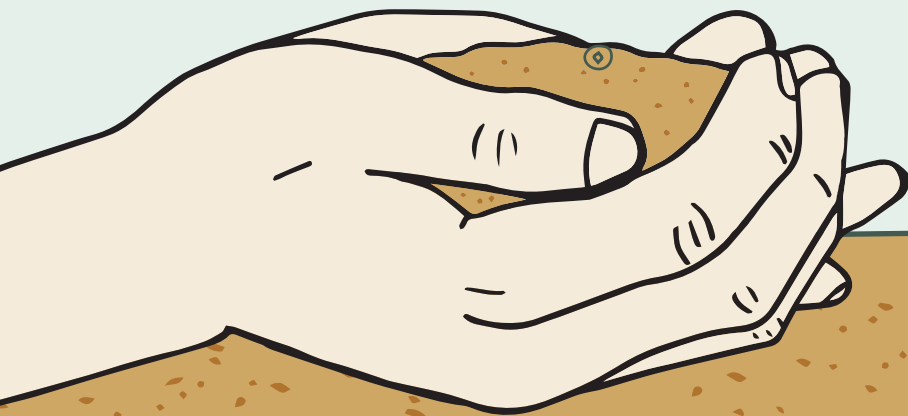


# The Seedling Project





# Acknowledgments

We would like to extend gratitude to the many people who have made this project and the background research possible.

We would like to thank Zingira Community Craft for showing and teaching us their craft work with local materials and resources. Special thanks to Evance Odhiambo and Apollo Omondi for their support and guidance, and for being an inspiration to the development of workshops with children within the subject of planting and growing seeds.

We would also like to thank Harryzon Otieno and the other members of Kibuye Market Waste Management CBO for showing us how they handle waste disposal at Kibuye Market and for helping us map the outlines of the local waste system in Kisumu.

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We would like to give an extra thanks to Shea Hagy for being the best support and friend in Kenya when we had to leave due to the Covid-19 pandemic outbreak.

Lastly, we would like to thank the children who have been participating in the Seedling Project as well as their parents. Without their hard work, dedication and excitement, the project would never have reached its full potential.

This report is the result of the project work within the course Reality Studios, 22,5 credits, ARK496, Master programme Architecture and Planning Beyond Sustainability, Department of Architecture and Civil Engineering, Chalmers University of Technology, 2020.

Authors: Ella Davidsson, Ida Johansson, Frida Edstam, Markus Zorn, Sarah Gold







## INTRODUCTION

### Abstract

The Seedling Project aims to highlight the value of organic waste and the possibilities of local food production at a household level through online education material suitable for children across the globe.

When beginning our project in Kisumu, Kenya, we found there was a need to improve the waste management within the city. Especially the organic waste, being 60 percent of the total waste, caused problems at markets and on the streets.

We shifted our focus to children in primary school to find how we could support their learning within the subject of agriculture and composting. By teaching children about the circularity of food, food waste and small-scale farming, we could show the value of organic waste and inspire to sort and make use of it.

The Covid-19 pandemic outbreak made us reframe the project. Due to the pandemic, a lot of children were restricted to quarantine and could no longer go to school. This made us shift focus from the context of Kisumu to a global context where we found there was a need for home activities and education.

We created manuals for home learning and invited 12 children from Kenya, Austria, Sweden and the U.S. to participate in a pilot project. To educate the children in the pilot group, an online platform was set up where the participants could share their work and comment on each other's plants, composts and food, among others.

In the manuals the two guiding avatars, Space Potato and Wormy, graphically explained to the children how to do the given task, with the purpose of reducing the language barriers and to make the activities more fun.

For future expansion of the project, we collected the learning material and the method we used in a guiding handbook. This was sent out to the parents of the pilot group and to different communities on social media, such as Fridays for Future.



SUMMARY OF WORK

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# 1. Introduction

*As an introduction to The Seedling Project,  
this chapter will give some background as to  
explain where it originated as well as what it set  
out to achieve.*





BACKGROUND

Reality Studio

Reality Studio is a course within the master programme Architecture and Planning Beyond Sustainability at Chalmers university, afford to master students in architecture and industrial design engineering. The goal for the studio is to give students the opportunity to develop skills and methods, valid in situations where the aim is to find adaptable solutions to problems at hand.

The design course takes place in the East African Context of Kisumu, Kenya. This year, a field study to Kenya was planned for six weeks, one week in Nairobi and five weeks in Kisumu. During the field study, through interaction and communication with local stakeholders such as school, organisations and local universities, the students are to formulate projects and form project groups.

This year, the project defined within the studio should relate to the four themes of firstly, *Resilient manufacturing facilities, processes and products*, secondly, *Affordable housing and Healthy schools*, thirdly, *Food chain*, and lastly, *Ecotourism and Inclusive public spaces*.

The solutions of the student projects should dignify the everyday life of the humans affected, aiming at developing inexpensive, material and energy efficient, user and environmental-friendly solutions.

The Seedling Project was formulated as a project to target mainly the theme Food chain. The project group is a both multidisciplinary and cross cultural group, consisting of five students originated from both Sweden and Austria, studying the master programs Architecture and Urban Design, Industrial Design Engineering and Design and Construction Project Management at Chalmers university.



Frida Edstam

My name is Frida and I am a 27 years old Industrial Design Engineer student from Sweden. I am really excited about the Seedling Project since I run a super small scale vegetable farm on my spare time. I also keep my own compost and have hens in my back yard!

Ella Davidsson

My name is Ella and I am a 27 years old architecture student from Sweden. I enjoy working with the Seedling Project because I love being outdoors and think teaching about how to plant and grow is important when learning about how to take care of the environment.



Markus Zorn

I am Markus and I am a 27 years old architecture student. Originally I am from Austria, but I have lived in different places. Enjoying nature is one of my favorite things to do. I have learned a lot through the Seedlings project, because I haven't worked with plants in the past.

Ida Johansson

My name is Ida and I am a 27 years old project manager student from Sweden. The best part of being involved in the Seedling project is getting to work globally with children and teach them knowledge that is beneficial and important to them as well as the environment.



Sarah Gold

My name is Sarah, I'm a 26 years old architecture exchange student from Vienna, Austria. I enjoy working on the Seedling Project as it is really exciting to work interdisciplinary, to think of globally existing problems and how to target them in different local contexts.



# Sustainable Development Goals

The 2030 Agenda for Sustainable Development was published and established in September 2015 by the United Nation. The universal agenda consists of 17 sustainable development goals and 169 targets. The agenda aim is to during fifteen years continue the work of the Millennium Development Goals and direct the world towards a resilient and sustainable path.

The goal is to improve the conditions for the people and the planet and to achieve prosperity and peace all over the world. In the Seedling Project, we are targeting three of these sustainable development goals; Zero hunger, Quality education and responsible consumption and production.

## UNSDG's description:

2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

2 ZERO HUNGER



## The Seedling Project aims...

...to empower children with knowledge and inspiration on how to obtain resilient agriculture on a household level. This will extend the child's understanding of food production and the importance of local and ecological production. By encouraging children to practically engage in making their own compost, growing seeds and reflecting on what food is on their plate, the value of organic waste and small-scale farming is highlighted.

## UNSDG's description:

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

4 QUALITY EDUCATION



## The Seedling Project aims...

...to involve children from different countries in a project-based platform online, which encourages the child to interact with children from different cultures and teaches global citizenship. The online platform can be used by any child, anywhere in the world, giving the ultimate equality to the access of knowledge, if the use of modern technology is available.

## UNSDG's description:

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

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

12.A Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

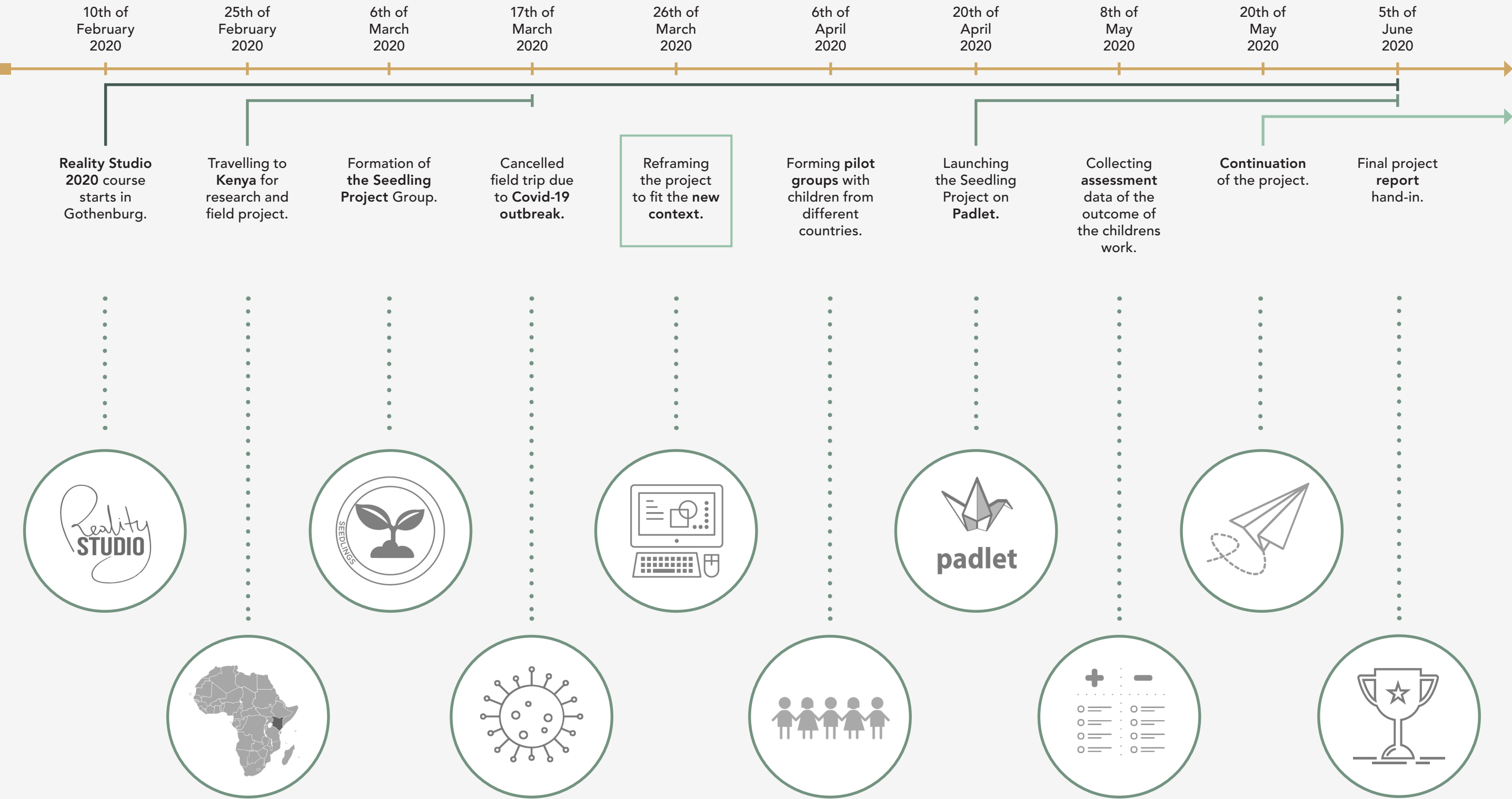


## The Seedling Project aims...

...to create awareness of sustainable food production and the value of organic waste for children from an early age and to spark curiosity of the possibilities each individual has to affect nature in their closest surrounding.

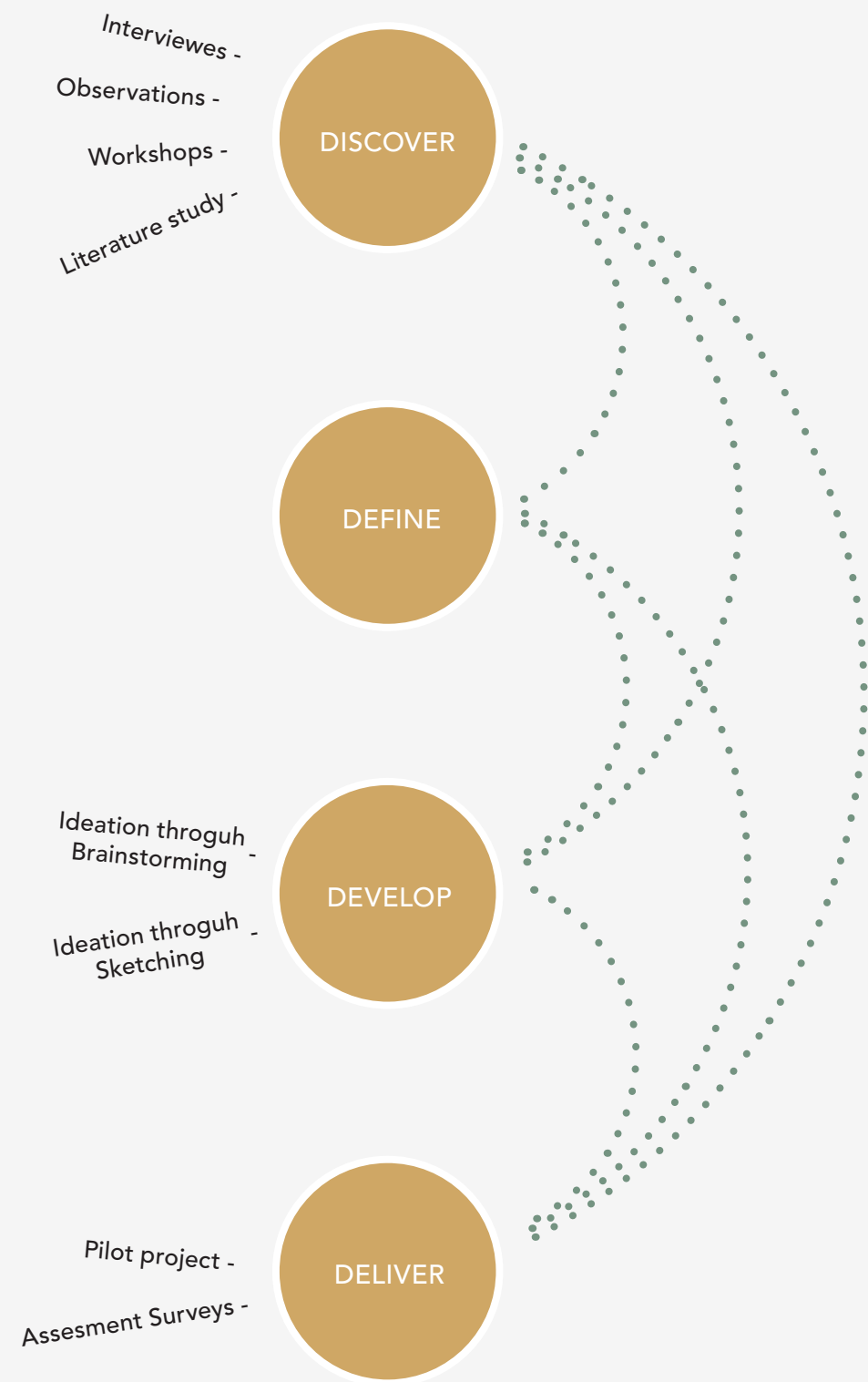
TIMELINE

# The Seedling Project



Timeline. A summary of Reality Studio and The Seedling Project, from the field studies in Kisumu, Kenya, to a finalized concept of the Seedling Project.





**Figure. 1. Process and methods.** The iterative process of this project has consisted of four phases; discover, define, develop and deliver. In each phase, several different methods were utilized.

## INTERVIEWS & OBSERVATIONS

Aiming at creating a broad understanding of the context of Kisumu, Kenya, and especially the topic of waste management, interviews were a method frequently used during the discovering phase of the project, see Fig. . The interviews were mostly semi structured to enable comparison of interviews but at the same time allow the interview to be influenced by the interviewee.

Several interviews were conducted with various stakeholders, such as Zingira, Kibuye Market Waste Management, KMWM, but also with teachers at four different schools to get an understanding of how the topics of waste management and agriculture were taught in schools.

Some of these interviews were conducted together with a short observation. For example, observations of waste pickers working at Kibuye market and observations of an agriculture class at one of the visited schools was made.

## WORKSHOPS

During the field study in Kisumu, one workshop was performed with the aim of understanding the waste system in Kisumu further, identifying problems and potential points of interaction.

The workshop was set up next to the facilities of KMWM where two members of the project team together with three members of KMWM mapped out how waste is moving within the waste system of Kisumu today , focusing on the flow of food waste.

## LITERATURE STUDY

As a complement to what was learnt and explored during interviews, observations and workshops a literature study was conducted. This enabled an increase of knowledge, for example, about the waste system in Kenya but also a brief understanding of the waste systems in Sweden, Austria and the U.S., as the project was reframed to fit a global context.

## IDEATION

Designing the method and material of the Seedling Project was an iterative process, developing and changing throughout the project. Different methods for ideating were frequently a part of the process, in particular when developing the method and the educational material. Brainstorming was the method mostly used but other ways of ideating, such as sketching, was also present.

## PILOT PROJECT

Aiming at testing the material and the method for teaching children about the circularity of food, food waste and small-scale farming, a pilot project was set up. The pilot project was conducted online during three weeks' time and invited twelve children, three from each country, to participate.

During the pilot project, the children were divided into three different groups, to be able to compare the results between the groups. The twelve participating children were chosen due to nationality, gender and age. The aim was to have one participating child from each country in a group, with a balance between girls and boys and 7-15 years olds.

To get a more detailed understanding of the method developed to conduct the Seedling project, the method is further described in Chapter 4, The Seedling Project.

## SURVEYS

To get feedback on the pilot project, an evaluation in the form of three surveys was conducted. The survey mixed open ended and close ended questions to get both qualitative but as well quantitative data.

The first two surveys were sent out to the twelve participating children. The first was sent out after week one and the second after the end of the pilot project. This was done in order to gather the children's opinions on the different missions soon after performing them.

The third survey was sent out to parents. The aim was to get their view on the child's participation, the method of the project and the material sent out. The survey also enabled a validation of the children's survey, as the parents could communicate their point of view.

## 2. Understanding the Kenyan context

*The Seedling project was established during a field study in Kisumu, Kenya. This chapter will explain the context of Kisumu further and present the learnings from the field study.*





# Kisumu, Kenya

Kisumu is the third largest city in Kenya and is located on the east shore of the second largest freshwater lake in the world named Lake Victoria. The city plays a vital role for the country’s economy with both large producers of rice and sugar as well as working as an important center for trading and communication with the countries part of the Great Lakes region. Kisumu has more than 500 000 inhabitants. Kisumu has a high population density and is one of the fastest growing cities in Kenya. (CGK, 2017)

The population of the city is rapidly increasing at a rate of 1,86 % which has caused a serious degradation of the city. On average 385 tons of waste is generated per day in Kisumu and 75% of the waste remains uncollected. The uncollected waste ends up on the roadsides, markets sites, back streets and open spaces, especially in the informal settlements. About 60-65 % of the waste is organic waste that could be used for farming purposes. (CGK, 2017)



**Map of Kenya and Kisumu.** Kisumu is the third largest city of Kenya and the location of the field study. Marked on the map of Kisumu are different neighbourhoods and areas, but also Kibuye Market, which played an important role aiming at understanding the Kenyan context.





# Waste management at Kibuye Market

## VISITING THE MARKET

As we tried to get more information about the waste management in Kisumu, we inevitably had to take a closer look at Kibuye Market, which plays a key role when trying to understand how people in the city deal with waste.

Harryzon Otieno, founder and leader of the Kibuye Market Waste Management CBO, KMWM, and part of his team introduced us to existing projects targeting waste at the market. We had two longer meetings, in which we discovered different aspects about the waste management of Kisumu.

In the first encounter, all five of us met with Harryzon and one of his co-workers. They gave us a tour around the market and we were shown where waste was produced, how it was transported and where it was stored. A great value of this active tour was seeing things with our own eyes, which, due to our cultural background, would have been hard to imagine otherwise.

## COLLABORATIVE MAPPING

The goal of the second meeting was to get a better understanding of how waste is managed in Kisumu in general. Two members in the project group joined an official KMWM meeting, where around 25 market vendors and other members got together to discuss current issues. We got a change to share our project vision, and many commented with their ideas on the relevance and implementations.

The other half of this meeting was a workshop with Harryzson and two of his co-workers. We used collaborative mapping, to get a better understanding of the parts of the system and how they are connected. By arranging, re-arranging and connecting post-its we managed to get an overview of the different kinds of materials and actors involved in the process, see fig. 2. The map played a key role for us, in learning about waste and how it is being dealt with in Kisumu.

## KEY ELEMENTS: FERTILIZER AND FOOD WASTE

We discovered two key elements in the flow of resources which we wanted to address with our project.

Firstly, the most common fertilizer is an expensive, industrialized, chemical product. This is an issue because it is expensive and not beneficial for the environment.

Secondly, the majority of organic waste is mixed with other materials, for example, metals and plastics, and ends up on a continuously growing dump site. Practicing composting would lead to improvements in both, the provision of fertilizer, as well as waste disposal.

Through emphasizing the value of food waste, we are hoping to create a change of mindset, from seeing organic waste as a source of problems to a resource with economical and ecological worth.

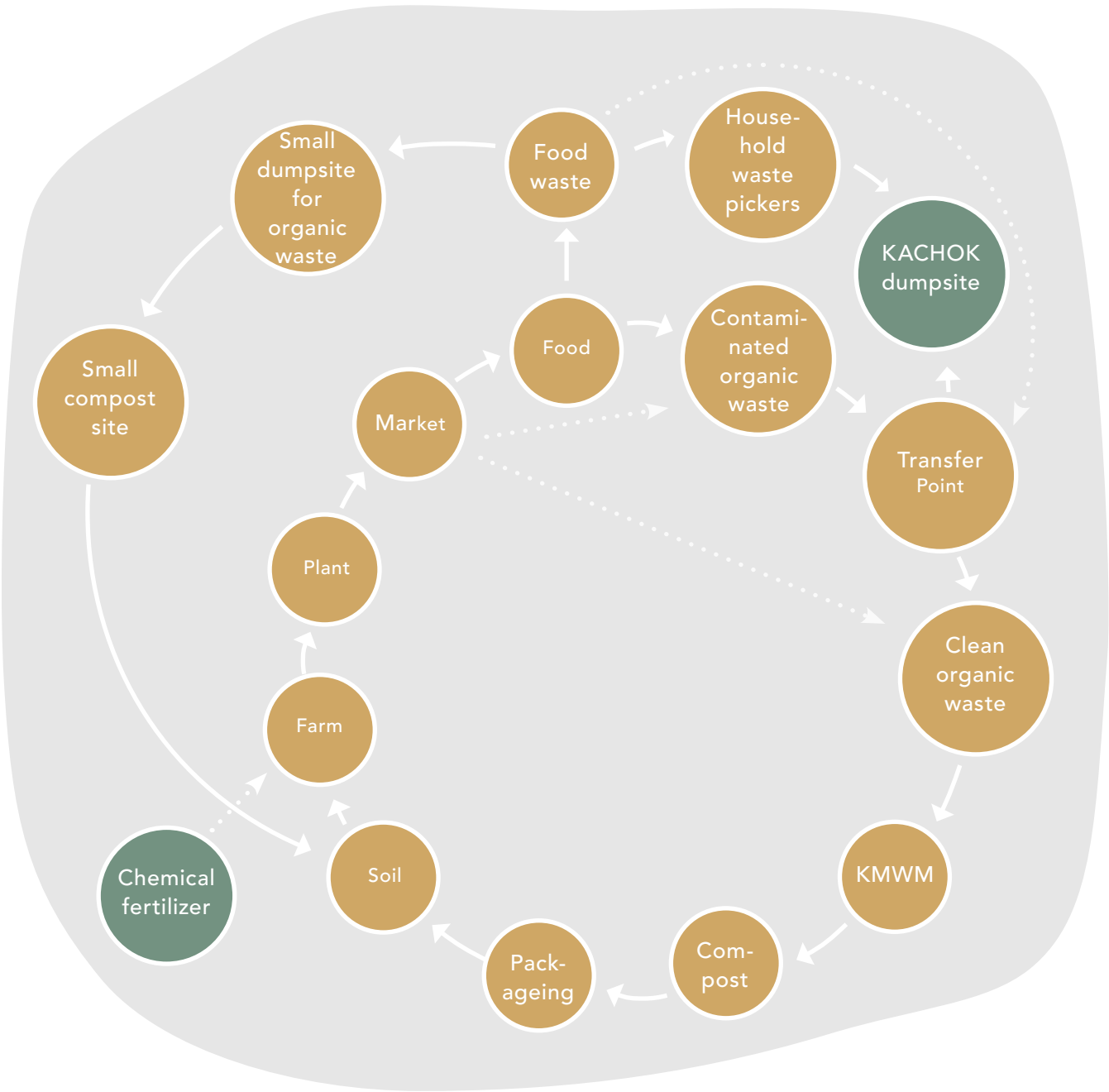


Figure 2. Mapping of Kisumu waste system. An overview of materials and actors involved in the Kisumu waste system, highlighting the key points of the Kachok dumpsite and chemical fertilizers, that create errors in the circularity.









## RESEARCH

## Making paper with Apollo

A full day was spent at Zingira Community Craft, which is an independent organization based in Kisumu. Local engagement plays a key role in their work, which happens through mentoring and training youth as well as collaborating with other local organizations. They run many projects simultaneously, addressing different topics related to sustainability. ‘Zingi Pad’ for example, deals with menstrual health issues by producing and selling affordable sanitary pads as well as educating society about this topic.

A project more relevant to The Seedling Project, is the production of hand-made paper, by recycling paper waste. Different ideas about composting and using their biodegradable paper as well as experience with prior workshops at schools were the main reasons for our visit.

We participated in a workshop, where we learned about the process of reusing paper waste, which was mixed with water hyacinths and water to produce new hand-made paper. Through adding different kinds of seeds, leaves and blossoms, we tried to combine their existing methods of making seed paper, with our visions of creating educational material.

Besides the paper production itself, an existing idea by Zingira called “Seed in a Box”, also caught our interest. Creating a small box from the artistic paper they produce, where seeds can be planted inside, can be used for workshops at schools. This concept seemed to go well with our thoughts on creating educational material for teaching about composting and the value of organic waste.







# Schools in Kisumu

In order for the project to respond to current needs, it was important for us to understand the educational system in Kenya. Knowing which teaching material already exists, how it is used and where to identify room for improvement, is crucial to answer the question of how to make a valuable contribution within given boundaries.

We decided to visit four schools in two different areas of Kisumu. Three of the schools were located in the informal settlement Ubunga and one of them in the outskirts of Nyalenda, in a more rural setting. By talking to teachers, we could learn more about their situation.

## NANGA PRIMARY SCHOOL

Nanga Primary School is located a bit outside the centre, south of Kisumu, in the outskirts of Nyalenda. Much space and a big school yard are big advantages of the low density suburban context. With more than 1200 students and only around 30 teachers, the staff-student ratio shows a need for more tutors.

The school had a compost that they used for educational purposes and also used to have a small garden at the schoolyard. Though, due to cows eating the plants, the garden was put out of use. During the visit to Nanga an observation of an agriculture class was made. During the class, the children in the 4th grade used to compost soil to plant and sow seeds. The children were very enthusiastic, which made this class perceived as both exciting and chaotic.

## JULIANA PRIMARY SCHOOL

Juliana Primary School is the school with the lowest number of students among the visited schools and charges the lowest tuition fee, making it attractive for children with young and low-income parents. The school also offers a few beds for children to live on site, if parents do not have the necessary resources to provide for a place to live at home.

The financial situation of Juliana Primary School seemed challenging, which explains why they only own one hand-written copy of a newly released textbook, teaching children topics as agriculture and composting (Government of Kenya, n.d.). We were told that lessons about composting are about to be implemented.

Asking general questions gave us an idea of how many hours the children spend in school, how far they have to commute every day and how much their parents have to pay in tuition fee each year. In more detail we wanted to know how the subject of agriculture is being taught, which methods and textbooks they use and if they had a compost on site for hands-on work with organic waste.

## FUTURE HOPE PRIMARY SCHOOL

This medium sized school is also located in Ubunga. Children usually stay for an extra hour after class to play games and enjoy their free time, which makes them spend around nine hours per day on school grounds. The tuition fee is around 9000 Ksh/year.

Teachers at Future Hope showed much interest in educating children in agriculture. Although there was a shortage of space, each child in the 4th grade had a small garden patch of around two square meters. The children got to bring food waste from their households, preparing their own compost to fertilize the soil on their patch. As each child was responsible for the care of their own patch, comparison between student patches was possible. The teachers explained that this helped the children to get insight in the importance of, for example, compost and water.

## EMMAUS PRIMARY SCHOOL

At Emmaus Primary School about one quarter of all 500+ students is fully accommodated on site, free of charge. To compensate for the lack of teachers, the school is dependent on about five volunteer tutors.

The lack of space made practical classes about composting almost impossible. Nevertheless, we found out that they ask the children to bring organic waste from home for small experiments, and they showed general interest in trying composting in the future.





Visiting the four schools, it was found that all schools were interested in the project work, collaborating and offered to hold workshops at their school.

Another discovery made was the importance of clearly communicating the project’s intentions, to avoid misunderstandings and inaccurate expectations. Explaining the general aim of the project work and its vision, as well as talking about the financial situation, were crucial in establishing a good foundation for a potential future collaboration.

Fig. 3, Fig. 4 and Fig. 5, show how the four schools visited responded to the questions about their composting possibilities, how they deal with organic waste and in which settings they usually teach.

In conclusion it can be said that schools with composting possibilities are using them. Those who lack the space or money for a compost, express a wish of having one. Using organic waste for additional educational purposes would also add to the variety of teaching methods currently used.

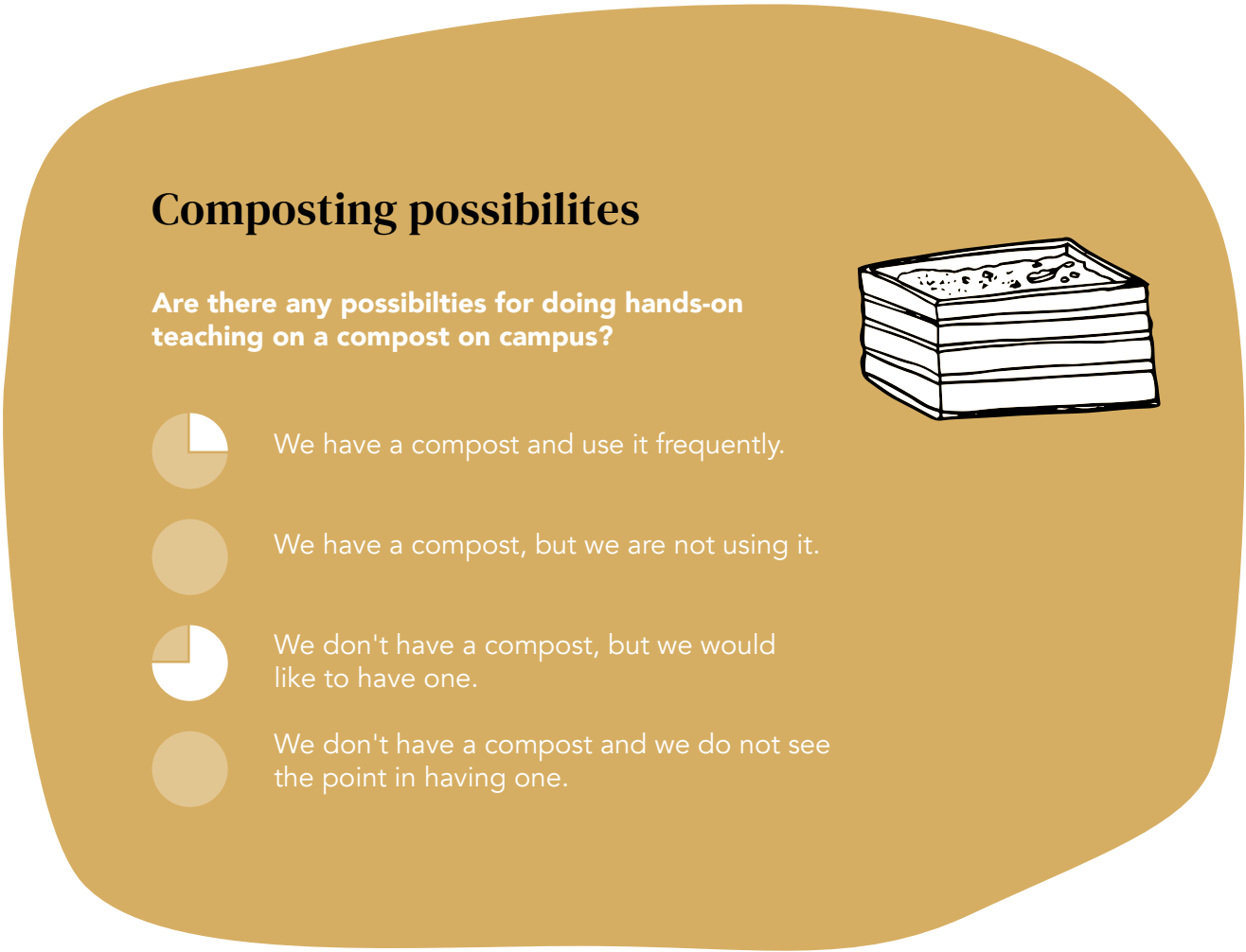


Figure 3. Composting possibilities of the four schools visited in Kisumu.



Figure 4. Dealing with organic waste at the four schools visited in Kisumu.

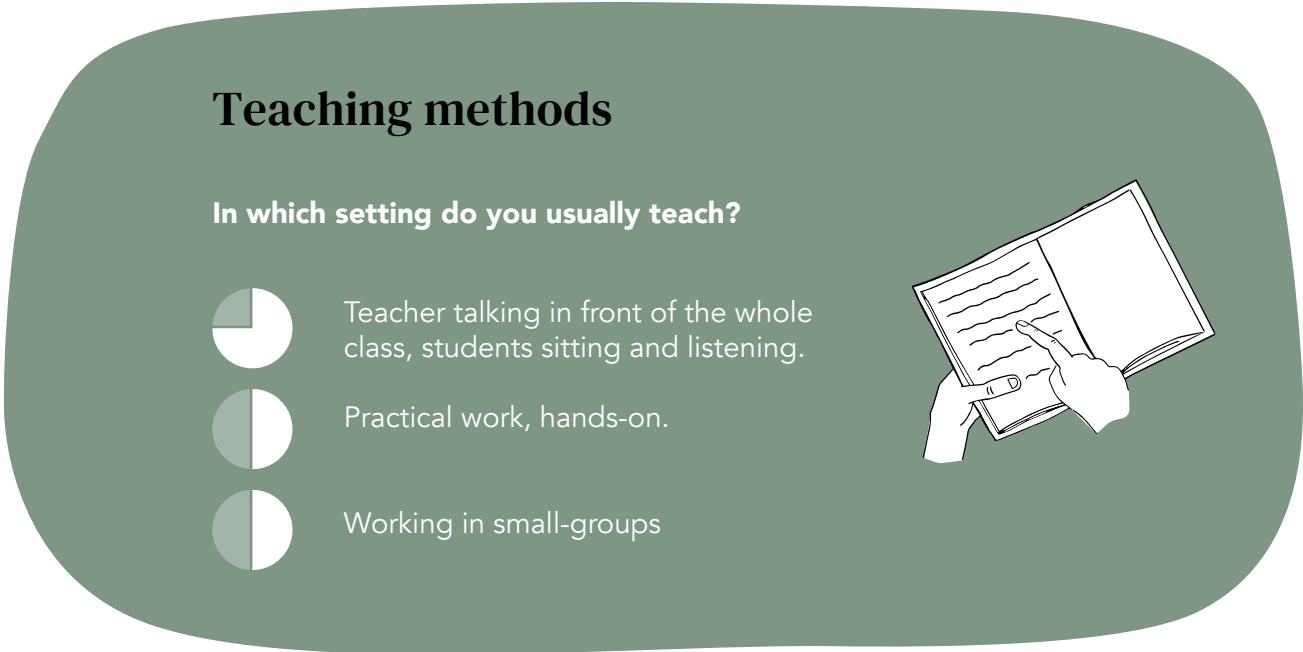


Figure 5. Teaching methods used by the four schools visited in Kisumu.



CONCLUSIONS

# Learnings from Kisumu

LEARNINGS & AIM

By analyzing different parts of the waste management system in KIsumu and how some of the waste is recycled and some not, the project group found different problems and possibilities. One of the main problems found was the contamination of the food waste generated by not being handled separately. A need of handling the organic waste directly at the souce, as for example in households, was acknowledged. As of today, the people of Kisumu appeared to already have a interest in recycling and sorting waste. For example, there is both scrapyards for metal and plastic where the materials are recycled and sold. The project group therefore saw an opportunity to increase the value and knowledge about organic waste and how it can be reused, in order to reduce the contamination. The area that the project group decided to focus on was adding value through composting. The project therefore set out to answer the question of how to add value to clean organic waste.

CONCLUSION: THE SEED CIRCLE

Through the organisation Zingira, and their work with planting seeds with children, we started to explore something we call the Seed Circle, see Fig. 6.

By adding complexity and introducing this circle to children, we targeted not only the value of organic waste but also the importance of local food, good soil and recycling. If you start with the food on your table, you can make the waste into a compost that will turn into soil. In this soil you can put a seed and harvest to complete the circle.

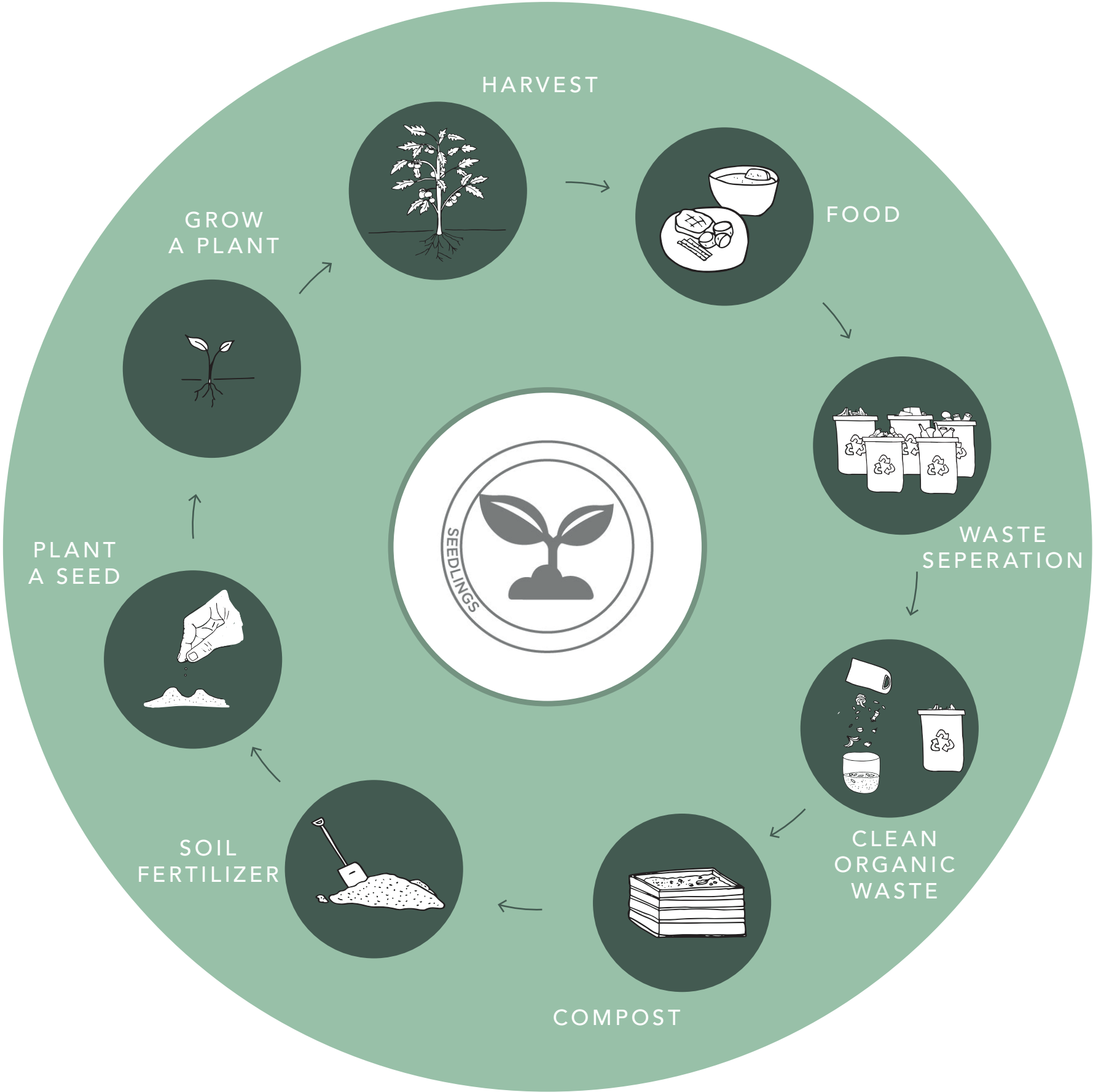
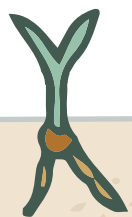


Figure 6. The Seed Circle. The circularity of food, food waste, compost and growings.

### 3. Reframing & New Context

*As the Seedling project progressed the aim was reframed. This chapter will explain how it reframed and why.*





# Reframing Project

In november 2019 the first case of a virus that later became known as Covid-19 was discovered in Wuhan, China. During the end of february the virus eventually widespread outside of China and more cases of the virus were rapidly confirmed positive around the world. The spread of the virus was a fact on the 11th of march when the World Health Organisation,WHO, declared the virus outbreak a pandemic.

Only two days later on the 13th of march Kenya had the first confirmed case. A woman who travelled back to Nairobi, Kenya on the fifth of march was tested positive. The students and teachers involved in Reality Studio were called back by Chalmers on the 16th of march. The further spring semester was rearranged to online teaching due to the circumstances.

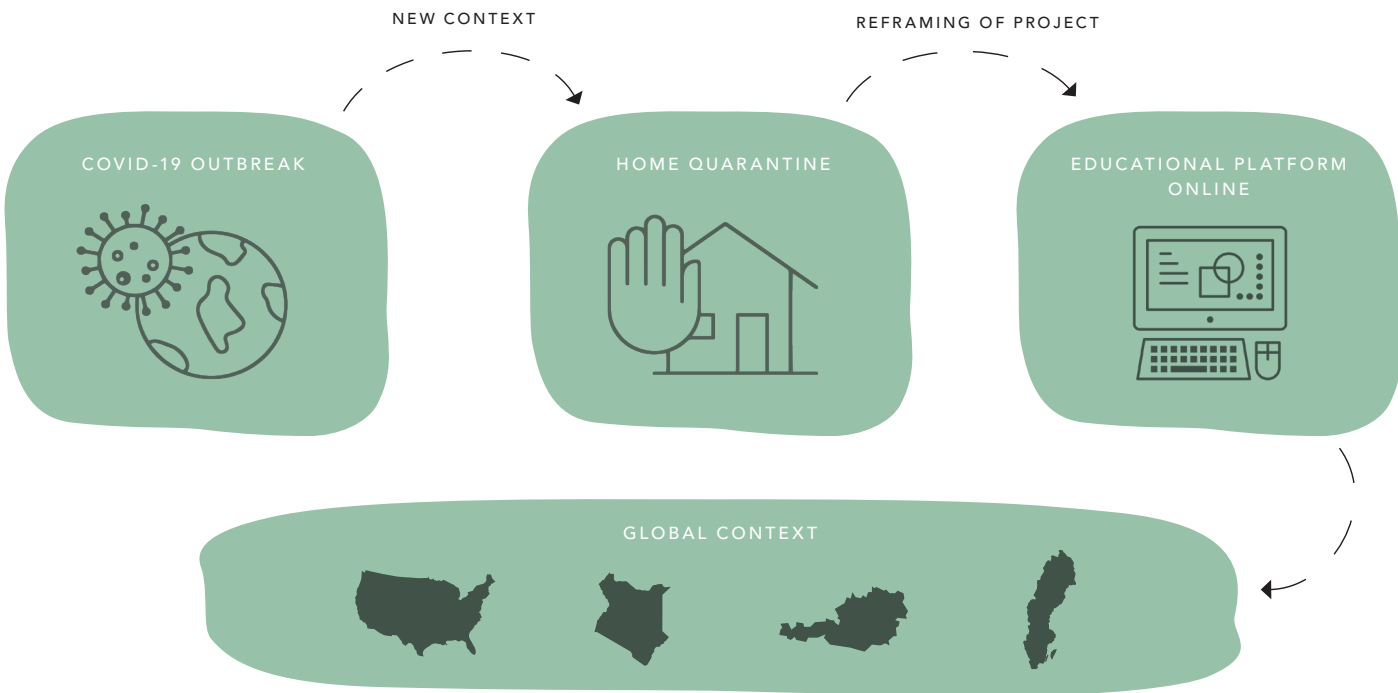
The participants of the field study returned home to a new everyday life characterized by self-quarantine and social distancing. In order to cope with the pandemic, countries were closing their borders as well as restaurants and shops.

With little to none preparation, primary schools were closed in countries such as Austria, Kenya and the US. Communities all over the world were doing their best to cope with the new foreign reality.

The project group decided to embrace the new context and take advantage of the situation, rather than see it as a drawback. In order to adapt the project into the new foreign context the project group acknowledged the need to reframe the project.

With the children spending more time at home there was a need for online education all over the world. This was beneficial for the project since it made it easier to target the households directly. When reframing the project the opportunity to fit our project into a global context was acknowledged. A possibility was identified to build upon learnings made in Kenya, scaling up the project to fit a global context, including Sweden, Austria and the U.S.

Teaching children about the circularity of food, food waste and small scale farming through developing online teaching material.





Waste Management

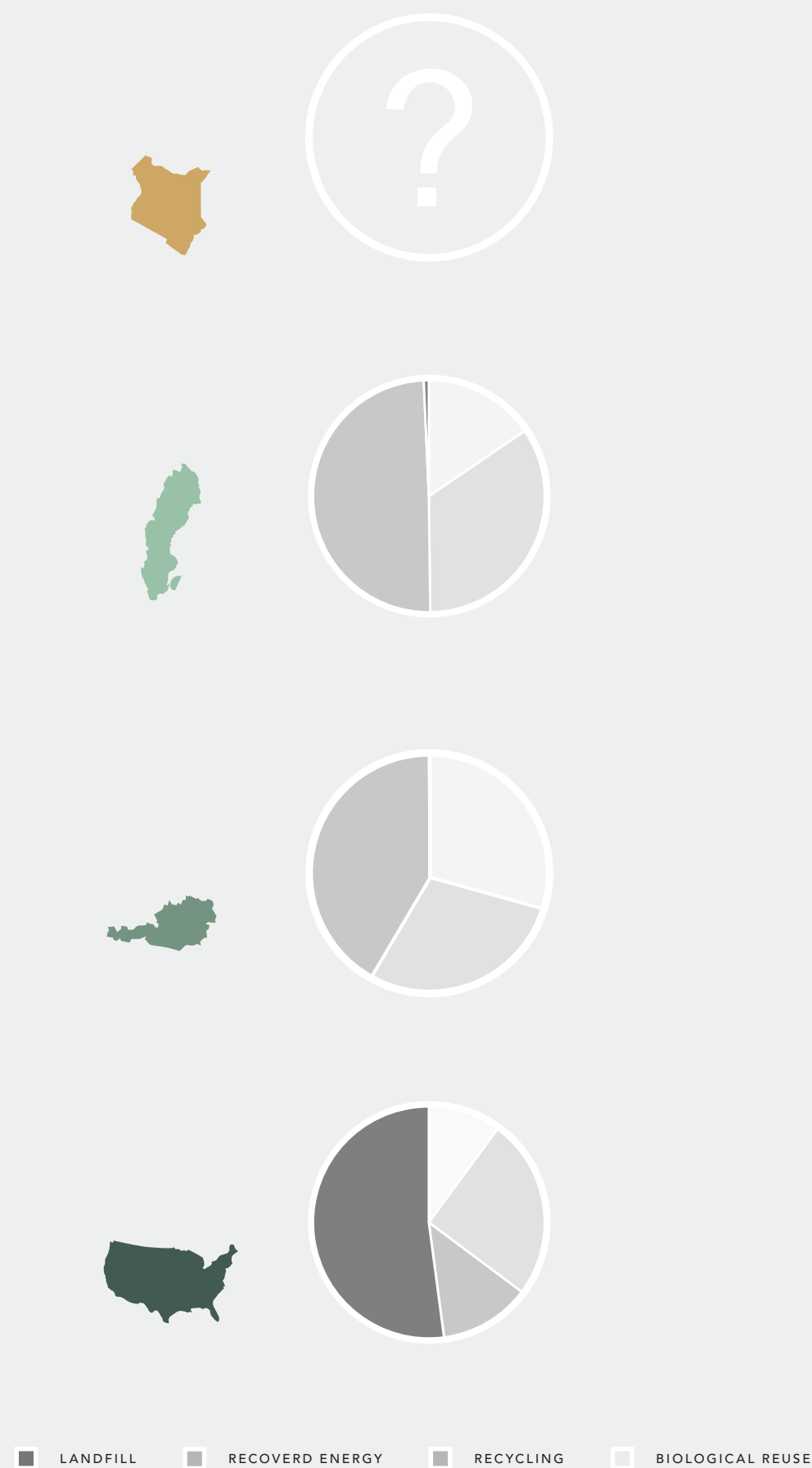


Fig. 7. Waste management of the studied contexts, comparing how Kenya, Sweden, Austria and the U.S. handels their waste.

Kenya

As research regarding waste management in Kenya was conducted before the change of context the data is focusing on the specific context of Kisumu. In average the amount of solid waste generated in Kisumu is about 146 000 ton per year. Out of the collected waste, which only makes up for 20-25 % of the total generated waste, 60-65% is organic waste and 27 % is recyclable waste. (de Azevedo M. et al, 2016) At a household level only 3.1 % have their waste collected. Instead 33.6 % leave the waste at open spaces, 26.1 % use a compost pit, 23.8 % deposit the waste in their backyard, 7.7 % leave it on the side of the road and 4.8 % leave it in trenches. (CGK, 2015) The Kenyan waste system differs a lot from the other studied context, thus, the data of where the collected waste in Kisumu or Kenya is reused for or placed to compare with the other countries could not be found.

Sweden

In 2018 the total amount of municipal solid waste was 4 771 450 ton in Sweden and out of the total waste 23.1 % was regarded as food waste. In 2018 the collected and transported waste was measured 216kg per capita. 40 % of the waste was collected at a household level and 60 % was collected elsewhere or imported. Out of the collected waste 49.5 % of the waste was turned into recovered energy, 34.4 % was recycled, 15.5 % was reused biologically and 0.7 % became landfill, see Fig. 7. (Avfall Sverige, 2019)

Austria

In 2015 the total amount of municipal solid waste was 4 160 000 ton in Austria, that's 482 kg per person. Out of the waste 23,2% is regarded as biogenic material, that's between 51 - 159kg biogenic waste per person in 2015. Out of the green waste 23.1 % is digested or composted. Around 60% of the waste was collected in separated collections. Out of the collected waste 41.4 % is turned into recovered energy, 27.1 % is recycled, 22.1 % composted, 7.2% was reused biologically, 2.1% electronic and problematic waste and 0.1 % becomes landfill, see Fig. 7. (BMLRT, 2017) In Fig.7 the electronic and problematic waste was combined with the recycled waste.

The U.S.

In 2017 the total amount of municipal solid waste was 268 000 000 ton in the U.S. The collected and transported waste was measured 746.7kg per capita. Out of the collected waste 12.7 % of the waste is turned into recovered energy, 25.1 % is recycled, 10.1 % is reused biologically and 52.1 % becomes landfill, see Fig. 7. Out of the waste that was biological reusable only 9.5% was food waste and the rest was yard trimmings. (EPA, 2019)



User objectives

Aiming at developing educational online material that will be used, appreciated and spread, it is of importance to understand the potential users and benefitters of such a concept. To do so, an analysis was carried out of the different subjects and their objectives in relation to our concept.

Analysing people with a potential interest in an online educational material, the main subjects were identified to be the children, their parents and the society. To understand their objectives to a further extent, it is of interest analysing them in relation to the context in which the concept

is used. Thus, the analysis was performed for each of the main subjects in relation to each of the four countries included, Kenya, Sweden, Austria and the U.S., see Fig. 8. Some emphasis has also been put on the complexity that Covid-19 adds to each of the contexts and thus, affects the objectives.

Further, firstly, the result of the analysis is explained, focusing on the three main subjects; child, parent and society. Secondly, a visual representation of the analysis is presented, see Fig. 9., where the objectives are presented in relation to both countries and subjects.

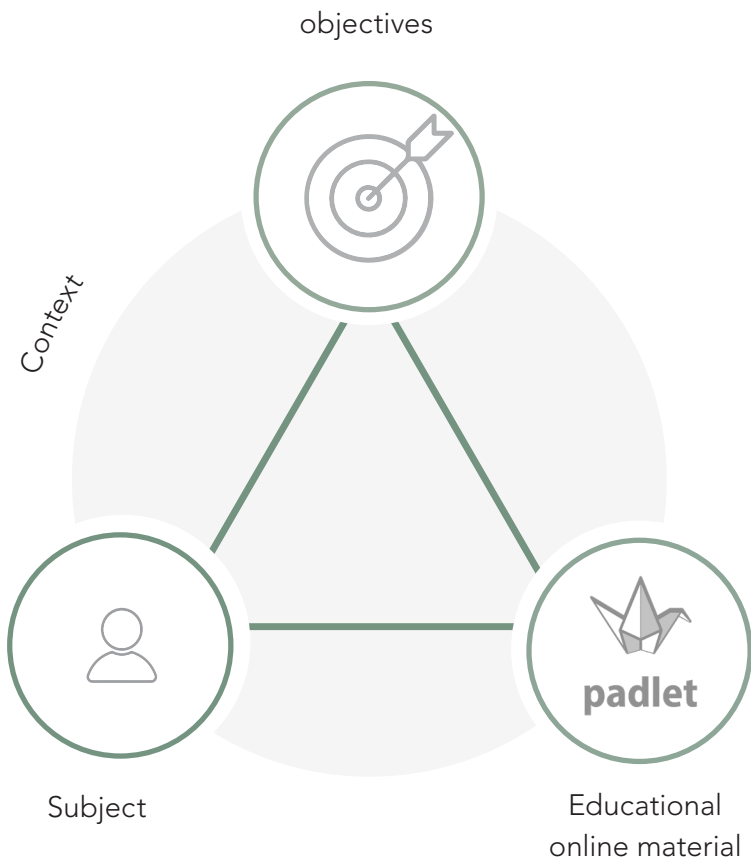


Figure. 8. Finding objectives. Throguh analysing the objective that a certain subject has, in a certain context, we aimed at identifying objectives.



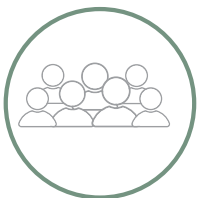
CHILD

As our concept foremost is targeting children, they are our primary users and highly important to analyse further. Studying their objectives in relation to each context, similarities but as well differences appear, see Fig. 9. For example, the objectives of fun activities and making friends from other countries are objectives important within all contexts. An objective found to differ between the contexts are the objective of potentially earning money. When performing our field study in Kenya, how an activity could serve as a potential of earning an income was a topic recurrent in school. This is an example of an objective that may be stronger in the Kenyan context than in the other studied contexts. Other examples that differ between the contexts are objectives such as practising english and new ways of being taught.



PARENT

Since the concept foremost targets children between 7 - 15 years old, the parents are likely to be a part of the child's participation. A parents role could, for example, be to offer support and to encourage participation. Analysing the parents objectives both differences and similarities are found, see Fig. 9. Common objectives are, for example, development of children. The biggest difference is believed to be connected to how Covid-19 affects the different contexts, with homeschooling being a case in all contexts apart from Sweden. This leads to the objective of stimulating children being more important where homeschooling is the case.



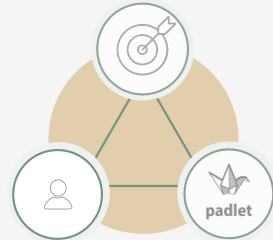
SOCIETY

Changing perspective, instead looking at a societal level, the society as a whole can be a benefitter from children being taught on the circularity of food, food waste and small scale farming. Forces within the society, as for example different organisations, could also help continuing and expanding a project like this. Thus, it is important as well studying objectives sprung from society, see Fig. 9. Similarities between the contexts, found on a societal level, are for example reducing CO2 emissions and creating opportunities for small-scale farming. The main differences in objectives is connected to the different waste management systems within the context. For example, in Kenya, a strong objective is to decrease the organic waste at dump sites and to add value to the organic waste. In contexts where the possibility to sort waste exists, the objective is rather to increase the organic waste sorted.

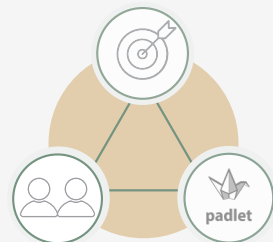


## Kenya

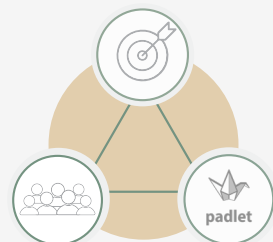
fun activities  
make friends from other countries  
new way of being taught  
potential of earning money  
practising english  
learning new things



stimulate child when school is closed  
development of child  
potentially lower household costs

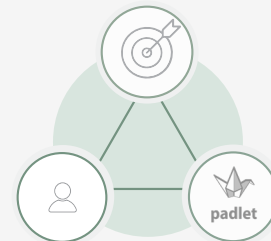


decrease organic waste at dumpsites  
create value in organic waste  
create awareness of where food is produced  
small scale farming opportunities  
reducing CO2 emissions

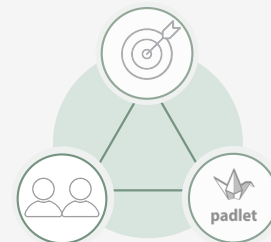


## Sweden

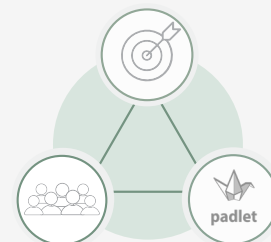
fun activities  
make friends from other countries  
learning new things  
practising english



stimulate child  
development of child  
potential to lower household costs

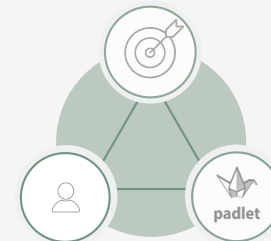


increase organic waste sorted  
decrease amount of waste produced  
encourage small scale farming  
create awareness of where food is produced  
reducing CO2 emissions

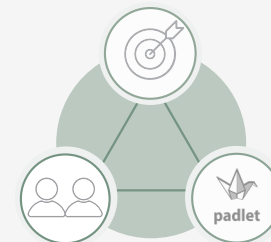


## Austria

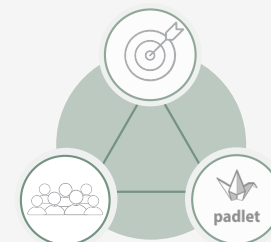
fun activities  
make friends from other countries  
learning new things  
practising english



stimulate child when school is closed  
development of child  
potential to lower household costs



increase organic waste sorted  
decrease amount of waste produced  
encourage small scale farming  
create awareness of where food is produced  
reducing CO2 emissions

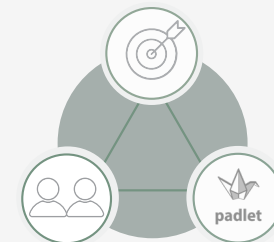


## The US

fun to learn  
make friends from other countries  
learning new things



stimulate child when school is closed  
development of child  
potential to lower household costs



increase organic waste sorted  
decrease amount of waste produced  
encourage small scale farming  
create awareness of where food is produced  
reducing CO2 emissions

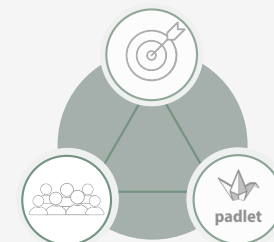
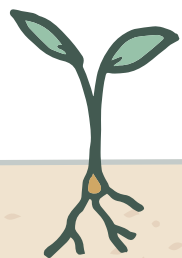


Figure 9. Analysis of user objectives. The found objectives presented according to country and subject.



## 4. The Seedling Project

*During the Seedling project a pilot project was performed. This chapter will explain how it was executed and what outcomes the pilot project had.*





TIMELINE

# The Pilot Project

After conducting research about waste management in the four countries and exploring what value increasing knowledge about the Seed Circle would bring, a concept of educational material and methods teaching it globally was created. The main endeavor was to improve the knowledge of circularity of organic waste and meet the newfound demand of online teaching for children.

To test the concept of method and educational material out, a pilot of The Seedling Project was launched where twelve children were invited to participate in a three week long project. In fig. 10, a brief summary of the pilot project is presented as a timeline.

INTRODUCTION

To kick off the pilot project an introduction movie was released to the participating children, see Appendix B. This served as a way for the project group to present themselves and the project, but the participants were as well asked to share a short introduction about themselves with the project group and their fellow participants.

MISSIONS

To educate the participating children about the circularity of food, food waste and small-scale farming the learnings was divided into six different missions. These missions were released one by one throughout the pilot project. For further information of the missions, see Chapter 4, The Circle of Missions.

ANIMATION

As a conclusion of the project, an animation was presented to the children, see Appendix C. In the animation, each of the missions were presented in relation to each other, for the children to fully understand how they were interconnected. The animation also served as a way to conclude the children’s work, presenting their creations to each other and give them a feeling of ownership towards the result.

EVALUATION

For us to be able to learn from the pilot project, evaluations in the form of three surveys were sent out to the participating children and their parents. For further information on the result of the evaluation, see Chapter 4, Evaluation.



Figure 10. Pilot Project timeline. The three week long pilot project included an introduction, six missions, an animation and three evaluations.



# Four key elements of the Seedling Project

In the pilot of the seedling project a method consisting of four elements; a facilitator, participants, an online platform and material was used, see Fig. 11. The method aims to make it possible for children from different places around the world to learn interactively online.

## FACILITATOR

The facilitator is the one that provides the participants with the material as well as a platform. As a facilitator you decide upon what topic the project will address and how and when the material will be provided to the participants. The facilitator will be in charge of what platform will be used to perform the project and decide whom the participants of the project are. It is important that the facilitator keep encouraging the participants to both fulfill their tasks and interact as well as making sure that the platform is working properly.

## PLATFORM

The platform is where the facilitator and participants meet. In regard to the method of the Seedling project it needs to be interactive. When choosing upon a platform it is important to think what features one would like it to have to enable the participants to interact. The platform should be easy to use, and another positive point while working with children is, to follow privacy policies. A few examples for such platforms are Google Classrooms, Openlearning, Padlet, or any Social Media platform.

## PARTICIPANTS

The participants can vary endlessly. The facilitator chooses the participants based on whom they want to educate and what they want the project to achieve. As a participant you get invited by the facilitator to the online platform. Your role is to finish different tasks and missions. You will have the possibility to share your result and talk with the other participants about it. With this process you will not only learn what you did, but as well learn from the other participants.

## MATERIAL

The material used is created to address the topic the facilitator wants to educate. For the material to be inline with the method used in the Seedling Project, it should be easy to understand and to use. The material is recommended to communicate visually and complemented with basic english to reduce language barriers. The tasks for the participants should be easy to perform within any context, for example, utilizing material that is easily accessible and affordable. These tasks are then to be uploaded to the interactive platform.



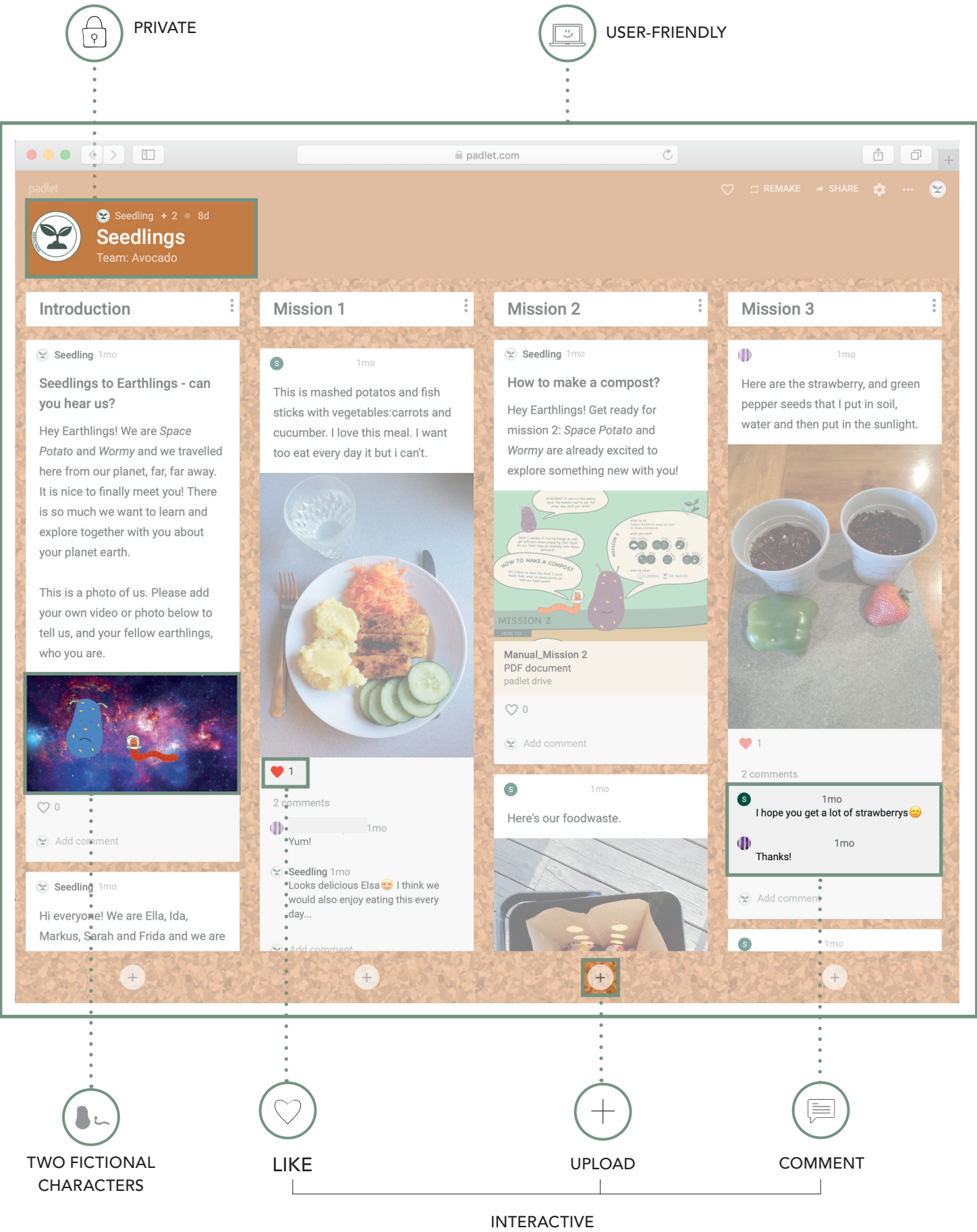
Figure. 11. The four key elements. The four key elements of the method, used to perform the pilot project; facilitator, participants, platform and material.



# The Seedling Padlet

When deciding upon a platform, an important aspect was for it to be interactive. To be able to make it possible for the children to connect and interact, regardless of their time zone and geographical location, an online platform was used. The pilot project was executed on a platform called Padlet, which is set up to look like an online black-board. On this platform one can upload a photo, a pdf or a video. The members of the Padlet page can comment or like each other’s posts. By giving the participants the chance to see each other’s work they could learn and be inspired by one another.

Since the participants were children between the age of 7-15 it was important to make sure that the platform was user friendly and that the option of making it private was available. The privacy of the three padlet pages was established by setting it to be only accessible for those who had received the link. The invitation to the three different Padlet pages was sent out to the participants’ parents by an email, which included a link to the assigned Padlet page.



The Seedling Padlet. Padlet was used as the platform for conducting the pilot project as it, among other, was private, user friendly and included all interactive features needed.



EDUCATIONAL MATERIAL

# The Circle of Missions

To educate the children participating in the pilot of The Seedling Project about the circularity of food, food waste and small-scale farming the learnings was divided into different steps, referred to as missions. Each mission was connected to a certain step of the seed circle, see fig. 12. Further, each mission and how it relates to the seed circle will be shortly presented.

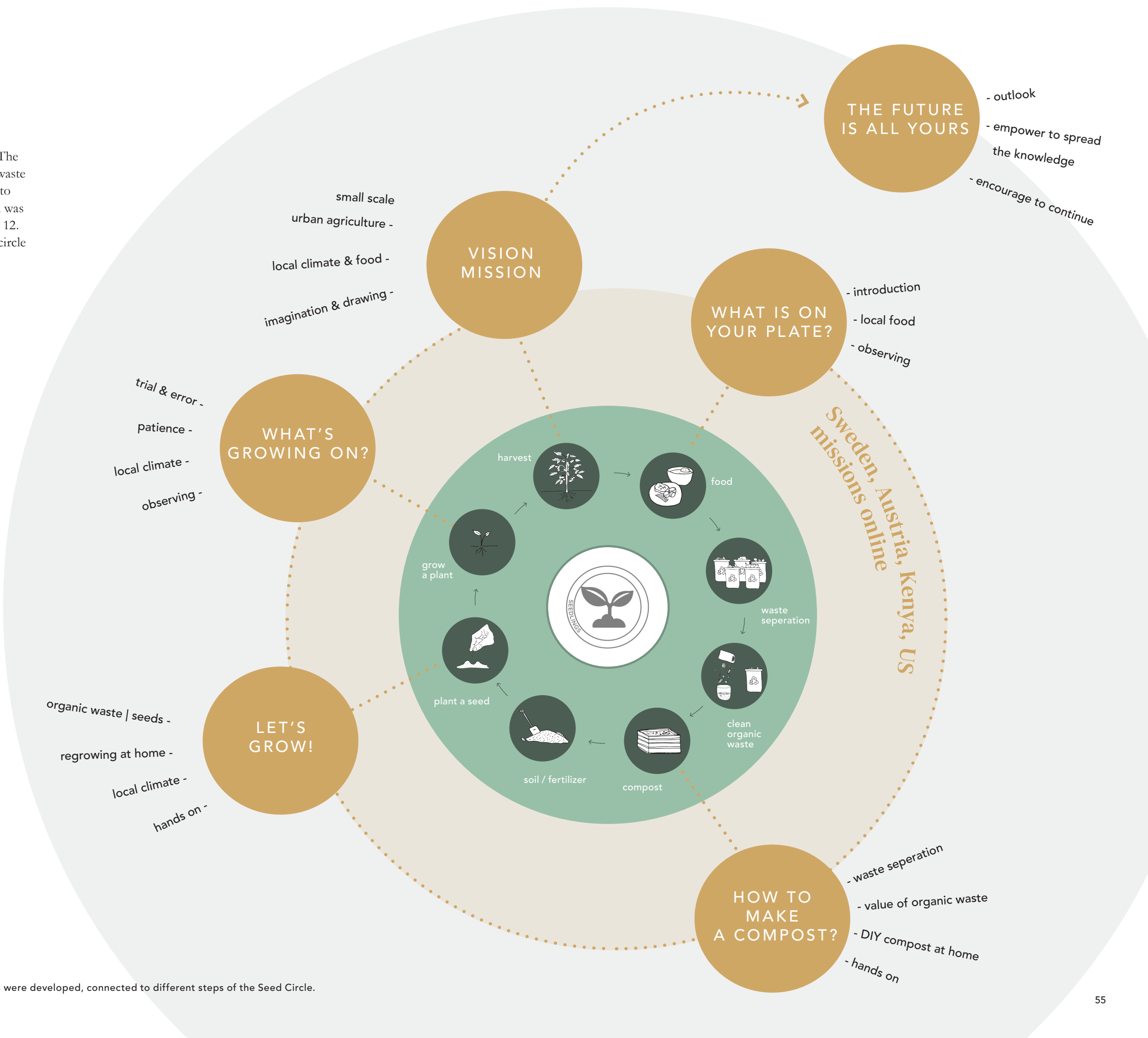


Figure 12. The Circle of Missions. Six missions were developed, connected to different steps of the Seed Circle.



MISSION 1: WHAT’S ON YOUR PLATE?

We believe that a good place to start off, aiming at teaching circularity, is with a topic that the children are very familiar with. Thus, we believed it to be ideal starting off with a mission related to the food that the children are eating.

In the first mission, “What is on your plate?” the children get to share the food that they are usually eating, what it is called and what ingredients it consists of. Apart from serving as a familiar topic to start off with, this mission is also short and easy to perform. This enables the children to rather spend time exploring the platform but as well get familiar with each other and with the structure of the missions.

MISSION 2: HOW TO MAKE A COMPOST?

In the second mission, “How to make a compost?” the children are taught how to make a small-scale window compost. This mission targets the topic of composting, but also touches upon the topic of separating waste as the children are encouraged to use clean food waste, among other things, to build their compost on. Thus, we believe this mission to be an important part of teaching the value of organic waste.

For children of all studied contexts to be able to build a compost, we decided on making a small-scale window compost as the legal aspects on keeping a household compost differs around the world. For example, in Sweden, a household that wants to compost their food waste are obligated to report this to the municipality (Göteborgs stad, n.d.). As our aim is to teach children about the circularity of food, food waste and small-scale farming and inspire them to reflect on the topics included, we believe that making a small-scale window compost serves as a good solution as they still get the chance to learn the basics of composting.

MISSION 3: LET’S GROW!

The third mission, “Let’s grow”, connects the compost soil produced by a compost, introduced in Mission 2 , with small-scale household farming. In this mission, the participants are asked to search their food waste for seeds to sow or vegetable parts to re-plant. The children are then encouraged to plant their findings in a reused container. Asking the children to find seeds, vegetable parts but as well containers in their household waste we believe contributes to further added value of food waste, but as well of other kinds of waste.

Through not adding direct descriptions of what seeds to sow and what vegetable parts to plant, this mission also aims at encouraging the participants to try out and experiment with what can be regrown. Through doing this, we aim at not steering them in a certain direction, but rather letting their food waste and what they have at hand guide them.

MISSION 4: VISION MISSION!

In the fourth mission, “Vision Mission”, the participants are encouraged to imagine and draw what their plant will look like in the future and what food they can cook out of their harvest. Through this, we aim at completing the circle, starting with the food on their plates and ending with their visions of future harvest and meals.

To add further complexity to the circle, this mission as well touches upon the topic of locally produced food. Through posing the question if the participants’ visions would be possible to achieve in the local climate where they live, we aim at triggering reflections on whether or not the food that the children are eating can be grown where they live.



Introduction  
Local food  
Observing



Waste separation  
Value of organic waste  
DIY compost at home  
Hands on



Organic waste, seeds  
Regrowing at home  
Local climate  
Hands on



Trial and error  
Patience  
Local climate  
Observing

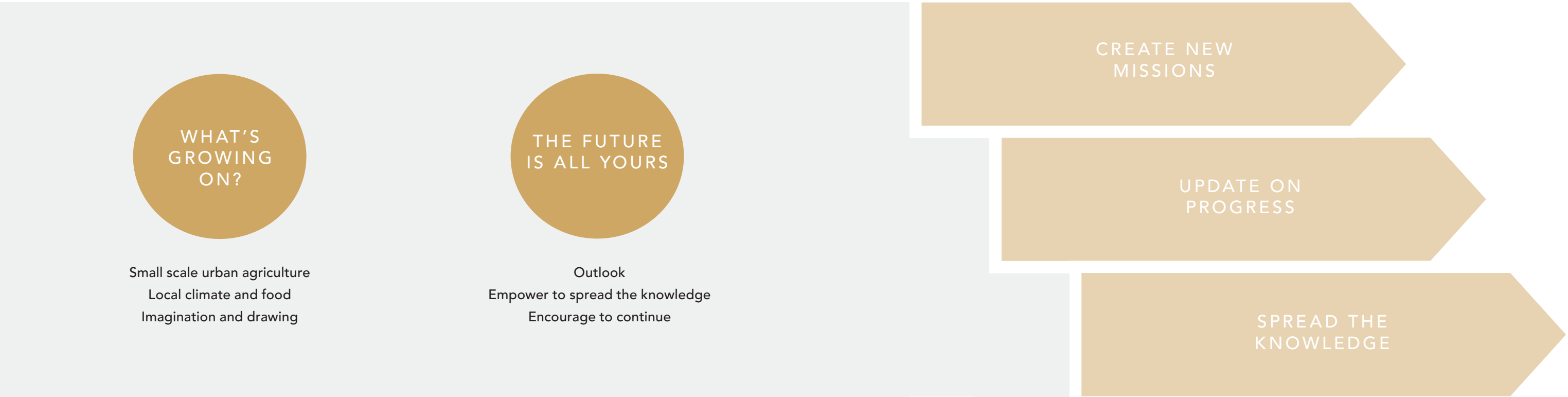


MISSION 5: WHAT'S GROWING ON?

Aiming at following up the participants' composts and growings, the fifth mission "What's growing on?" serves as a way for the children to update each other on how things are going. In this mission, some emphasis is also put on seeds that do not sprout and composts that are not turning into soil. To highlight that it is okay if things are not turning out as planned, we believe this to be important. Through reflections on what went wrong, we believe one can learn a lot.

MISSION 6: THE FUTURE IS ALL YOURS

In the last mission, "The future is all yours", the participants are encouraged to continue and keep on reflecting on these topics even though The Seedling Project has come to an end. They are encouraged to create their own new missions, to share with the other participants, friends or family, and to continue updating each other on the progress of their composts and growings.

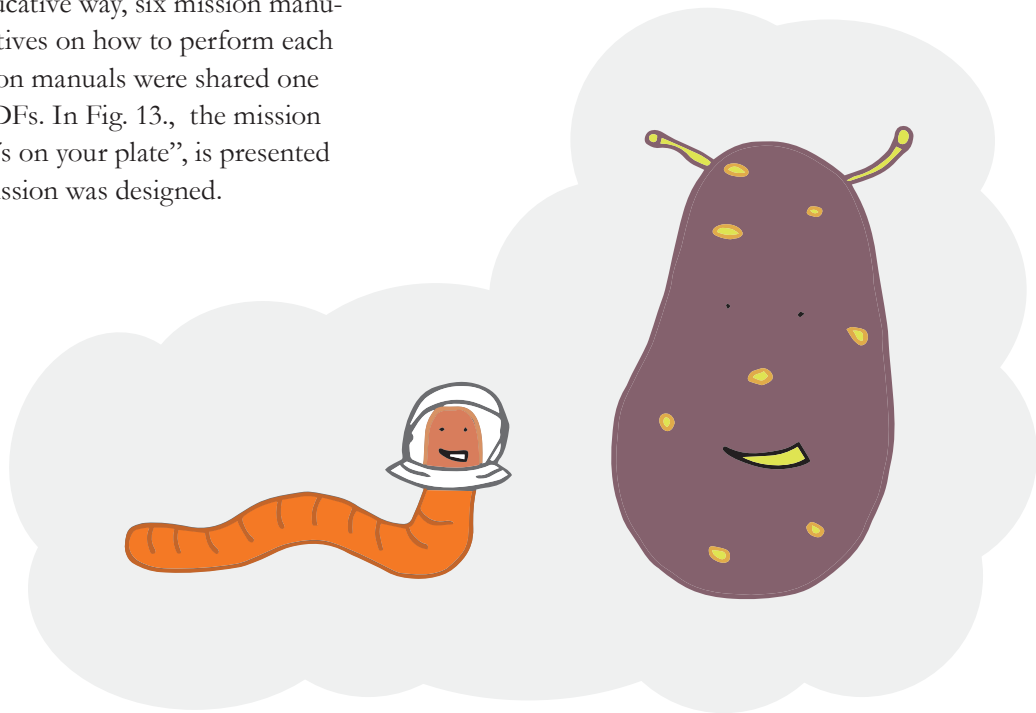




EDUCATIONAL MATERIAL

# The Mission Manuals

To be able to communicate the missions to the participating children in a fun and educative way, six mission manuals were designed with directives on how to perform each of the missions. These mission manuals were shared one by one on the platform as PDFs. In Fig. 13., the mission manual of mission 1, “What’s on your plate”, is presented as an example of how the mission was designed.



Space Potato & Wormy. Two fictional characters used for the communication between facilitators and participants.

## REDUCING LANGUAGE BARRIERS

Aiming to educate children from four different countries, speaking several different languages, it was important for us to make the manuals easy to understand visually to reduce the language barrier that otherwise could hinder the children’s understanding.

Analysing the objectives of children, as described in Chapter 2, User objectives, one potential objective of a child was found to be practising english. Thus, we wanted english to be used as the main communication language. Through designing the missions in a comic style, we managed to base the mission manuals on graphical elements, only using limited explanatory text with basic english words.

To evaluate how understandable the graphics and the language was within the manuals, questions about this were included in the assessment, both towards children in the pilot group but also asking their parents how much help they needed to understand the guides.

## DESIGNING FOR FRUGAL CONTEXTS

Aiming at giving the participants equal education, regardless what context they originate from, the mission was designed with the frugal context in mind. According to Holm et. al. (2019) designing and innovating for frugal contexts is, among other things, about cutting costs and using less resources and materials.

Thus, for the missions to be applicable to all studied contexts, it was important to lower the amount of material needed and make sure that the material needed could be found within all contexts. As a way of achieving this, the manuals were also designed to guide the participants without explaining exactly how and with what materials it should be done. Through doing so, the children were encouraged to be creative, choosing materials and methods suitable in their own context.

## VARIATION IN METHOD

Not only do the participating children differ in native language and context of origin, how they learn and what they believe is fun most likely differs as well. As one learns and likes differently, we believe it to be important to design the missions and the manuals with such a variety that there is something for everyone to enjoy. Trying out different ways of teaching in the pilot project as well enables us to evaluate if and how the different methods are suited for this project.

To achieve this, the manuals worked with different methods of teaching. The first three mission manuals encourage hands on doings, for example, teaching the participants how to make a compost. The missions “Let’s grow!” as well includes elements of experimenting, as the participants are encouraged to experiment with what can be regrown from food waste. Another kind of mission instead encourages learnings through reflections, as for example the “vision mission” in which the children are encouraged to reflect upon how well their growings are suited for their local climate. Lastly, in the mission “What’s growing on?”, the method of teaching rather encourages learnings through observations, as the participants are to register and present how their growings and composts are developing.

## VARIATION IN MEDIA

To further contribute to a variety among the missions, different types of media were encouraged to use for hand-in. Different missions acquire different media to be uploaded, such as photos, movies, text and drawings.

For the same reasons, different types of media were used when the Seedling Project Group were communicating with the children in the pilot group. We created an introduction movie of ourselves, made a GIF of the avatars Space Potato and Wormy, created PDF:s for the missions, online forms for evaluation and an animation to sum up the Seed Circle at the end of the learning period.

As well as communicating in different media, the project group commented on the children’s work on Padlet to encourage their work and to give them feedback on their uploads.

## THE MISSION STORYLINE

To make the missions more fun, but as well connecting the different missions to each other and to the Seed Circle, the mission manuals were formatted in a storyline. Thus, we introduced two guiding avatars, Space Potato and Wormy, as the main characters explaining the missions and what to do. As Space Potato and Wormy are two characters from outer space, they were easy to design without gender, age and nationality, something we believe to be important working with children of different nationalities, ages and gender.

In the first mission, Space Potato and Wormy have just arrived on earth from a planet far away. After long travels they are hungry and curious about what to eat on earth. In the following manuals, Space Potato and Wormy presents and explores the different missions together with the children, guiding the children through the Seed Circle. In the last mission, Space Potato has started to sprout due to the environment on earth. The need for the two characters to return home due to this, serves as a good moment for the facilitators to hand over the platform to the participants.

## LAYOUT OF THE MISSION MANUALS

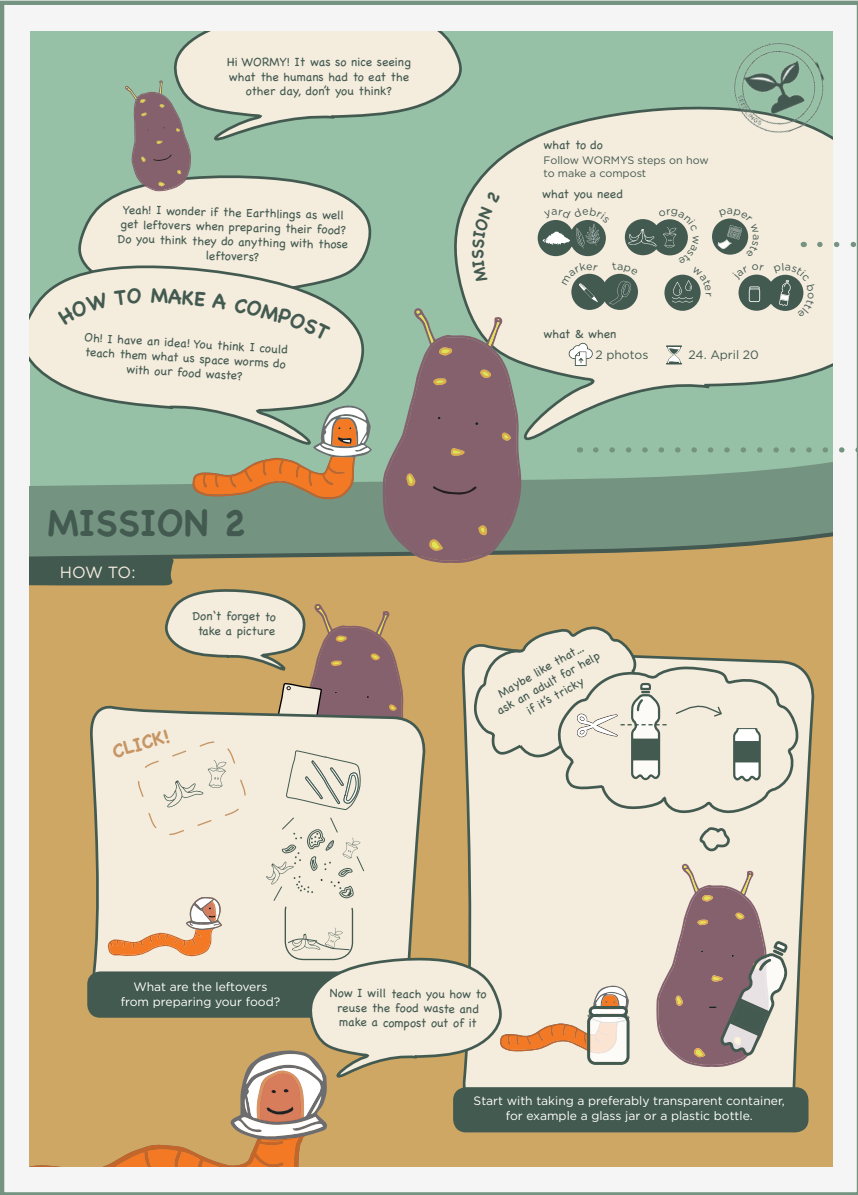
To create manuals that are understandable and easy to follow, we designed each of the missions following a similar pattern, see Fig. 13, for an example.

Aiming at connecting the mission manuals to the storyline, but as well to enhance the circularity of the presented topics, we designed each manual to start off by a section with a short conversation between the characters, connecting the upcoming mission and topics to the previous ones. In this section it is as well presented what is needed, what should be uploaded and when.

Further, each manual continues with a step by step guide of how to perform the mission. As well in this section, Space Potato and Wormy are guiding the participants. Finally, the mission ends with a small hint on what is needed to perform the next mission.

Introducing the mission:  
Conversation between the avatars

Visual steps of the mission



Material list/hand in description

Guiding avatars:  
Space Potato and Wormy

Visual steps of the mission



What is needed for upcoming mission

Figure 13. The mission manual. Six manuals were created to communicate the missions, each of them using the same layout. This is an example of the manual for mission 2, "How to make a compost?".



RECEIVED MATERIAL

# Uploads by participants

After completing every mission the participants were encouraged to upload their results to the Padlet as well as explain what they did. In each mission they were as well encouraged to look at their colleagues’ work and comment on each other’s post.

The received material showed a diversity, since the manuals had clear instructions, but left room for the participants own interpretation. For example, the participants used different materials, as various seeds and containers, to complete the missions. As well they used different ways to show their result on the Padlet, for example, some participants posting videos while others posted pictures.

The material we received. In relation to each mission, the participants were encouraged to upload their produced material to the Seedling Padlet.

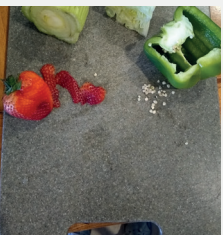
WHAT IS ON YOUR PLATE?



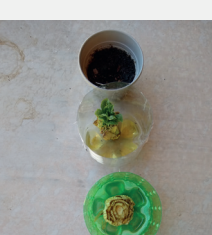
HOW TO MAKE A COMPOST?



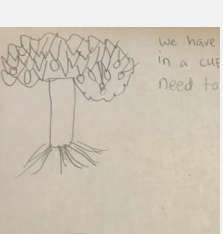
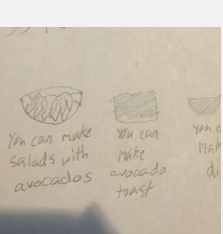
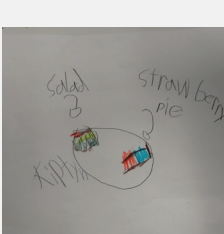
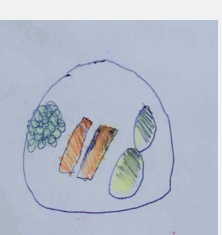
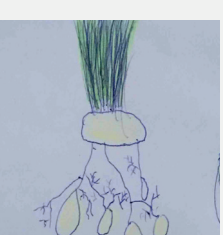
LET'S GROW!



WHAT'S GROWING ON?



VISION MISSION



THE FUTURE IS ALL YOURS

# Evaluation form and results

To receive feedback during and after the pilot project the facilitators sent out two assessments to the participating children and one to their parents. Due to several factors the Kenyan children unfortunately did not participate, reducing the total number of participants answering the assessments to nine.

The second assessment had quite a low response rate, which most likely is connected to some technology difficulties with the response form that the project group

experienced. Only three out of the nine participating children completed the assessment. For this reason this assessment was not used or considered when comparing and evaluating the children’s responses.

Further, the result from the other two assessments will be presented and discussed, in text but as well visually in Fig. 14 - Fig. 17.

## CHILDREN ASSESSMENT - WEEK 1

**Mission 1 - What’s on your plate?**  
Most of the participants thought the mission was fun and a few even thought that it was super fun. One responded that it was okay. Half of the participants believe they had learnt something new while completing the missions. Learnings expressed were, for example, what the food eaten consisted of, new words in English and what other children around the world like to eat. The participants all agreed upon that the topic is important and the majority did not need so much help completing the mission. Help was for some participants needed to cook the food, upload the picture and decide what to write as a description.

**Mission 2. - How to Compost.**  
The majority thought the mission about making a compost was super fun. Five of the participants found that they learned when completed the missions and three did not. They learnt that items can turn into soil and how to set up a compost and what components a compost can consist of. Out of the three that already knew about composting, two had learnt it in school and one from their family. 75% of the children thought it was important to learn about composting. The need of help varied quite a lot for this mission, most of them need some help or not so much help. Help was needed to collect the different components, cutting the plastic bottle, layering items in the right order and finally to post the picture on Padlet.

**Mission 3 - Let’s grow.**  
All of the participants thought the let’s grow mission was fun, a convincing majority even found the mission super fun. Eight out of nine believe they learnt something new. Mainly the learning was about what and how you can regrow certain vegetables and fruit. One also mentioned learning how fast things can grow. Two of the children had been taught about this topic previously in school. All answering participants agreed that it was important to learn about this. Most of the participating children needed some or not so much help to complete the missions. Help was needed to cut boxes to plant in, understanding the directions and one needed help putting sticks into the avocado seed.

Regarding the use and communication on Padlet and understanding the manuals most of the participants found it to be easy. An equal amount of participants answered that they learnt quite a bit from the other participants as the amount answering that they did not learn so much. Additionally the fictional characters Space Potato and Wormy were appreciated and one was hoping for more responding comments from fellow participants.



Comparing the Missions 1-3 to each other, by asking the children about the learning outcome and how much they enjoyed completing those first three missions.



Figure. 14. Learning outcome and enjoyment. Answers from children about their learning outcomes and how much they enjoyed completing the mission.



PARENT ASSESSMENT

The convincing majority agreed that the workload was just right and that the project met their education expectations or at least some of them. All of the parents felt it was safe for their child to use and upload on Padlet. They as well agreed upon that the subject was relevant for their child to learn. Everyone was happy that their child took part in the pilot project.

According to the parents, if the children were in need of help it was with the composting mission and the planting one as well as gathering material. They would sometimes help with reading and understanding the instructions and uploading pictures to Padlet. One commented that the manual could emphasize more what was supposed to be completed and when. Suggestions were also made about making more explanatory instructions for the missions and adding some more time between the missions. The parents all agreed that it was easy if not super easy for the

child to use Padlet, but they expressed that some children had a problem understanding and communicating in English. One parent suggested that a solution could be to ask a child that does not have english as their first language, to make sure the english is on the right level. Enhancing the interaction on the Padlet was wanted by encouraging the children more to comment on each other’s work and possibly include more children to each group.

Most of the parents were equally excited as their child about completing the missions. Participating in the project had according to the parents increased an further interest within the topic of the circularity of food. Many of the children want to do more planting. Additional comments were that the children felt proud to be a part of the project, that the layout felt very professional, well developed and child friendly.

COMPARING RESULTS

When comparing the children’s answers, on mission one to three, it could be argued that how educational they found the mission was connected to how fun they believed the mission was.

When comparing the questions to parents and children regarding how much help the child needed, the children believe to need less help than what the parent argued.

When asking how easy it was to use Padlet, communicate in English and understand the manuals a similar conclusion could be drawn. The children believe it was easier for them than what their parents thought. With that said it is important to mention that both parents and children found the answer for all three questions to be in a range of easy.

Comparing the learning outcome to the the help needed to complete the missions, from the parents and chlidrens perspective.



Figure. 15. Comparisons of learning outcome between parents and children.

Comparing levels of difficulty about different aspects of the project, from the parents and chlidrens perspective.

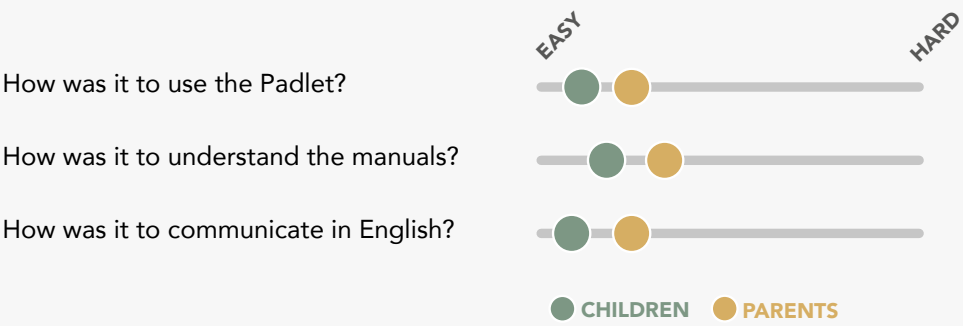


Figure. 16. Comparisons of difficulty between parents and children.

Comparing levels of difficulty about different aspects of the project, from the parents and chlidrens perspective.

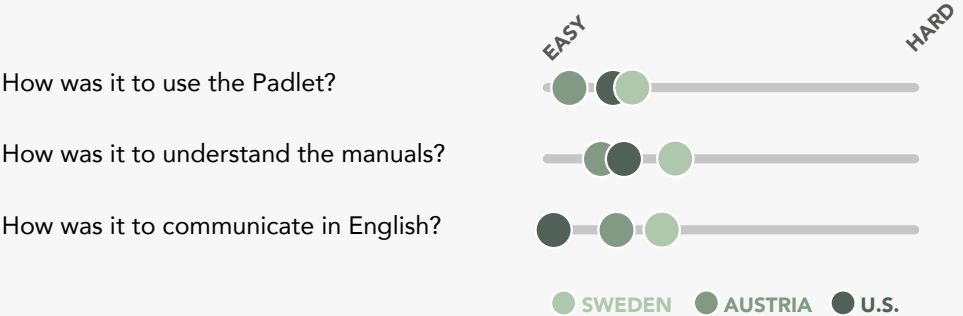
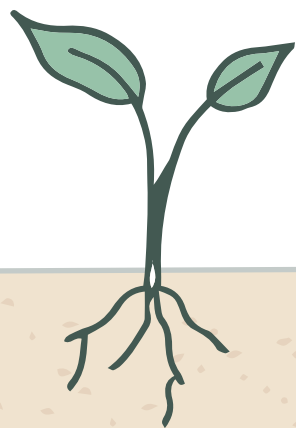


Figure. 17. Comparisons of difficulty between countries participating.

## 5. Conclusions

*This chapter will address important reflections and conclusions that were made after the Seedling project was performed, both about what was learned as well as how the Seedling project can be further expanded.*

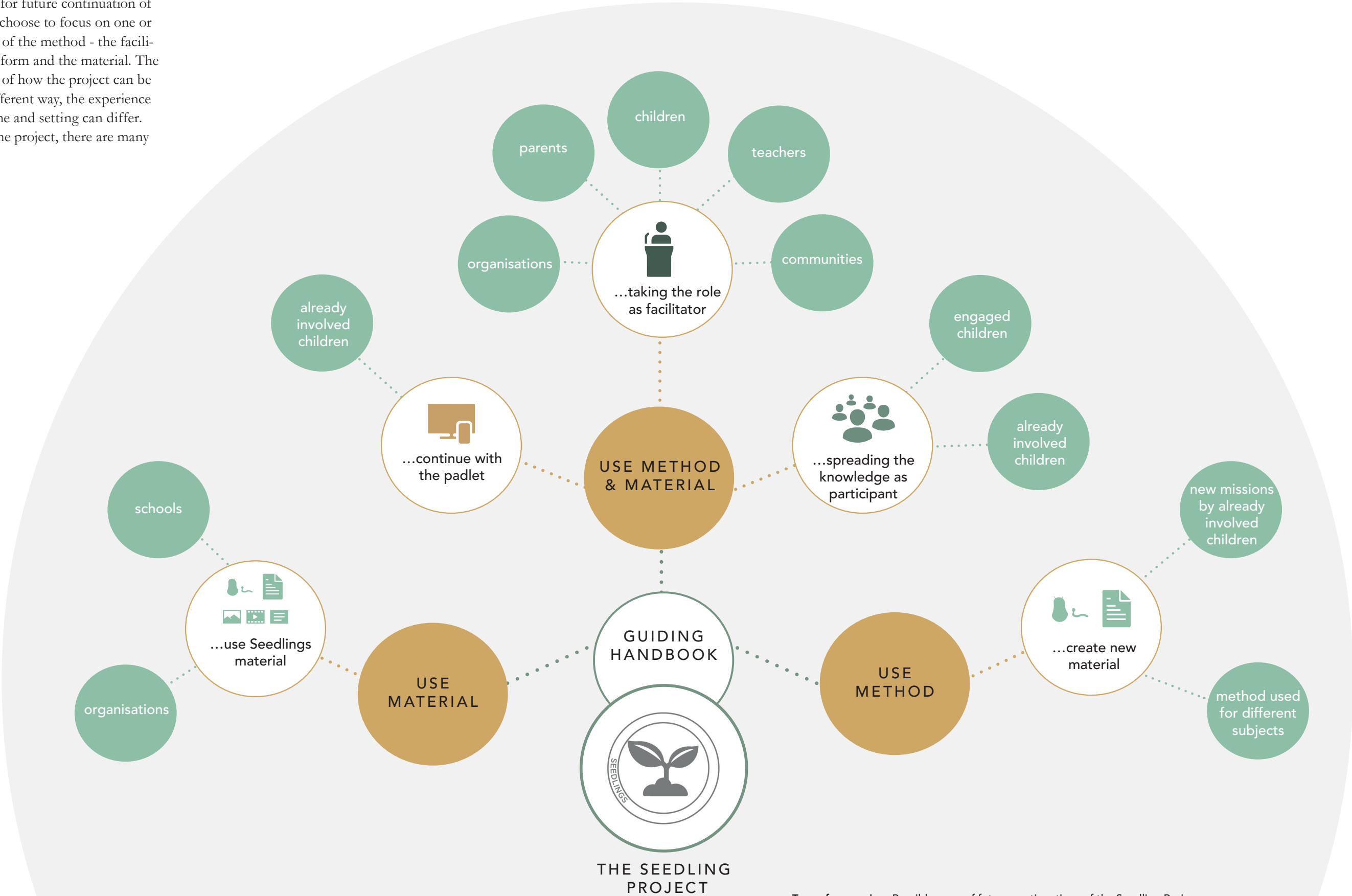




# Possible expansion of project

## TREE OF EXPANSION

There are many possible ways for future continuation of the Seedling Project. You can choose to focus on one or more of the four key elements of the method - the facilitator, the participants, the platform and the material. The Pilot Project was one example of how the project can be executed, but if choosing a different way, the experience of online teaching, the outcome and setting can differ. Due to the global context of the project, there are many potential stakeholders.



CONTINUATION

# Use Method & Material

PILOT PROJECT

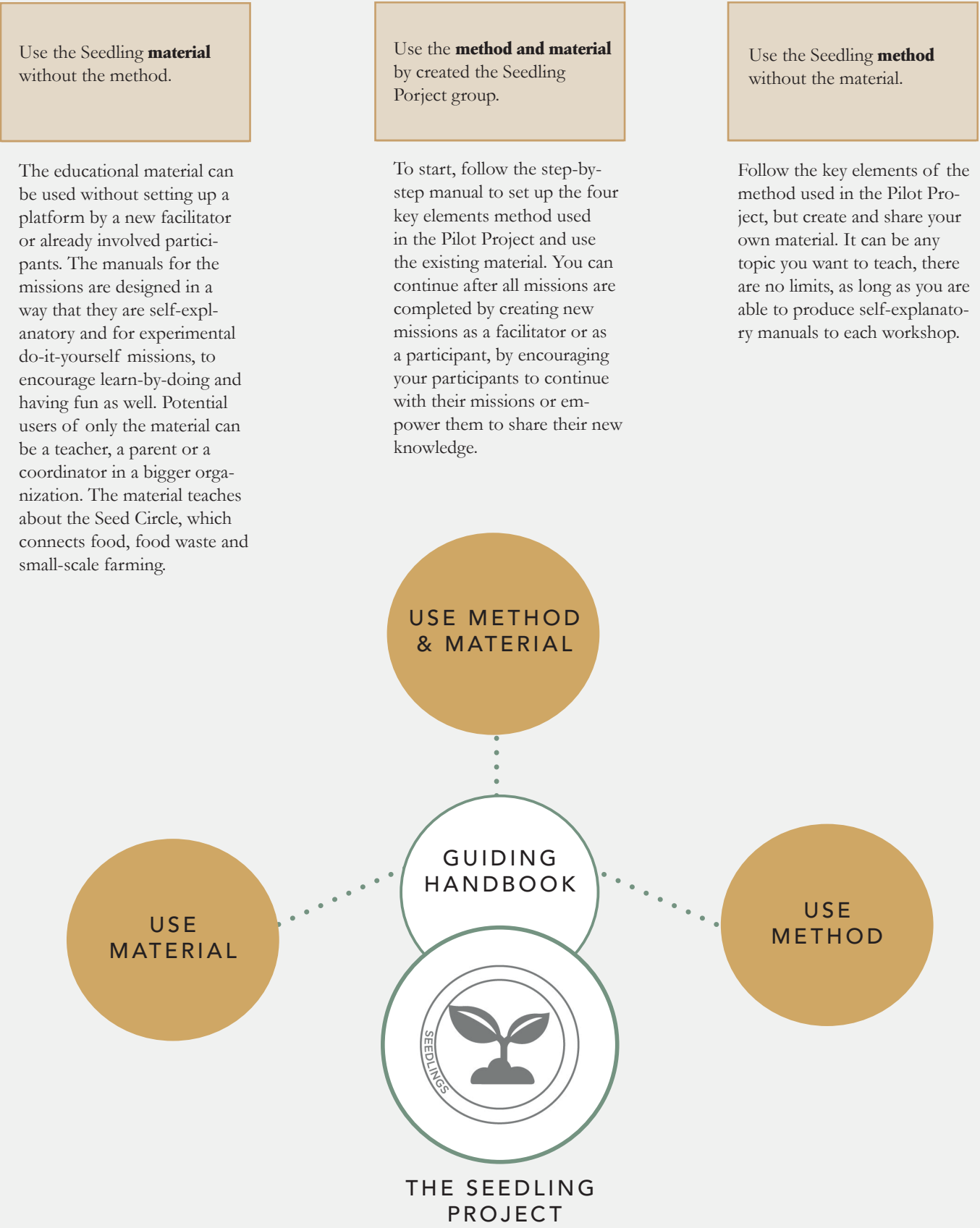
As the Pilot Project ended after three weeks, it was important to provide a possible way of continuation. The facilitators, the Seedling Project Group, decided not to maintain the work on Padlet further. Nevertheless, the participants of the pilot project can still use Padlet as a sharing platform and come up with new missions. By uploading new material or spreading their knowledge not only to their Seedling colleagues but as well to their classmates, friends and family, it is a way of expansion.

CREATE GUIDING HANDBOOK

The idea and aim of the project is to highlight the value of organic waste in many parts of the world. To be able to hand over and apply the method and material used in the pilot project, a guiding handbook was created. The Guiding Handbook is an introduction to the Seedling Project and a step-by-step instruction on how the method and the material can be used. It will be handed over not only to already involved parents and children, who participated in the Pilot Project, but also to potential future facilitators. A Guiding Handbook - The Seedling Project can be found in Appendix A.

DIFFERENT WAYS OF EXPANSION

The project has many possible ways to expand and continue as it includes two main components; the method and the material. Both are included in the Guiding Handbook. Potential facilitators, or participants, can read through the handbook to get an understanding about what the Seedling Project is and how the material can be used in different ways.



Usage of method and material. Using the material, the method and the material, or only the method is three possible ways of using the result of the Seedling Project.



# Specific scenario

## SENDING OUT THE GUIDING HANDBOOK

The project group believes that to secure the continuation and expansion of the Seedling Project the next step is to send it to potential facilitators.

The engaged or already involved parents and children as well as teachers we met in schools in Kenya and Sweden are regarded as potential future facilitators. Other possible ways of expanding the project is sending the handbook to coordinators of environmental organisations like Fridays For Future, which is acting globally, or organisations with communities like Zingira, located in Kisumu. It will also be shared on the Seedlings Project facebook page.

## PARENTS & CHILDREN

Already involved parents in the pilot project might want to share what their children learned during the online workshops and enjoy telling other parents. The participating children’s interest in the subject of the Seed circle increased after the pilot project. Sending them the handbook might encourage them to set up new missions for fellow participants, friends or family.

During the study trip in Kisumu we had the chance to meet one ambassador of an environmentalist community. She acts as an inspiring role model for many other children in Kisumu. Sending her the handbook, targets the context of Kisumu, and the way of spreading knowledge from child to child.

## SCHOOLS

During Reality Studio we got to know different schools in the context of both in Kenya and in Sweden. Teachers of schools we visited in Kisumu are potential facilitators as well as teachers of Guldhedsskolan Reality Studio collaborates with in Gothenburg.

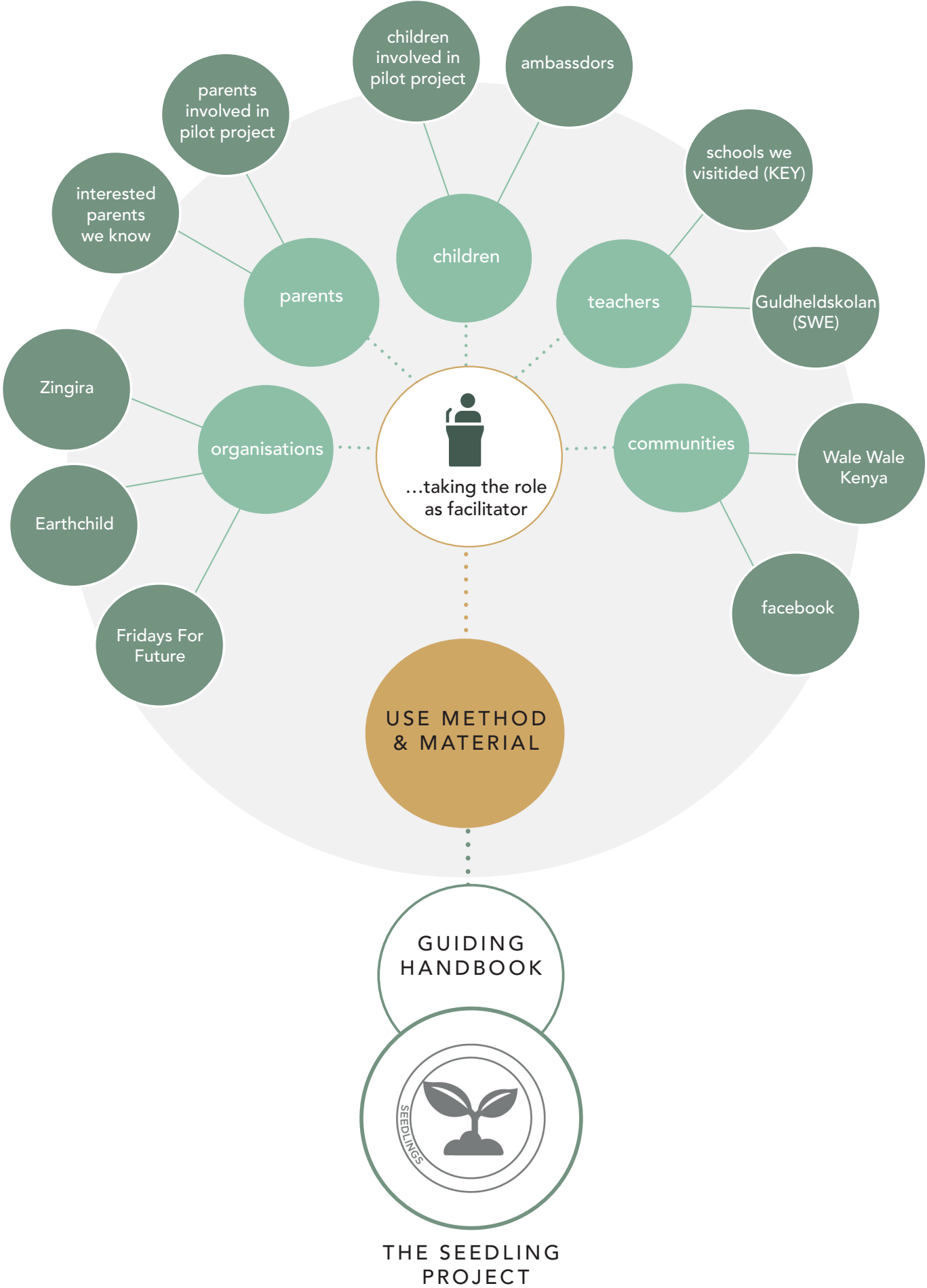
## ORGANISATIONS & COMMUNITIES

Handing the guide handbook over to various organisations or communities would target different contexts and perspectives.

While in Kisumu we got to know Evance and Apollo from Zingira, who have previous experience of workshops with children and are considered potential facilitators. Another organisation in the Kenyan context is Wale Wale Kenya, an non profit organisation that were in contact with the Seedling project group during their first week in Nairobi. Wale Wale Kenya is located in Kibera, one of the biggest informal settlements. They provide different programmes to support the children in the neighbourhood, and could act as facilitator as well.

Earthchild is another possible facilitator. It is an environmental conservation organisation acting mainly in Western Cape, Southern Africa, that also provides online teaching material.

By sharing the guiding handbook with organisations like Fridays For Future the knowledge would spread in a more global context. Finally, sharing the handbook with all the manuals on the Seedling Project Facebook page would make the material more accessible and can be seen as an open source for the educational material.



Scenario of continuation. Finding people to take on the role as facilitator is believed to be key. There are many potential facilitators.

LEARNINGS AND OUTCOMES

Reflection

LEARNINGS

Conducting this project has provided us with a lot of new insights and experiences. We have learnt by working both with the project as such, but also through performing a project within a new context and culture. Getting a chance to work cross disciplinary and cross cultural, within the project group but also with collaborators during the field study, has been rewarding. It enabled a knowledge exchange that resulted in new insights and learnings, but it also offered a depth of knowledge that otherwise would have been lost.

Foemost, conducting this project has taught us that change is constant. It is all about how we as designers adapt and adjust to these changes. In our case, the outbreak of Covid-19 resulted in canceling our field study and reframing the project. This is just one example of a change within a design project. What we have learnt is that, rather than seeing change as a drawback, we as designers can explore the opportunities and new grounds provided by the change. This is why we reframed our project, choosing to focus on the opportunity the Covid-19 outbreak resulted in, as more parents and children all over the world were staying at home.

RELATION TO ARCHITECTURAL PROFESSION

Performing this project in a project group consisting of students with a background in architecture and industrial design engineering, have meant exploring a lot of unfamiliar areas of work. For example, topics as user centered design and education to this extent were both new to some students. It was a chance to gather some new experiences outside of their academic profession. Thus, it could be discussed if the architectural profession is suited to perform this kind of project. Though, we believe that the architectural practice actually has a lot to contribute with.

According to Wardah, E. S. A. A. & Khalil, M. O. (2016), design processes and strategic thinking play a key role in the development of innovative design solutions for many architects. Even though this project is not about spatial design, as many architects are used to, design processes and creative strategic thinking have been a big part. According to Nabeel Hamdi (2004), every small scale project can have a big impact in city planning, as well as socio-economic projects affect the structure of communities and cities. He describes a project working with composting and the value of organic waste and its visible impacts:

“*At the same time, Seva, with Mela’s cohort of composters, had organized meetings and events in schools and community centres to sensitize people to garbage and its associated problems of poor sanitation, to train women on how to segregate waste at source and compost the organic waste in barrels. Area clean-up programmes were organized, art and photographic exhibitions staged for youth on how to recycle materials – all part of an effort to get people interested and committed. Four months into the programme, there was an official event to launch the project by the city mayor, his inauguration helping to build a sense of pride in what could be a citywide initiative.*”

- Nabeel Hamdi

Though, as this project has differed a lot from previously performed projects, it has also meant a chance for us to learn a lot of new things. One of the greatest learnings has been practicing basing our designs on the understanding of a completely new context and user groups. We believe that listening to potential users and observing the local context has taught us many things we can apply to our future profession as designers and architects. The possibility to perform a project not only in a different context, but as an academic project in reality with hands-on and real potential users puts new light on aspects which would be hard to grasp in only a theoretical context.

Architects are used to communicate their project ideas in a graphical language. Producing teaching material for children, trying to avoid language barriers by explaining complex concepts through mere visualizing the content, is a new experience of designing and using graphic design as a tool.

The Seedling project has a different scale than what we are used to as architects, but looking at it holistically every small project can have a big impact. It’s a start to change human behaviours, by analyzing their needs and approaching them in a maybe not common way. Addressing not only their spatial needs, but their socio-economic ones as well. This, as a design principle and an approach can be useful for every project, regardless of context, scale or profession.

APPLICABILITY IN KENYAN CONTEXT

The fact that we reframed the project, not only focusing on the Kenyan context but including as well three other countries, also appeared to be challenging. Broadening our focus into providing educational material to children of four different contexts, Kenya was no longer our only focus. One of the greatest challenges that we faced during the project turned out to be how to reach and include the Kenyan kids in our pilot project. Technical issues with the platform and communication difficulties resulted in that none of the intended Kenyan children participated. As the intended Kenyan participants were only three, originating from two different families, it is not possible to draw any general conclusions out of this.

However, due to the hardships involving Kenyan parents and children, it is relevant to pose the question; is the method and the material in this project a successful way of teaching children about the circularity of food, organic waste and small scale farming in a Kenyan context? We do believe that the developed material as such do have the possibility to impact children in Kenya. For example, the manuals could be printed out and used to educate children in a local context, contributing to an increase of knowledge and interest in the subject of food, organic waste and small-scale farming.

Though, our method of spreading the material global and online may need to be developed further to successfully include Kenya as well. We believe that, with more time set aside to communicate prior to the pilot project and with a more efficient way to offer technical assistance to the participants, we could potentially have managed to include the Kenyan children as well. However, there are also barriers present that we as a project group can not influence, as for example lack of internet connection or access to a device that enables participation. With this being said, further studying how to successfully include children of all contexts would be necessary.

DESIGNING PARTICIPATORY EDUCATION

As the twelve participants in the Pilot Project were divided into three groups, the result varied a bit between the groups. In general, we noticed that if there was one child within a group that was excited about the project and posted frequently, the others tended to follow that example. One conclusion from the Pilot Group was that the groups on Padlet could benefit from being larger, to get more activity on the site with more comments and uploads. Nevertheless, we were all surprised by how fun and rewarding it was to work with children.

As our participants were mainly children with prior connection to people involved in Reality Studio, it is interesting reflecting on how this potentially affected their engagement. Performing a pilot project, with children and parents without prior connection to us as facilitators, would be interesting as it possibly could have a different outcome.

POTENTIAL IMPACT OF RESULT

Looking at the Seedling Project as a whole, we are very proud of the result. We believe that we have created educational material that will spark interest and reflection among the participating children. Hopefully, this could lead to further explorations within these subjects on their own.

If successfully manage to achieve a continuous interest among the children, there is also a potential that this in turn will affect the parents. Thus, sparking an interest of a change within a child potentially could lead to parents as well requiring new knowledge, interest and inspiration on sustainable behaviours such as household waste management and small-scale household farming.

We do believe that through spreading the Seedling Project material and method, our goals of targeting the three UN SDG’s zero hunger, quality education and responsible consumption and production have the potential to be fulfilled. Firstly, Zero hunger, as the educational material have the potential to empower the participants with knowledge and inspiration on small-scale and local food production. Secondly, Quality education, as the material and method is developed to provide children worldwide with knowledge and insights on topics related to a sustainable lifestyle. Thirdly, responsible consumption and production, as new knowledge and inspiration is communicated to the participating children on topics as reuse of waste and the value of organic waste produced by a household.

Whether or not this particular educational material will spark enough interest and reflections among children to actually affect the situations in the studied contexts, as for example regarding waste management and local food production, is hard to tell. Though, what we can see already now through the assessments, is indications on how the children participating in the pilot project have been influenced. For example, several of the parents expressed that their children had developed a further interest in the subjects and now wanted to grow both more vegetables and flowers in their home. For us, this is a first sign of this project’s potential of making a difference, through encouraging children to start reflecting upon these important topics.



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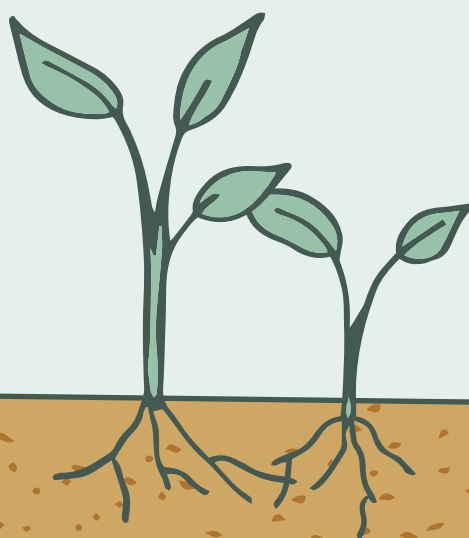
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APPENDIX A

# Guiding Handbook



GUIDING HANDBOOK

# The Seedling Project







SUMMARY

# Table of contents

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INTRODUCTION

The Seedling project

The Seedling Project aims to highlight the value of organic waste and the possibilities of local food production at a household level through online education material for children suitable for children across the globe. When beginning our project in Kisumu, Kenya, we found there was a need to improve the waste management within the city. Especially the organic waste, being 60 percent of the total waste, caused problems at markets and on the streets. We shifted our focus to children in primary school to find how we could support their learning within the subject of agriculture and composting. By teaching children about the circularity of food, food waste and small-scale farming, we could show the value of organic waste and inspire to sort and make use of it.

The Covid-19 pandemic outbreak made us reframe the project. Due to the pandemic, a lot of children were restricted to quarantine and could no longer go to school. This made us shift focus from the context of Kisumu to a global context where we found there was a need for home activities and education. We created manuals for home learning and set up an on-line platform where children could share their work and comment on each other's plants, composts, foods etc. Our pilot group involved twelve children from Kenya, Austria, Sweden and the U.S. The guides of the manuals, the fictional characters Space Potato and Wormy, graphically explained to the children how to do the given task, with the purpose of reducing the language barriers and to make the activities more fun.

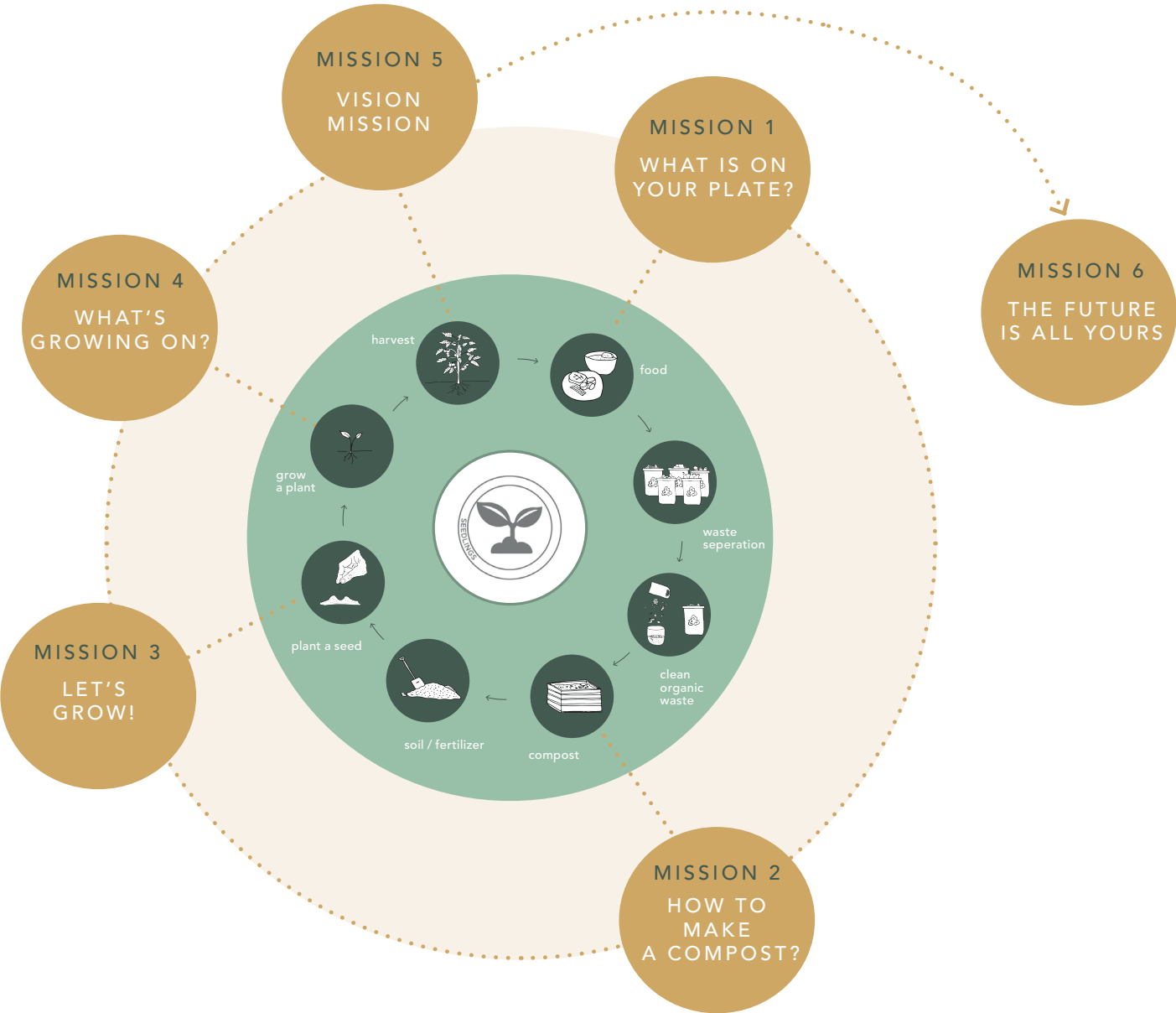


INTRODUCTION

The Seed Circle and the missions

Through an organisation in Kisumu called Zingira, and their work with planting seeds with children, we started to explore something we call the Seed Circle. By adding complexity and introducing this circle we targeted not only the value of organic waste but also the importance of local food, good soil and recycling. If you start with the food on your table, you can make the waste into a compost that will turn into organic fertilizer or soil. In this soil you can put a seed and eventually harvest your plant. After these steps you have completed the Seed Circle.

We created educational material based on the Seed Circle in the format of manuals, that we named Missions. By finishing all the Missions, every child completed the Seed Circle with experimental do-it-yourself tasks, observations and reflections. Our aim was to teach children about the value of organic waste by exploring small-scale urban agriculture.





FOUNDATION OF PROJECT

Four key elements



FACILITATOR

The facilitator can be parents, teachers, young adults or any person who has access to a device with internet connection.

PARTICIPANTS

Anybody who has a device (PC, tablet, phone) with internet access can participate.

PLATFORM

The online platform can be any existing platform. We chose the existing online website called Padlet.

MATERIAL

There is the provided material by the facilitator and the received material which will be uploaded by the participants.

The role of the facilitator is to set up and maintain the platform, as well as finding the participants and communicating with them. Another strategy is to first get in contact with their parents through mail or phone calls. Another task of the facilitator is to upload and share the educational material. That could be the material provided by the Seedling Project Group, which teaches the Seed Circle, or it could be new material produced. It is important that the facilitator has the overview of the group of participants, tries to encourage them to communicate in-between and has an eye on the platform.

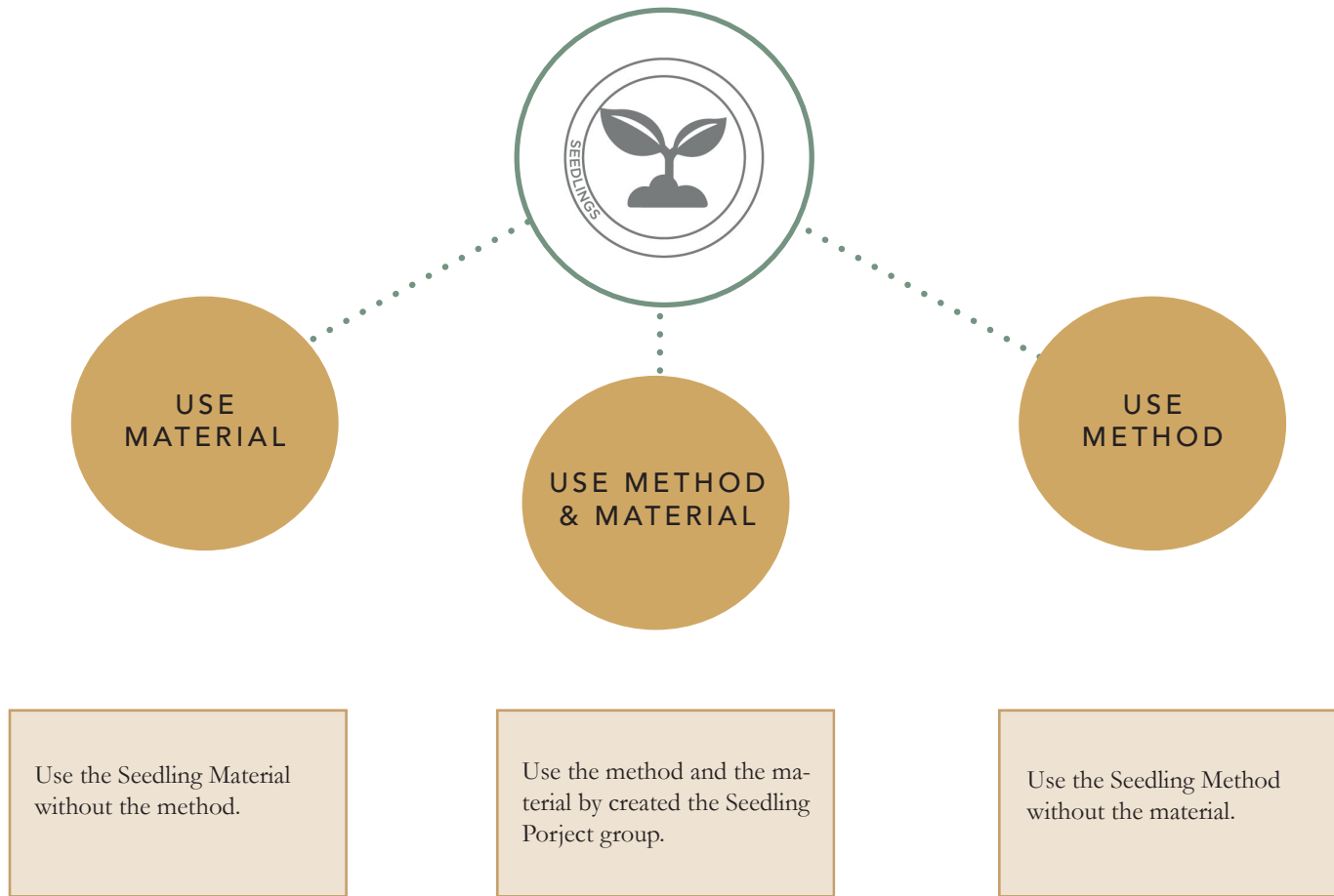
As a participant you get invited by the facilitator to the online platform. Your role is to finish different tasks and missions. You will have the possibility to share your result and talk with the other participants about it. With this process you will not only learn from the tasks, but as well from the others experiences regarding different locations, climate, contexts, etc. In the end you can also come up with your own missions and workshops. You might want to talk with your friends and fellow classmates about what you learnt, why you think it is important and share your new knowledge.

If you think about which online platform you want to use, there are some factors that might be considered. It is important that the facilitator can share material. Another aspect that was important to the Seedling pilot project was that the participants could share and see each other's work to make the platform interactive. The platform should be easy to use, and another positive point while working with children is, to have it private. Padlet works like an online black board, but there are many other options such as Google Classrooms, Open-learning, or any Social Media platform.

There are no borders set for the material. The Seedling Project focused on experimental do-it-yourself assignments called the missions with the topics organic waste, composting, regrowing and harvesting, to close the Seed Circle. The different missions are both hands-on and observing, to include different ways of learning. Feel free to use the PDF manuals and share them, or to create new missions for other topics.

FOUNDATION OF PROJECT

Using the material & method



Use the Seedling Material without the method.

You can use the educational material without setting up a platform and being a facilitator or a participant. The manuals for the missions are designed to be self-explanatory and for experimental do-it-yourself missions, thereby aiming for the children to learn-by-doing and to have fun. Possible users of only the material could be a teacher, a parent or a coordinator in a bigger organization. The material teaches about the Seed Circle, which connects organic waste, composting and re-growing.

Use the method and the material by created the Seedling Porject group.

To start, follow the step-by-step manual to set up the four key elements method used in the Seedling Project and use the existing material. You can continue after all missions are completed by creating new missions as a facilitator or as a participant. By encouraging your participants to continue with their missions or empower them to share their new knowledge.

Use the Seedling Method without the material.

Follow the key elements of the method used in the pilot project, but create and share your own material. It can be any topic you want to teach, there are no limits, as long as you are able to produce self-explanatory manuals to each workshop.

# The Seedling method step by step

- STEP 1

As a facilitator, find and choose an online platform you want to use. The Seedling Project group recommends Padlet. Set it up with material you want to share.
- STEP 2

As a facilitator, start the communication between your participants (or their parents) and yourself. Invite your participants to the online platform.
- STEP 3

Introduce yourself or a guide, as for example fictional characters on the platform. Ask your participants to introduce themselves, so all of them know each other. You can choose any kind of medium. The Seedling Project Group introduced themselves in a short video.
- STEP 4

Start with the first mission. As facilitator, upload the first mission (as PDF - you can find them through the QR-code further down). You can talk directly to your participants on the platform or use guiding avatars. In the Seedling Project, the avatars Space Potato and Wormy were used for communication, not only within the manuals, but at the platform as well.
- STEP 5

Maintain the online platform, answer questions, encourage the communication in between the participants to support the knowledge exchange in between them.
- STEP 6

Share all the missions 1-6 and wait for the results. Give not only the participants enough time to do the tasks, but also think about the time nature needs to do its job (re-growing and composting takes a while for changes to be noticeable).
- STEP 7

Encourage the participants to continue working and taking care of their plants and compost.
- STEP 8

Wrap up with a summary of what the participants have learned. If you use the Seedling Material it is the Seed Circle (see page 20). The Seedling Project group created an animated movie for wrapping up. Share all the outcomes and explain the seedling circle in detail.

You can have a look at the animated movie here:



**HINT** All the missions and the Seed Circle as single PDF's are also here:

Try the missions by yourself - you will enjoy them and they are fun!



**HELP** If something is unclear, you have question or just want to get in contact with the Seedling Project Group, you can reach us via social media:

[FACEBOOK.COM/THESEEDLINGPROJECT2020/](https://www.facebook.com/TheSeedlingProject2020/)

WHAT'S ON YOUR PLATE?

Hey WORMY!  
I am a bit hungry after all this travelling. Do you know what you can eat here on earth? I hope they do not eat space potatoes!?

MISSION 1

what to do  
show us what's on your plate

what you need

food

phone

what

photo or video

MISSION 1

HOW TO:



get a phone or a device with a camera



CLICK!



take a photo or video of your meal



Hey SPACE POTATO,  
Look at the padlet,  
it is super cool!



upload it to the platform



ask the cook what the meal is called & what's in it,  
describe what you learnt in a comment



do not forget to comment on a post  
from one of your colleagues

what you need for MISSION 2

yard debris

organic waste

jar or plastic bottle

marker

tape

water

paper waste

coming up next

9



Hi WORMY! It was so nice seeing what the humans had to eat the other day, don't you think?

Yeah! I wonder if the Earthlings as well get leftovers when preparing their food? Do you think they do anything with those leftovers?

Oh! I have an idea! You think I could teach them what us space worms do with our food waste?

**MISSION 2**

**HOW TO MAKE A COMPOST**

what to do  
Follow WORMYS steps on how to make a compost

what you need

- yard debris
- organic waste
- paper waste
- marker
- tape
- water
- jar or plastic bottle

what  
2 photos

Don't forget to take a picture

CLICK!

What are the leftovers from preparing your food?

Now I will teach you how to reuse the food waste and make a compost out of it

Maybe like that... ask an adult for help if it's tricky

Start with taking a preferably transparent container, for example a glass jar or a plastic bottle.

**MISSION 2** HOW TO MAKE A COMPOST

**HOW TO:**

...don't forget to put your computer or phone faaaar away!

Put a bit of scratched paper waste and food waste into it.

Add a layer of dead leaves and grass clippings.

Repeat these steps until the container is mostly full.

Finally, add your (rain)water ...

ask an adult for help if it's tricky

...and cap the whole thing or put something on top - make sure there is still air coming in and your compost can breathe!

Don't forget to comment on your colleagues compost.

Now we have to be patient - let's wait and see!

Draw a line on the glass to mark the top of the mixed ingredients.

CLICK!

Take a picture of your compost! share the pictures of the food waste and the compost to the platform.

what you need for MISSION 3

- soil
- something to plant in
- food waste
- water

coming up next

Hi WORMY! Can you help me with my compost? Nothing is really happening...

What... WOW! Imagine that we here on earth could grow our own food, in our own compost soil, that we made from our own food waste? How cool!

LET'S GROW!

But WORMY, I want to try growing things now. Can't we use different soil for now, just for practice?

I think it looks just perfect! You just have to be even more patient. If you manage to wait long enough, your compost will turn into soil! Did you know that?

MISSION 3

what to do  
Follow the SEEDLINGS steps on how to grow something.

what you need

organic waste

something to plant in

soil

water

what

2 photos

MISSION 3

HOW TO:

Take a picture of your findings!

CLICK!

Have another look through your food waste. Can you find something in there that you can grow?

Look! I found some seeds from fruits and vegetables! What did you find SPACE POTATO?

I found some parts of vegetables, I believe I can regrow!

If you think it is tricky to find something to grow, you can always ask someone for help!

Find something to plant the seed or vegetable part in.

MISSION 3 LET'S GROW!

HOW TO:

I'm sowing a seed in soil!

Fill the container with soil.

Make a small whole in the soil and put a seed in it.

Cover the seed with soil, water and place it somewhere sunny!

And I'm regrowing a part of a vegetable in water!

You could as well try to regrow in soil!

Put your vegetable part in the container...

... and add some water.

Make sure the water is not covering the whole vegetable.

Finally, place it somewhere sunny!

Don't forget to water it once in a while!

Now we have to be patient. Lets wait and see if something starts growing!

CLICK!

Take a picture of your growings! Share the picture of your containers and findings of the food waste on the platform.

Don't forget to comment on your colleagues growings.

what you need for MISSION 4

paper

pencils

coming up next



Hey WORMY!  
Look at this tiny tiny green sprout on my carrot - it has started to grow! Have your seeds started to grow yet?

So far, I don't see any sprouts. But sometimes it takes a while before seeds start to grow. I am sure that if I keep on watering it, soon will start sprouting!

what to do  
draw your vision of your growings  
what you need

paper  
pencils  
what  
photo

VISION MISSION

Imagine! In a while, both our growings will be big plants. Perhaps we could even harvest something from them, don't you think, WORMY? That would be so exciting!

MISSION 4

HOW TO:

Take a look at what you are growing...

Have you remembered to water it?  
Extra tip: you can cover your containers with transparent plastic to have a little greenhouse...

...imagine what your plant will look like when it has grown up and is ready to be harvested...

mmmh... barbecue

mmmh... soup

...imagine what you could cook out of it!

MISSION 4 VISION MISSION

Take a pen and some paper and draw your visions of your plant and your food.

Take a picture of your drawings and upload it to the platform.

WORMY? You think that I could grow this plant on our planet as well?

Hum... It depends... different plants need different climates. Even here on earth you can not grow everything everywhere.

In a comment to your vision, tell your colleagues if you think you can grow and harvest from your planted seeds or vegetable parts where you live? Why? Why not?

Comment on your colleagues' pictures and tell them if you think that their growings could be grown where you live.

what you need for MISSION 5

your compost  
your growings

coming up next

Look WORMY! Now almost all of our growings have started to sprout!



Wow! Our compost has not yet changed so much. I believe that we have to be even more patient for the food waste to start moulder.



WHAT'S GROWING ON?

I wonder if the Earthlings growings also have started to sprout? Perhaps they can see something happening with their composts as well?

MISSION 5

what to do  
Share a update of your compost and your growings.

what you need

your compost

your growings

what

2 photos

MISSION 5

HOW TO:

Give us a update on how your compost is doing!

hmm... soil?

Take a look at your compost. Can you see any changes?

CLICK!

Upload a picture of your compost to the platform.

Compost, 2 weeks

Changes:

In a comment to your compost, tell your colleagues how old your compost is. Can you see any changes?

MISSION 5 WHAT'S GROWING ON?

HOW TO:

Don't forget to check if your plant needs water!

Give us a update on how your growings are doing!

Take a look at what you are growing. Can you see any changes?

Hey WORMY. What if nothing has happened to my growing yet?

Perhaps it needs even more time?

Or perhaps, something went wrong. That is also okay! Think about what went wrong and try again! Maybe you end up learning something?

CLICK!

Upload a picture of your growings to the platform.

Plants, 2 weeks

Changes:

In a comment, tell your colleagues how long time ago you started your growings and if you can see any changes. If nothing has changed yet, do you know why?

Don't forget to comment on your colleagues growings.

MISSION 6 THE FUTURE IS ALL YOURS

coming up next



Hey WORMY!  
Look at me! It's not  
only the plants that are  
sprouting... I am as well!

Do you really think that we need to?  
Then we won't be able to see how the  
Earthlings and their plants are doing...

**THE FUTURE IS ALL YOURS**  
  
But I have an idea! If they want to, the  
Earthlings could still use their online platform  
and continue to update each other!

It must be the environment here on Earth. I  
think that it is soon time for us to say goodbye  
to the Earthlings and travel back home.

what to do  
  
Continue sharing updates with your  
fellow colleagues. Perhaps, you could  
even create your own missions!

Wow! The plants have  
grown so much!

If you like to, continue to update your fellow  
colleagues on how your plants are growing and how  
your compost is turning out.

Let the manual from MISSION 5 guide you,  
or maybe you have your own idea on how to  
update your colleagues?

Share the updates of your composts  
and growings on the platform.

**MISSION 6** THE FUTURE IS ALL YOURS

WORMY, since we are leaving,  
I guess this will be our last  
mission?

I guess this is the last  
mission we post at least.  
But who knows, maybe the  
Earthlings have their own  
ideas of missions? If they  
want to, they can post  
them on platform!

Perhaps you could even  
challenge a friend from  
school or a parent to  
perform the missions?

Share your mission on the platform. Just add  
your mission as a post on Earthling missions!

And as always - don't forget to comment on your  
colleagues updates and posts!

Would you like more missions? Perhaps you could create  
one yourself and challenge your fellow Earthlings?

Hey, WORMY!  
Maybe we could  
find internet  
connection on  
our planet?

Thats a great idea!  
Then, we could see all  
the updates as well!  
Let's try when we  
come home.

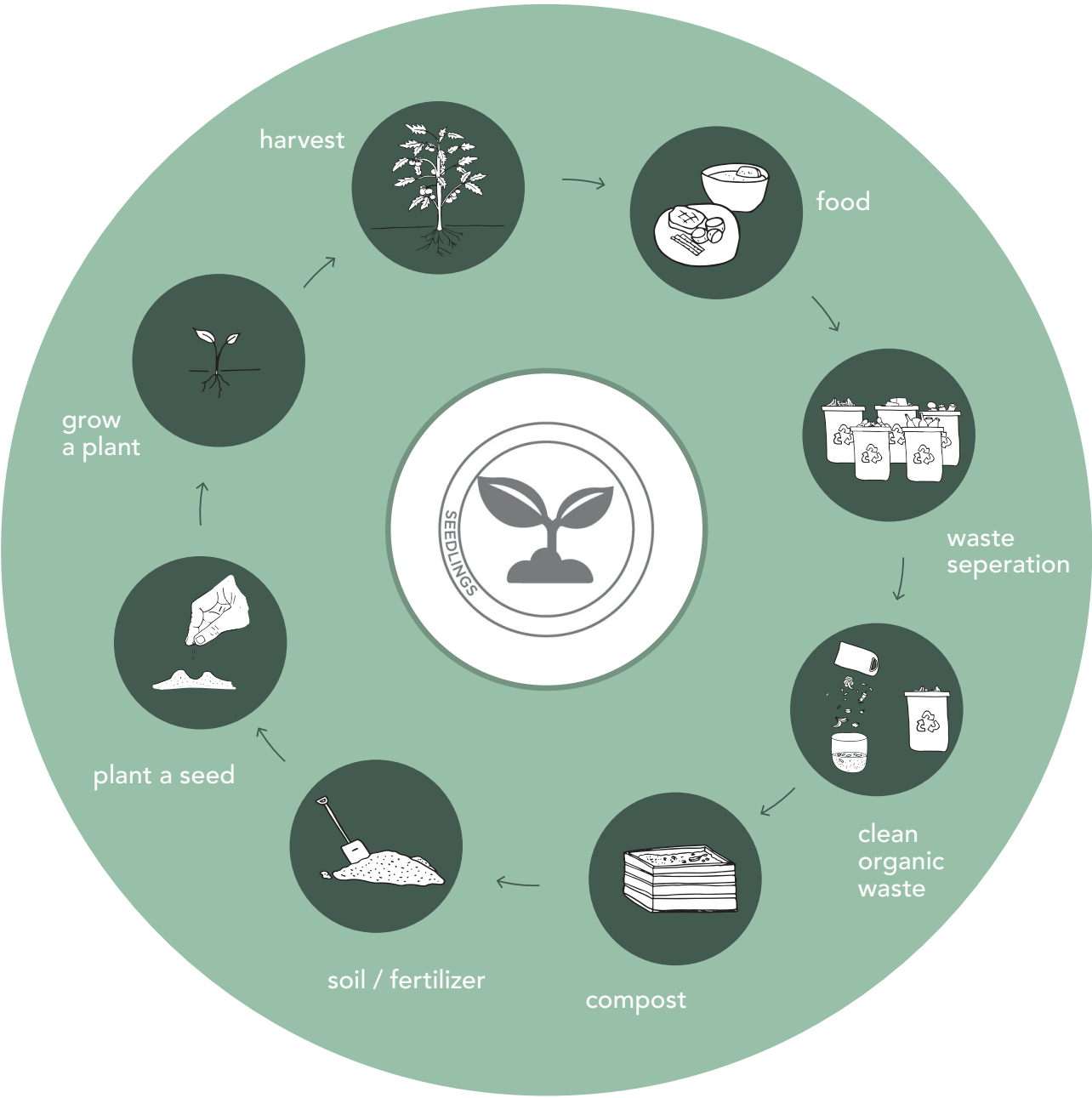
coming up next  
**SUMMARY**  
OF ALL OUR ADVENTURES

SUMMARY

The Seed Circle

The Seed Circle is the key message the Seedling Project Group wants to teach. You can start wherever you want in the circle, because it is all connected in a loop. But for example take the organic waste from preparing food, re-cycle it into a compost, use the soil or fertilizer to plant or regrow some seeds, take care of the plant long enough to harvest it and make food out of it again.

Wrap up the workshop series with a summary of what the participants have learned and connect it to the seed circle to teach the full circularity. The Seedling Project aims to highlight the value of organic waste and the possibilities of local food production at a household level suitable for children across the globe.



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Authors: Ella Davidsson, Frida Edstam, Ida Johansson, Markus Zorn, Sarah Gold

Contact to the Seedling Project Group:  
Social Media [FACEBOOK.COM/THESEEDLINGPROJECT2020/](https://www.facebook.com/TheSeedlingProject2020/)

Reality Studio - Project Report:  
[link to report:](#)







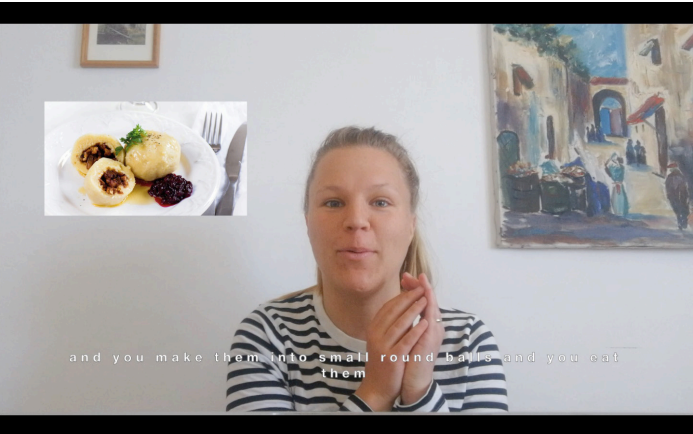
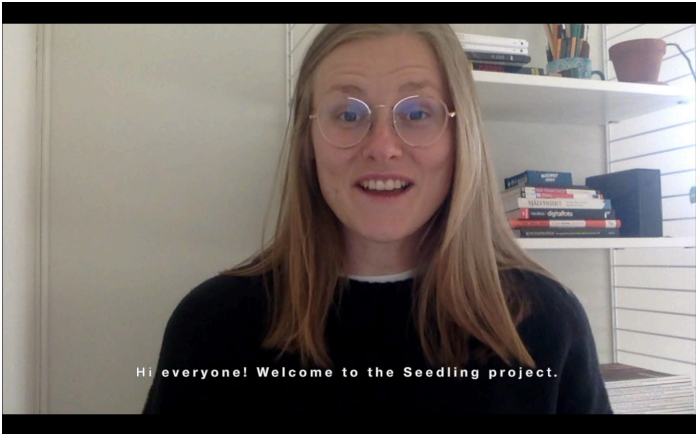
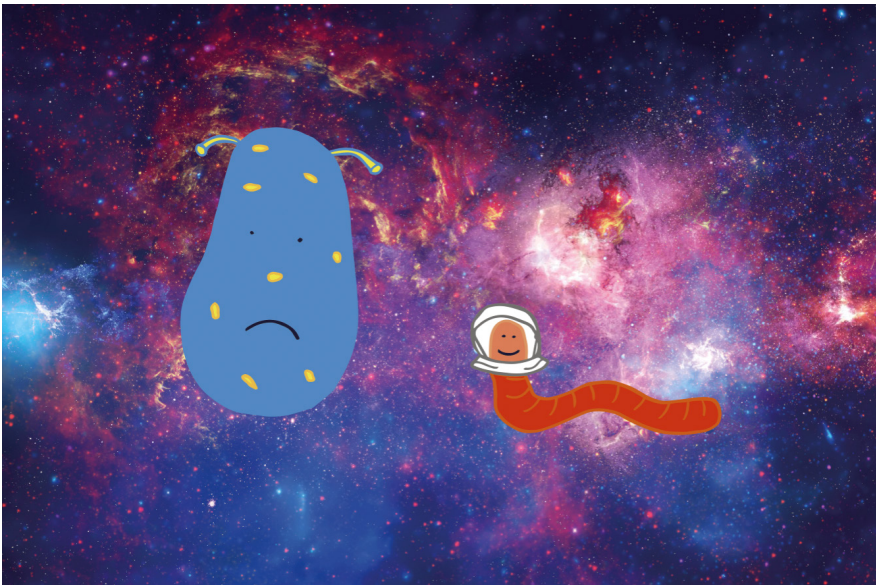
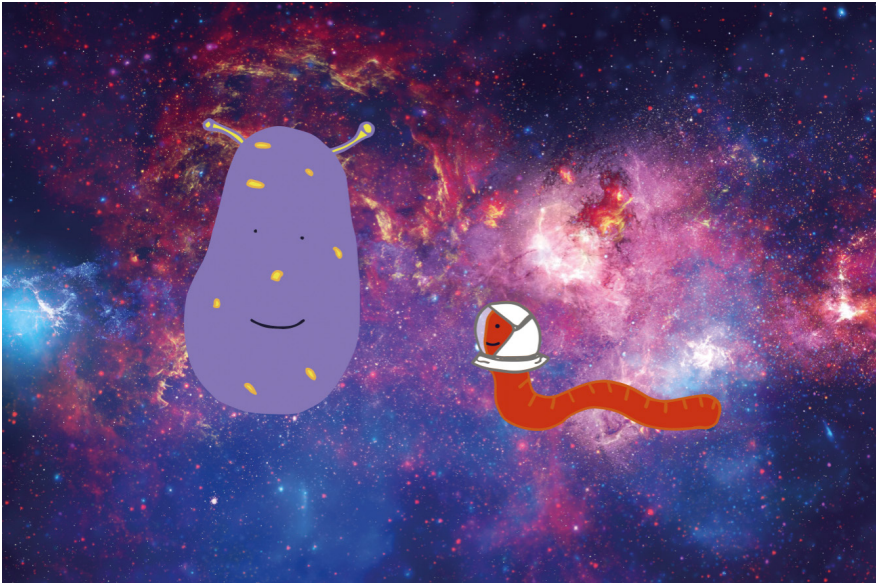
APPENDIX B

**Introduction movie and GIF**



APPENDIX B

Introduction movie and GIF



APPENDIX C

# **Animation**



APPENDIX C

# Animation



QR-code for Youtube

