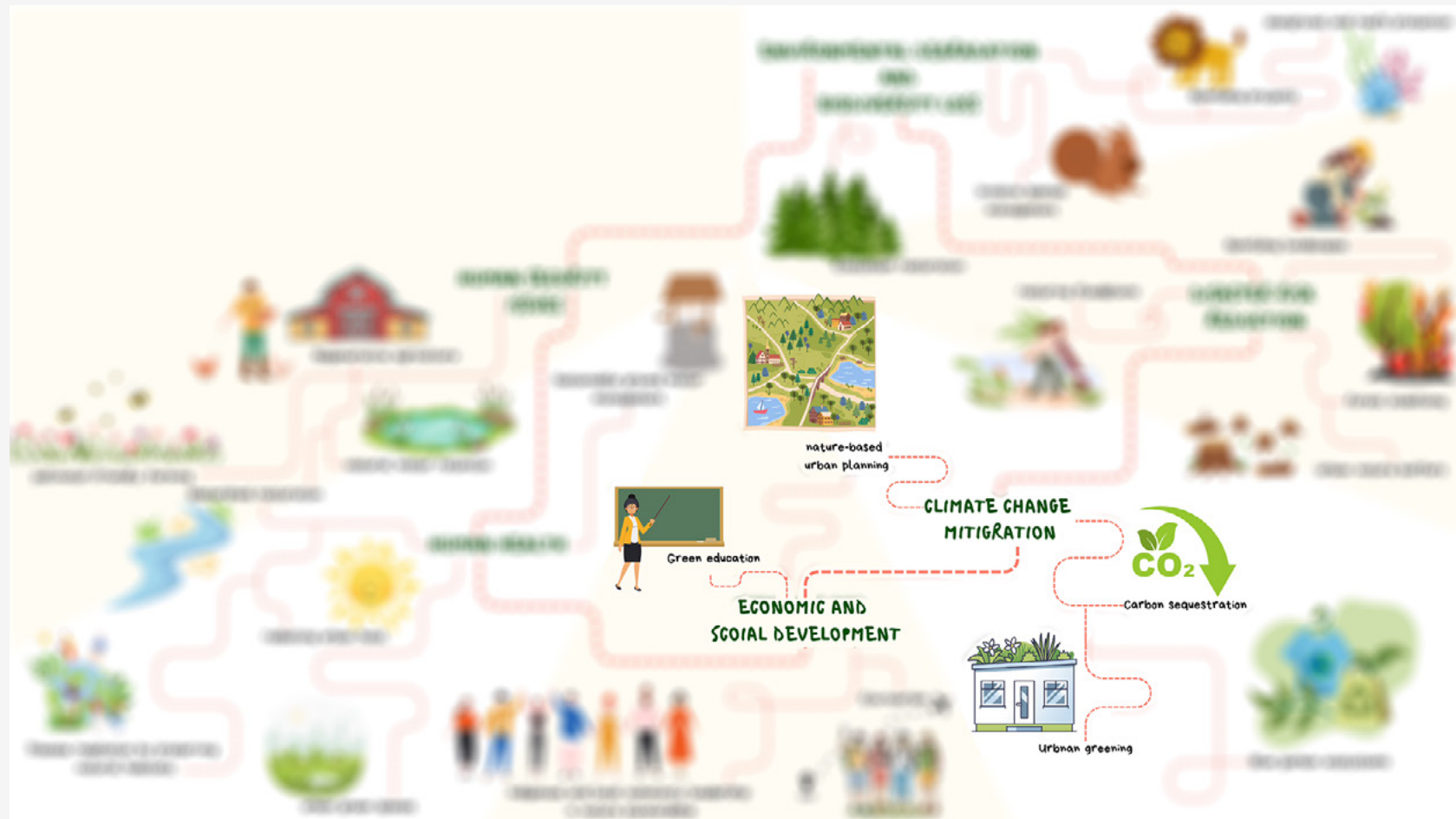
of primary-aged children say they are worried about climate change and over a quarter are
very worried - (GreenPeace UK, 2025)

4 Hours/ Week

Average time a student spends outside —
half the time compared to their parents
- (National trust, 2016)

Scope

Nature based solutions is a broad topic with a many points of interest, as can be seen in the included graphic from the World Business Council for Sustainable Development. When performing our initial research, we kept in mind this graph in mind.



World Business Council for Sustainable Development. (2024).

Stage 2

- Biophilic Design
- Case Studies
- Ideating Solutions
- Interviews
- Key Takeaways
- Retrospective

Biophilic Design

We looked into green education and nature-based urban planning and found many potential benefits when implemented into schools.



HEALTH AND WELLBEING

Numerous studies and a substantial body of empirical literature have demonstrated a **positive relationship** between exposure to nature and human health (Jimenez et al., 2021).

Furthermore, exposure to natural environments has been shown to **enhance cognitive performance** (Mason et al., 2021).

REDUCE CO2

Sustainable architecture is essential for achieving the goal of net-zero emissions (Scottish Government, 2023). This can be reached through the integration of **sustainable design elements**.

The primary objective is to enhance energy efficiency and reduce overall energy consumption. (UCEM, 2024).

SUSTAINABLE LEARNING

Sustainable architecture can facilitate **nature-based education** by creating outdoor spaces for learning (Robianti, 2024).

As students grow up in sustainably designed environments, they are likely to **carry these habits and values** into their **future** workplaces and homes (Gelfand, 2010).

Case Studies

During our research on biophilic design we found the Hazelwood school in Glasgow and the biophilic well-being systems approach by Gray and Downie. Through these case studies, we gained deeper insight as to how biophilic systems can be properly implemented.



Hazelwood School was designed to support students with sensory impairments and complex needs through biophilic and inclusive design principles. It incorporates a sensory trail wall, natural lighting, and outdoor learning spaces to create a more engaging and supportive environment (Abdel-Maksoud, 2016).

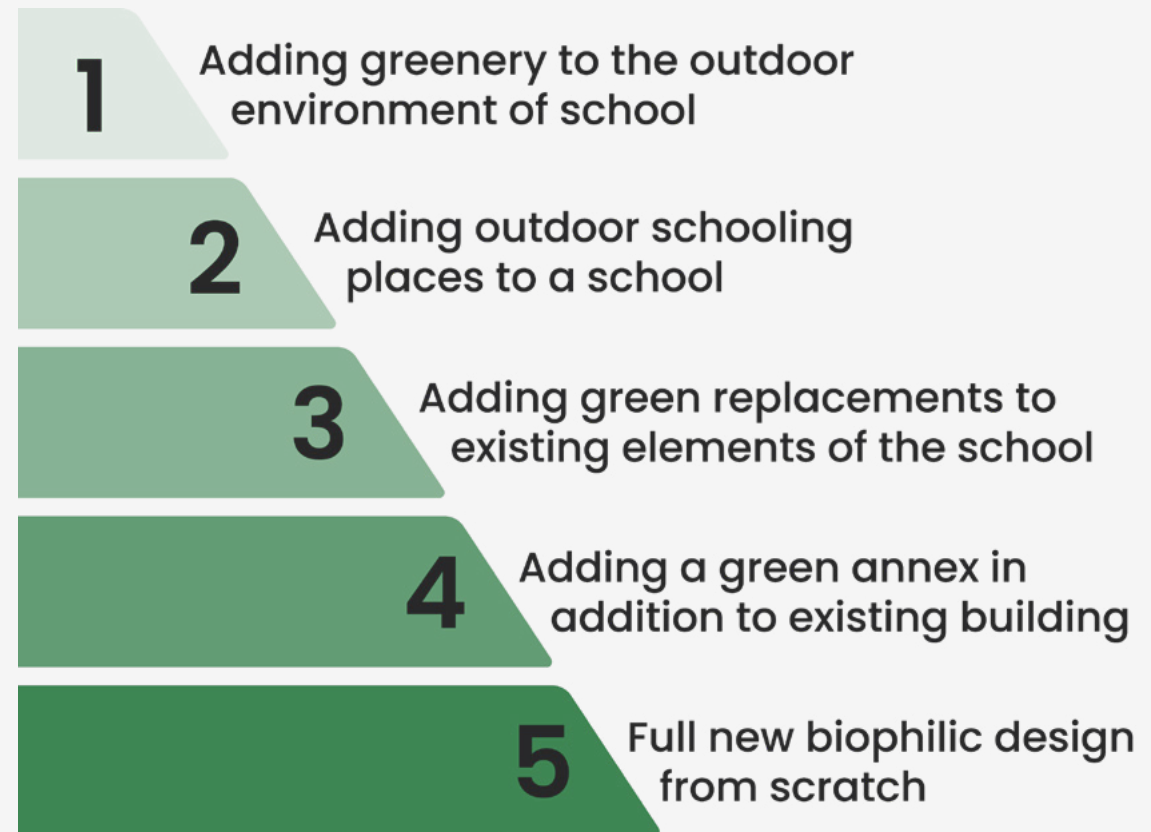


Designing Thriving School Ecosystems: The Synergy of Biophilic Design, Well-being Science, and Systems Science by Fiona Gray and Andrea Downie (2024). Biophilic Well-being Systems Approach (BWSA), combine biophilic design, well-being science, and systems thinking to enhance student well-being in educational settings.

Ideating Solutions


Implementing biophilic schools is not an easy task. It is a very large change that requires a lot of time and money.

So we proposed an intervention plan system in which tier one are simple changes and as you move up to tier five which is a new biophilic school. With this system we hoped that schools would be able to more easily make small changes and slowly build up.



Interviews


For our testing, we met with multiple stake holders to present our intervention plan and biophilic design as an intervention for schools with in Glasgow.



Dr. Beverley Ferguson
Head of Parental Engagement
Education Scotland

Parental Council focus on student improvement


Children ask for more sustainable activities



Mark Irwin & Mairi Thomson
Learning for Sustainability
Education Scotland

Language is a powerful and meaningful tool


Care is missing in the curriculum



Jennifer Guyer
Qualifications Manager
Scottish Qualifications Authority

Sustainable thinking from youth is important

The more interdisciplinary, the better



Anna MacPherson
Project Officer of Neighbourhood
Design Glasgow City Council

Policy as a motivator to change

Students want to learn about climate change

Also confirmed by: Greenpeace (2025), Climate change survey amongst children

Key Take aways

During our meetings, we noted down quotes that provided new useful information that guided us with how we could continue with our project.

These are some of the quotes from each person that pushed us forward.

“People feel like they don’t know anything about climate change.”

– Anna MacPherson, Project Officer of Neighborhood Design Glasgow City Council

“Design is misunderstood in education, but its what is needed.”

– Mairi Thompson, Learning for Sustainability.

“Kids spend 5% of their time in school, the other 85% at home.”

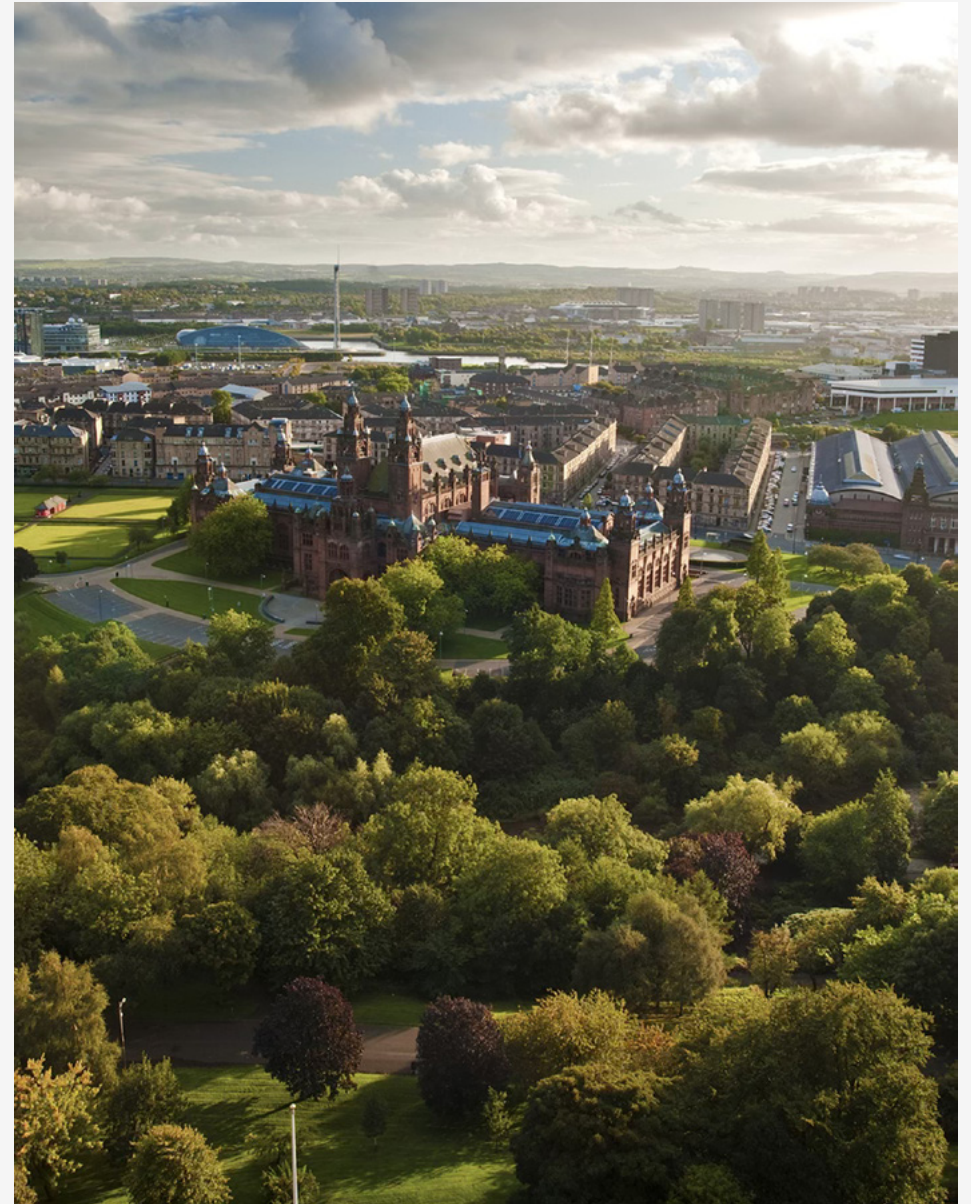
– Dr. Beverly Ferguson, head of parental engagement, education Scotland.

“Kids want to learn more about climate change, but feel the school does not teach it well.”

– Dr. Beverly Ferguson, head of parental engagement, education Scotland.

Retrospective

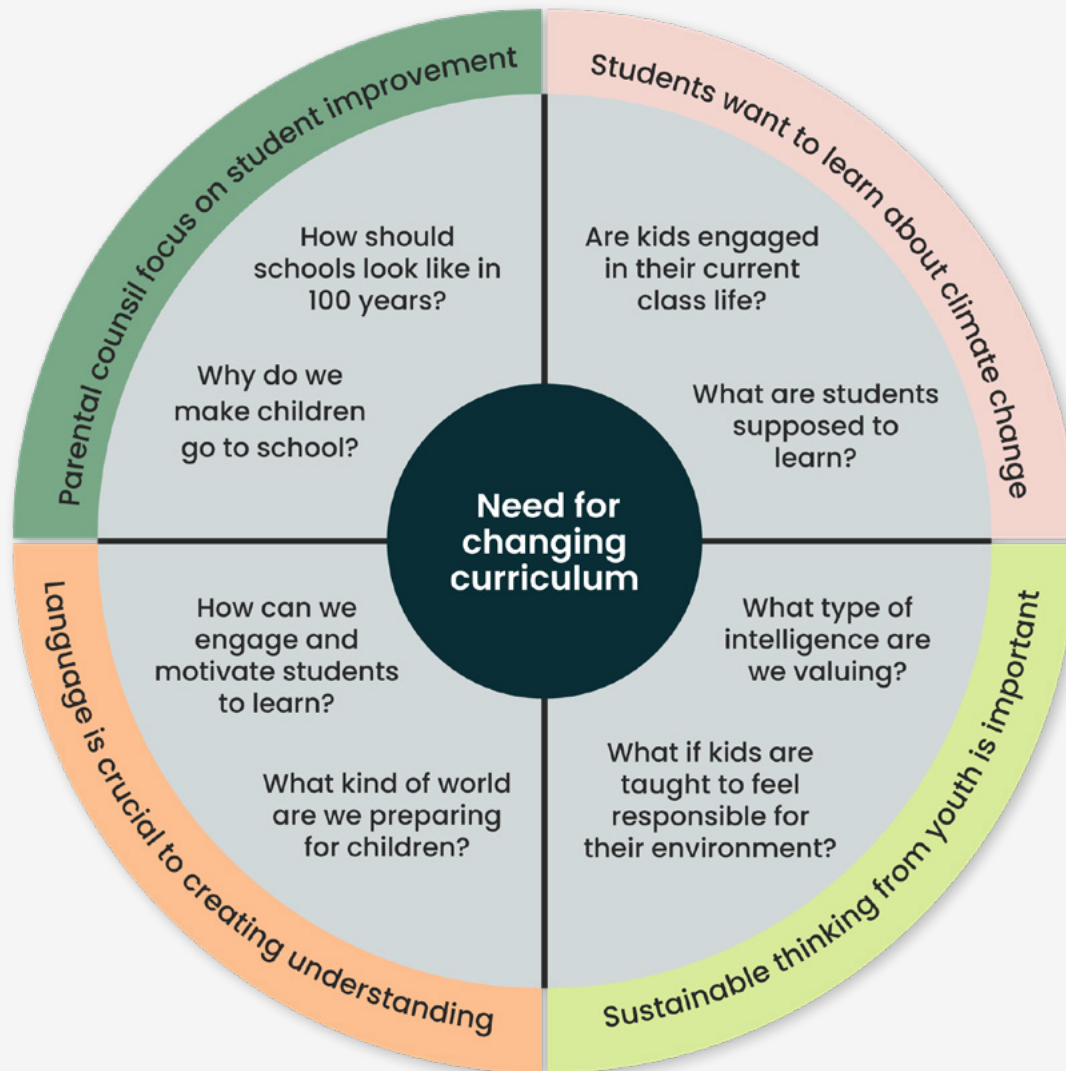
At the end of this stage I gained a lot of perspective into how important it is to talk with people in the area you want to create change. Listening to the feedback we received made me realize that while our research and solution was good, it was not obtainable currently. We had to go smaller if we wanted to make change right now.



Stage 3

- Pivot
- Why Curriculum?
- Living Education
- Feedback and Critique
- Retrospective

Pivot



After stage 2, we needed to pivot our ideated solution to a smaller scale change. We began ideating and looking deeper into the information that we gathered from our interviews.

We noted that there was a pattern of them expressing that while creating biophilic schools are a great change, it would be great if it came with a change in what the kids are taught.

Why Curriculum?

“Currently a lot of the teaching happens within the classroom. Kids do go outdoors, but they do not learn about it”

– Dr. Beverly Ferguson, head of parental engagement, education Scotland.

This led to us thinking how we could bring learning to the outside world. But we did not just want to stop at just kids learning the current curriculum outdoors. We wanted to go farther. We looked back at our primary research and clung to what Dr. Beverly Ferguson said, “kids want to learn about climate change, but they don’t understand when it is taught”.

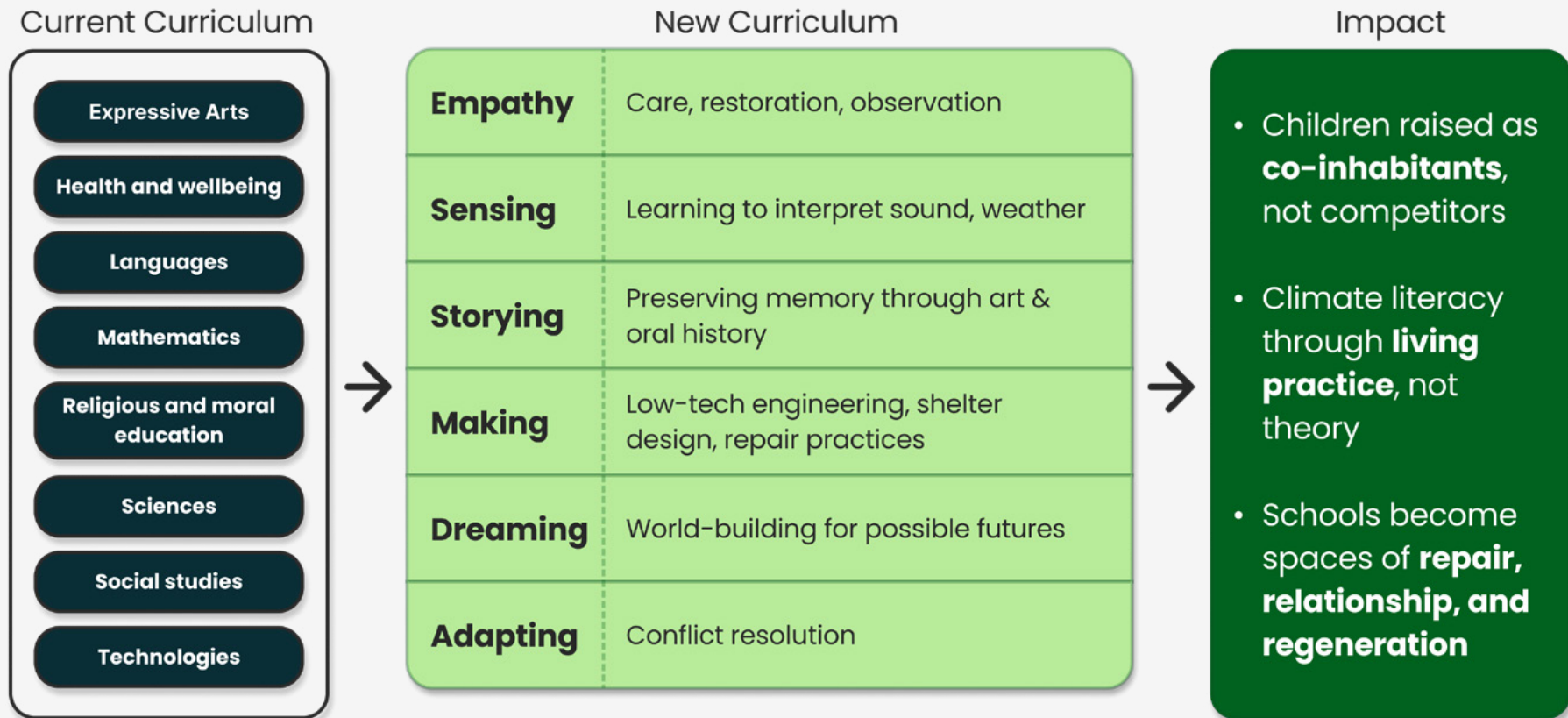
This is when we thought of creating relational studies, a class that would have students connect and understand their environment and why it needs to be protected through their own thinking.

**“It’s not about learning
‘climate facts’ – it’s about
feeling something in the
world and wanting to
care for it”**

- Mark Irwin, Learning for Sustainability

Living Education

From all of this we thought of the living education system. In this, courses focus more on how students relate to their surroundings in real life. Currently there are 8 main courses within the education system.



Courses have been changed where we believe that students will learn more about being more empathetic and caring towards their environment, people, and other living things, while still learning core skills.

Feedback and Critique

After developing this idea we reached out to our contacts at education Scotland to receive feedback on our latest idea. When we presented the idea they were very excited about living education. But while we did not receive direct critiques, some of the wording used in this approval made us realize something.

“This is a major change that is needed in schools”

– Mairi Thompson, Learning for Sustainability.

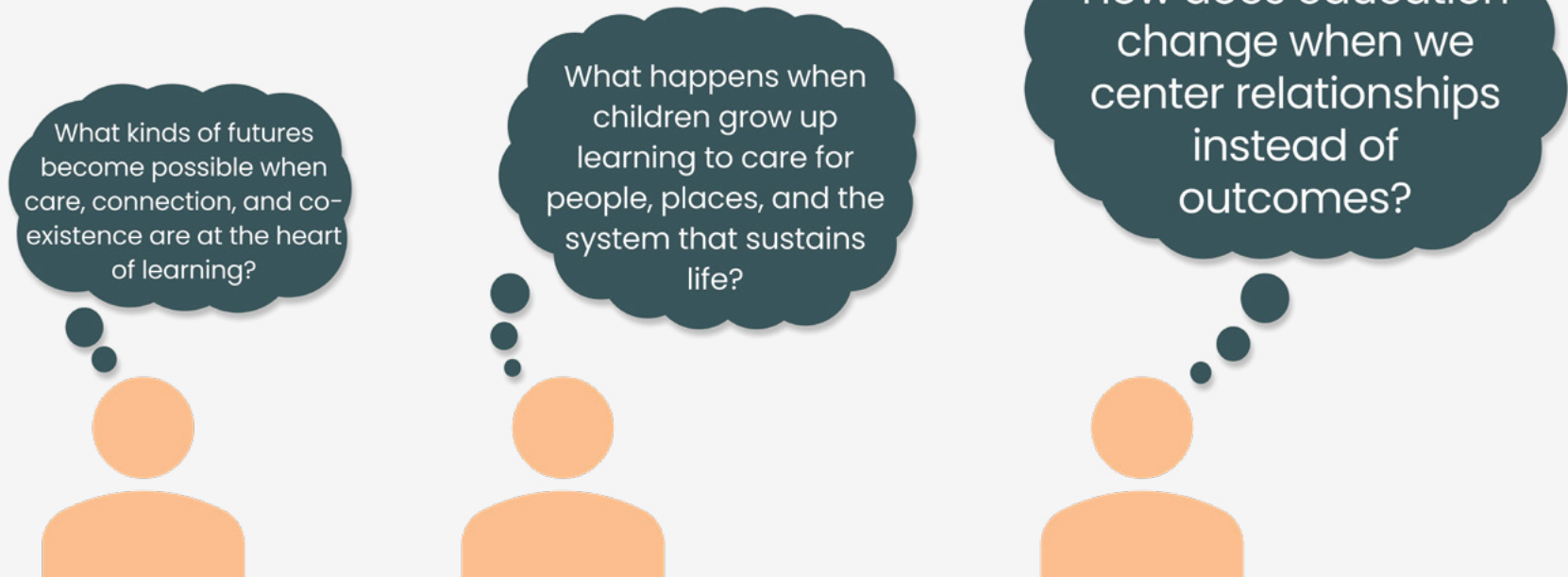
From this we found that while the change was great, it might still be too large scale to be an immediate solution. We realised that we might need to step back and look at how we can reach this distant change.

Retrospective

When we began this pivot, it was quite overwhelming. It felt like we were starting all over again. But as we began to flesh out I began to notice I was more motivated this new solution focused on curriculum.

It felt like a change that was actually achievable and new. After receiving positive feedback out interviews, I appreciated the pivot we made. Listening to our stakeholders and adjusting to what they felt was needed led us down to a road that can actually lead to a current and urgent change.

But even after this change, we still felt we had to take a step back. Although this step back now excited me at what new ideas could arise.



Stage 4

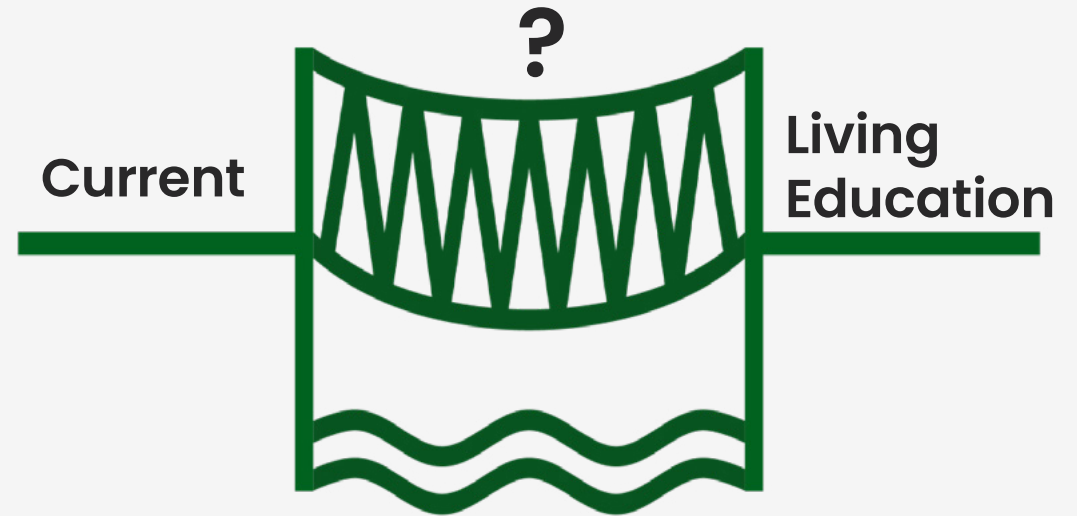
- Step Back
- Case Studies
- Beginning of Cards
- Or Goal
- Low and High Fidelity
- Co-Design Insights
- Storyboard
- Retrospective
- Next Steps
- Final Reflection

Step back

Although we really loved our idea of changing the curriculum of schools towards a more relational and empathetic focus through living education, it was clear that it was still a very large scale idea. Curriculum within schools has been relatively unchanged for many decades.

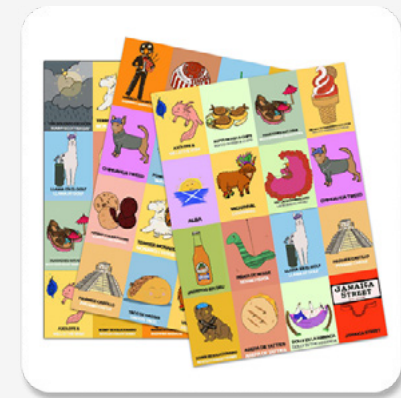
Proposing a major change in the current curriculum could present major stress towards teachers who have expressed that they feel overwhelmed with the current course load (Jeniffer Guyer) and be met with retaliation from parents as they do not understand the importance of a change in curriculum (Mark Irwin,).

We needed to create a bridge to simplify the process of getting to where the education system is now towards our idea of relational studies and living education.



Case Studies

Before ideating a solution to bridge this gap, we looked into a variety of case studies that aimed to find a creative solution for engaging people towards learning and relating with a topic that is new to them and taking on a new way of thinking.



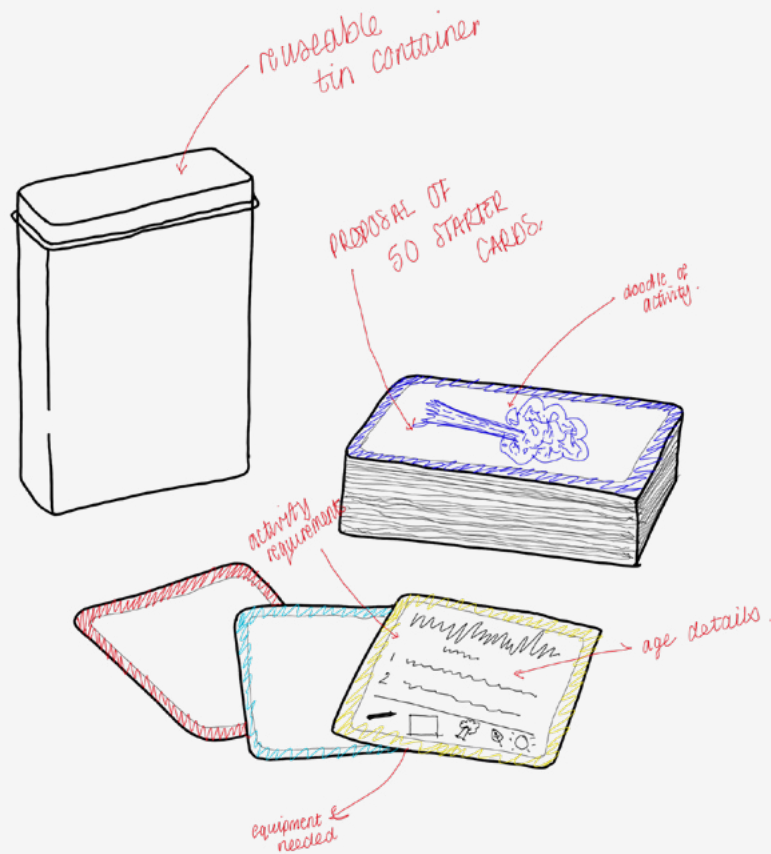
Urban Nature Youth Worker Toolkit

- Research focused on urban nature environments.
- Students are most engaged when interacting with flexible learning and activities.
- Students are more engaged with learning while in nature.
- Important to create solutions that can be easily implemented.

Wee Amigos

- Connect people with ideas and culture they are not knowledgeable on.
- People interact well with visual tools.
- Engage with stakeholders throughout development of solution.
- Important to have design suit the goal of all our stakeholders.

Beginning of cards



With these case studies, I came up with the idea of creating a deck of cards that teachers and parents can use to have their students interact with their surroundings. The main focus of these cards is not only for teachers to integrate with curriculum, but also as an introduction of relational studies.

The activities in these cards focus on students interacting their surroundings (outside and inside) and be more perceptive about what they are seeing.

The cards have a description of the activity, follow up questions that the teacher or parent can ask the child to initiate deeper thinking, and recommendations of how it could be tied to a certain subject if desired.

Our Goal

With these cards the hope is to close the gap in the change of curriculum that we found Scotland needs currently.

As we found through our interviews, teachers currently feel that the structure of the current curriculum does not have room for a new curriculum, parents are resistant to change within the current curriculum, and kids spend a major portion of their time outside of school.

Looking at those points, the cards will subtly introduce the values of our relational thinking curriculum.

Change of thinking

Teachers

will be able to more easily integrate this into their class schedules and not affect the time spent in teaching their other course

Use cards with their students during the school day

Students

will be active in engaging with relational thinking at all times and be more motivated to go to school.

Talk about that they enjoyed the activities at school

Parents

seeing how motivated their child is, they will look into these activities and start using them or the style of thinking

Low Fidelity

For creating the cards, I implemented the UX creation process which I learned during my bachelors. I first began with very low fidelity versions of the cards on cue cards.

This original ideation focused on writing down ideas we had for activities which could be included within the deck and what the graphic alongside it could look like.

By making these rough versions, we were able to quickly note down all of our ideas and make any changes to the cards without fearing the quality of them.



Medium Fidelity

Our second stage of the cards were the medium fidelity prototypes. These cards resembled more closely how we imagined the final version of our cards.

These cards included larger text and images with colours, and some of the cards included follow up questions, and ideas of how the activity can be tied back to the curriculum the students are currently learning.



Co-Design Insights

During one of our later meetings with Mairi, she had mentioned that there are already cards similar to these that focus on the current curriculum. The ones that already exist charge you because they come with additional tools such as magnifying glasses, crayons, cages, pencils, etc..

This is where our cards differ most as our cards do not focus on the curriculum but instead on kids interacting with their surroundings and inspire them to think more deeply about it.

We also aim to have these cards readily available to both teachers and parents for free. This will be achieved by having them readily available online to print.

Competition



Open the Joy® Emotion Management Boxes

Description: Cards and toys that help children understand and control their feelings.

Sold by: Little Whispers

Price: £21.99 (each)

Co-Design Insights

“Simplify the language”

- Mark Irwin, Learning for Sustainability

We also received a lot of useful feedback about changing certain language that could be more fun for young students such as changing further questions to “invitations”.

“Make it open source”

- Mairi Thompson - Learning for Sustainability.

They also recommended providing empty cards so that teachers and parents can make their own cards and include it into their deck.


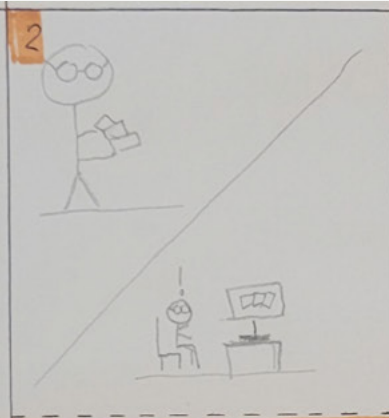
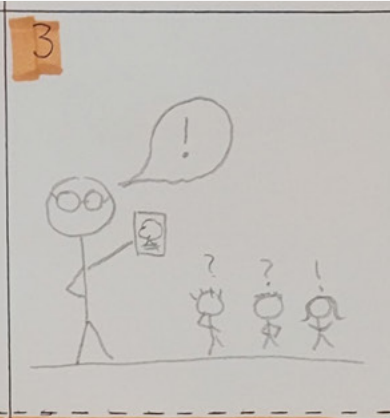
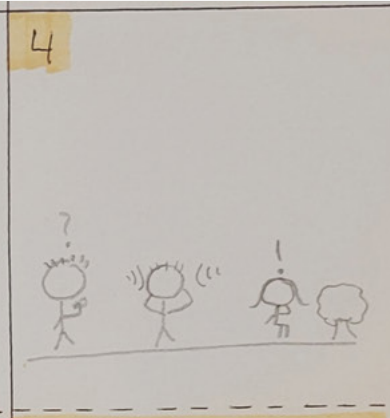
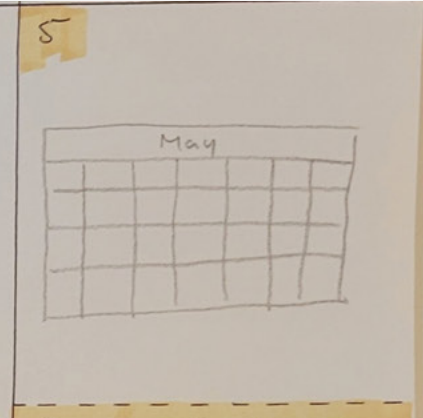
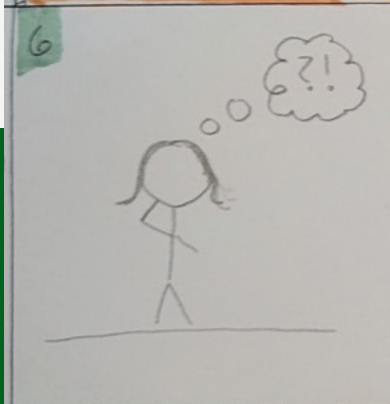
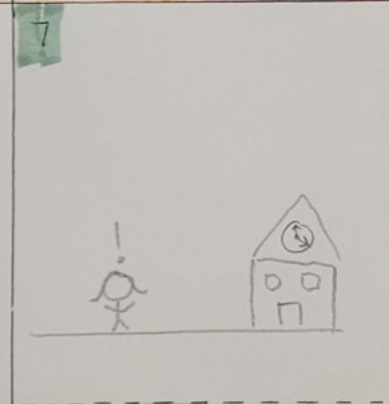
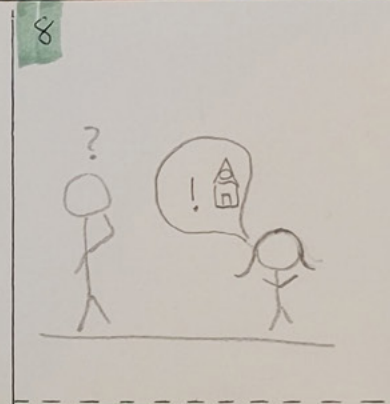
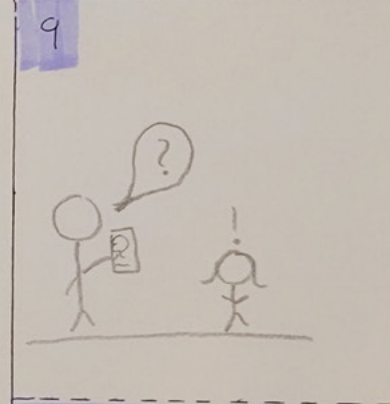
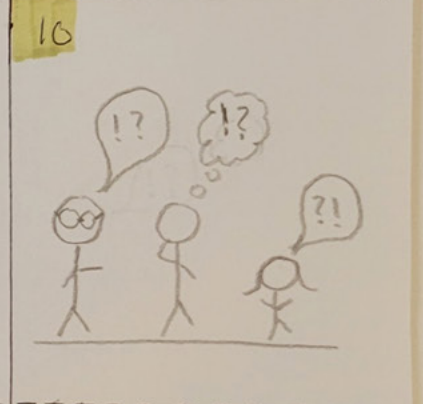
“Teachers need this but don’t know how to get it”

- Jeniffer Guyer, Qualifications Manager

When we presented the cards to our stakeholders were met with a lot of positivity. In our co-design session with Claire Young, a primary school teacher in South Lanarkshire, they expressed that this has been something that they been wanting and feel that their students would adapt and enjoy it.

This highly motivated us to further develop our intervention method and laying out how we envision these cards playing a part in achieving the change we want.

Storyboard

				
<p>Teachers want to engage with their students.</p>	<p>They are provided the cards or find them online.</p>	<p>Teachers begin to use with their students.</p>	<p>Students are engaged in the activities</p>	<p>Activity cards are integrated into the daily routine.</p>
				
<p>Students adapt to relational style thinking.</p>	<p>Students are motivated to go to school</p>	<p>Parents notice this motivation</p>	<p>Parents implement activity cards at home.</p>	<p>Kids, teachers, and parents are all engaged in relational thinking.</p>

Retrospective

Throughout this whole design, creation, and testing process I learned a lot more about the Glasgow education system and the issues it is facing day to day.

Start small to make big changes.

Creating **small** solutions that are easy to understand and will educate people will have much more of an impact and **help achieve the larger** solutions.

Having the cards that our participants could interact with lead to them talking more about how the day to day difficulties, such as lack of funding, lack of class supplies, lack of tools for parents to educate their children, and communication difficulties about the change needed, comes from any currently proposed solution having to high of a cost (monetary or time wise).

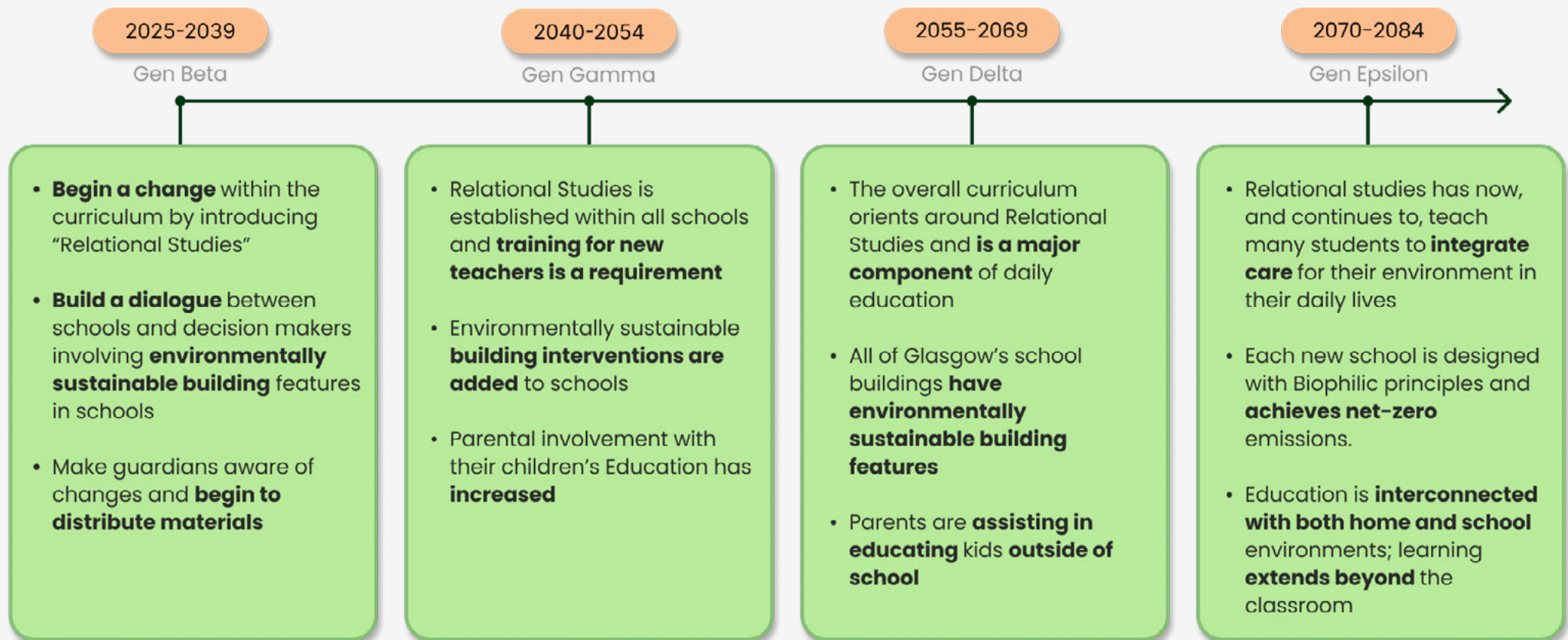
Everyone who interacted with our cards would express that this low-no cost solution that does not cause a major change to current day to day activities is what is needed to teach the importance of the grander future changes.

This has taught me that while it is great to think about large scale solutions that can lead to major change (biophilic schools and a complete curriculum change in this project), it is always important to remember that there will always be push back from people.

“It is not about getting the first follower, but the second follower. Once people see the second person join the movement, they will tag along”

– Mairy Thomson, Head of learning for sustainability, education Scotland.

Next Steps



Final Reflection

Throughout this whole project there was a lot of need for reflection on the work that was being done. Thanks to having constant communication with our stake holder, we gained constructive feedback at each stage that helped guide us to our final solution.

I believe that it is an intervention that is truly achievable in the near future and is something that teachers, parents, and students will truly benefit from.

While the solution is smaller, this process has taught me that large ideas are not what always achieve change, but instead smaller ones which get people talking about what needs to be done.

References

- Acosta Morales, M., (2022). *Migrantes Make Scotland: Final Master's Project*.
- Crook, L. (2020). Foster + Partners' Cairo Hospital Embodies 'latest Research on biophilia'. [online] Dezeen. Available at: <https://www.dezeen.com/2020/09/14/foster-partners-magdi-yacoub-global-heart-centre-cairo-hospital/>.
- Design Council (2025), *Framework for Innovation: Double Diamond*. Available: <https://www.designcouncil.org.uk/our-resources/framework-for-innovation>
- Dezeen. (2022). Softspace Digital surrounds Chart Art Fair pavilion with bioplastic revolving doors. [online] Available at: <https://www.dezeen.com/2022/08/28/softspace-digital-pavilion-chart-art-fair-2022/>.
- Dezeen. (2023). Ten beautifully biophilic buildings from Dezeen's Pinterest. [online] Available at: <https://www.dezeen.com/2023/05/15/biophilic-buildings-pinterest/>.
- Dunlop, A., (2010). *Hazelwood Report*.
- Education Scotland (2025). *Curriculum for Excellence*. Available at: <https://education.gov.scot/curriculum-for-excellence/>
- EFB - European Green Roof & Wall Associations (2023). *EFB Webinar - Green Roofs for Biodiversity and Beyond: European Perspective*. [online] YouTube. Available at: <https://www.youtube.com/watch?v=tPMVhG0vME0> [Accessed 4 Mar. 2025].
- Englefield, J. (2024). William Floyd Maclean designs modular timber furniture that 'considers a wider picture'. [online] Dezeen. Available at: <https://www.dezeen.com/2024/09/16/somer-freestanding-modular-timber-furniture/> [Accessed 4 Mar. 2025].
- Gienger, A., Nursey-Bray, M., Rodger, D., Szorenyi, A., Weinstein, P., Hanson-Easey, S., Fordham, D., Lemieux, D., Hill, C. and Yoneyama, S., (2024). Responsible environmental education in the Anthropocene: Understanding and responding to young people's experiences of nature disconnection, eco-anxiety and ontological insecurity. *Environmental Education Research*, 30(9), pp.1619-1649.
- Gray, F., & Downie, A. (2024). *Designing Thriving School Ecosystems: The Synergy of Biophilic Design, Wellbeing Science, and Systems Science*. *Architecture*, 4(3), 594-612. <https://doi.org/10.3390/architecture4030031>

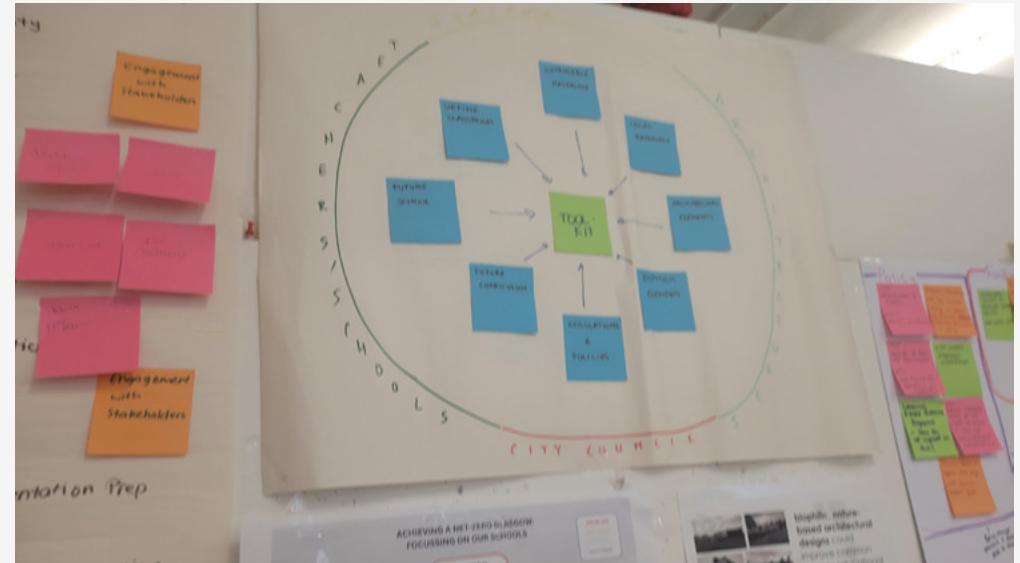
References

- Glasgow City Council (2024). Glasgow's Climate Plan. Available at: <https://glasgow.gov.uk/article/2389/Glasgow-s-Climate-Plan>
- Griffiths, A. (2024). Makhno Studio creates breathable clay panels to improve indoor air quality. [online] Dezeen. Available at: <https://www.dezeen.com/2024/11/25/makhno-studio-breathable-clay-walls/>.
- Gsasustainability.org.uk. (2023). Sustainability at Glasgow School of Art. [online] Available at: <https://www.gsasustainability.org.uk/about-us> [Accessed 4 Mar. 2025].
- Kellert, S.R. and Calabrese, E.F., (2015). The practice of biophilic design. Terrapin Bright Green.
- Natural History Museum, (2023). Urban Nature Youth Worker Toolkit.
- Naturebasedenterprise.com. (2025). Connecting Nature Enterprise Platform. [online] Available at: <https://naturebasedenterprise.com/ventures> [Accessed 4 Mar. 2025].
- Scott, S., (2020). Biophilic Design in Schools: A Case Study Approach. Teacher Magazine. Available at: https://www.teachermagazine.com/au_en/articles/learning-spaces-biophilic-design-in-schools
- Scottish Government (n.d.) School curriculum. Available at: <https://www.gov.scot/policies/schools/school-curriculum/>
- Stefano Gelmini (2025). Majority of under-12s worried about climate change, survey shows - Greenpeace UK. Available at: <https://www.greenpeace.org.uk/news/majority-of-under-12s-worried-about-climate-change-survey-shows/>.
- Thackara, J. (2023). Lifeworlds: Nature as urban infrastructure — John Thackara. [online] John Thackara. Available at: <https://thackara.com/civicecology/nature-as-infrastructure-microbial-urbanism-and-design/> [Accessed 4 Mar. 2025].

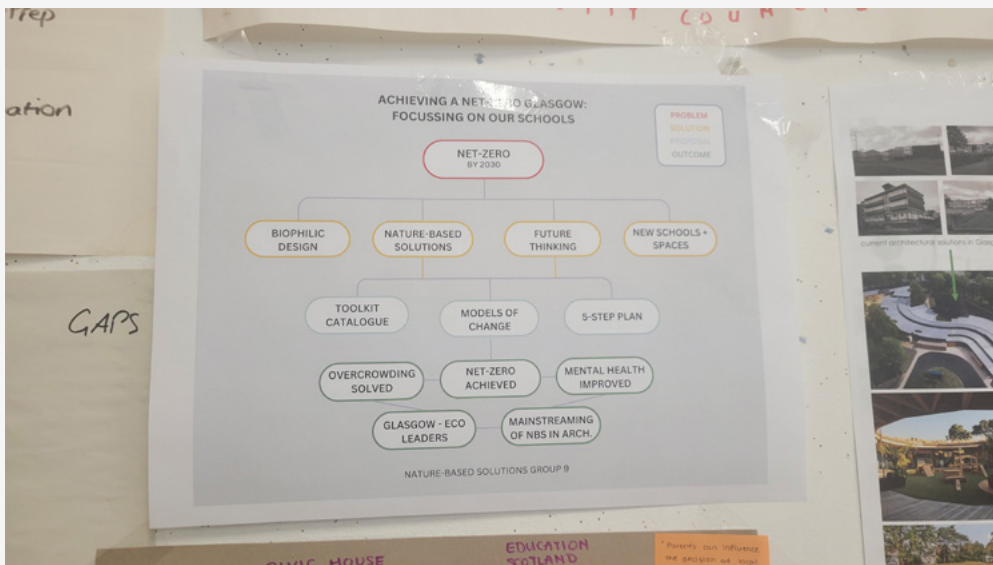
Appendix



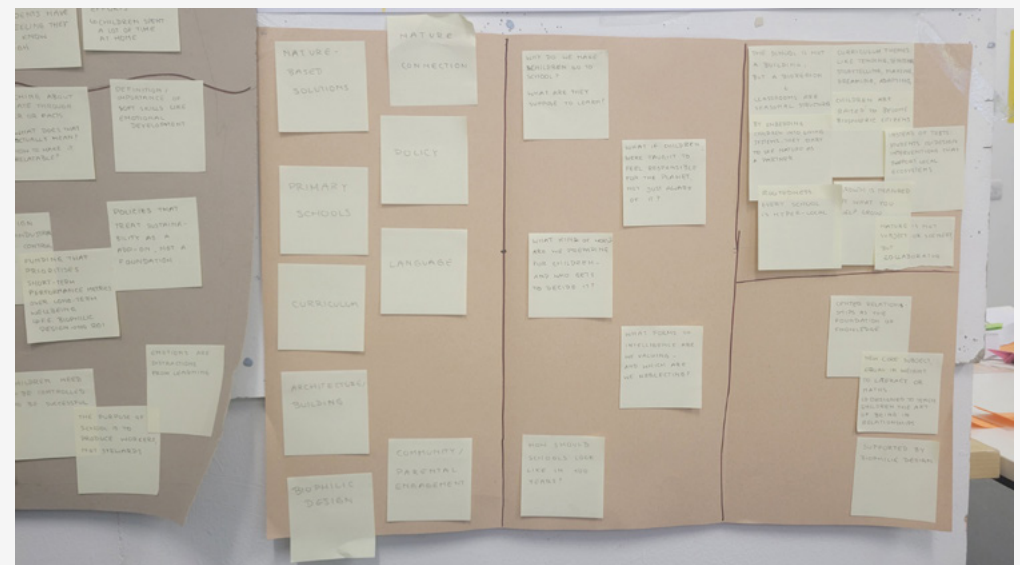
Internalisation of our biophilic idea after meetings.



Toolkit ideation board.

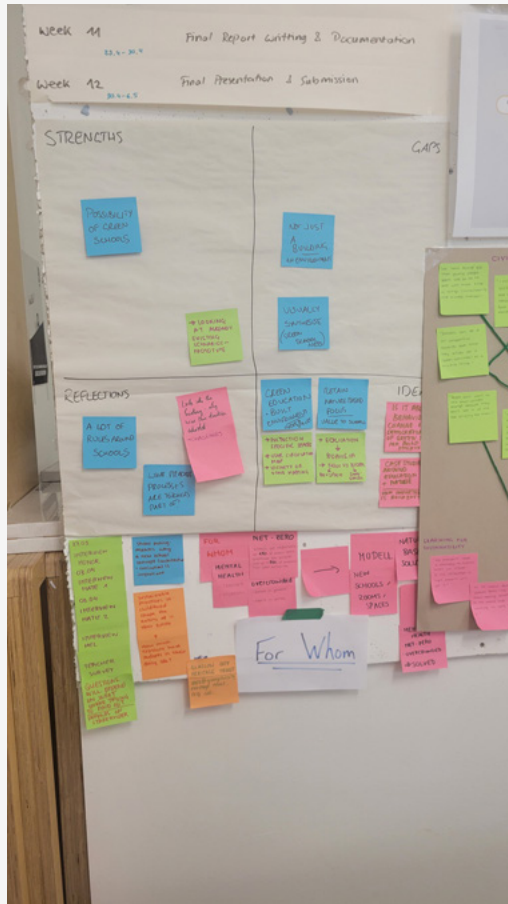


Visualisation of Net Zero system.



Curriculum ideation stages and build up.

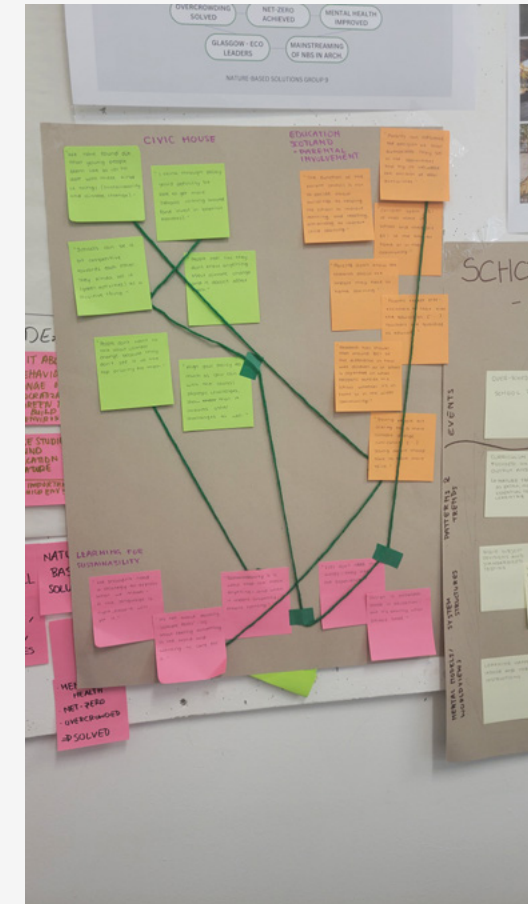
Appendix



Peer Feedback board.



Summary of why we are targeting biophilic schools at the beginning of our project.



Key quotes from our meetings and how they connect.

