T.I.S. School Garden

東北インタナショナルスクール学校の庭

Sendai, Miyagi, JAPAN |日本国宮城県仙台市

Student: *Mayi Lekuona*
Mentored by *Mandy Merklein*

T.I.S. School Garden Proposal - School Overview

T.I.S. is an international school in Sendai, Miyagi, Japan. It provides education from pre-kindergarten through grade 12 for Japanese and foreign families from all over the world. The school has approximately **100 students (aged 5 to 18)**. There are 8 classes, all of which are composite classes (**multi-age classes**, e.g. p1/2) with 10-20 students in each.

Their school program focuses on the development of the whole child as an inquirer, both at school and beyond, following the school **5 core values** (Knowledgeable, Risk-taker, Open-minded, Responsible, Communicator). **The classrooms are multipurpose spaces that lend themselves to a variety of learning styles and activities.** Four to five students gather around a table and allows students to help each other with their studies.
The classrooms are comfortable spaces where students feel at home and might crawl up and read a book.

The school principal is very enthusiastic and highly supportive of permaculture education with children.
Overall, **T.I.S. community is like a family**, where everybody is very easy to approach.

Design Thesis & Vision Statement

Mission: To create a sustainable school garden that is functional for children & youngsters (4 to 18 years old) and provide a dynamic environment in which to observe, discover, experiment and, learn.

Vision: The school garden is a lush garden full of a mix of functional and kid-friendly elements. The landscape includes a mixture of edible, aromatic, medicinal, and pollinator-attracting plants, as well as some creative spaces. Vertical gardens grow on the building walls. The outdoor classroom offers a shaded open space and is improved with colourful and fun elements. The school garden is a welcoming and inclusive space that improves relationships and helps connecting with nature.

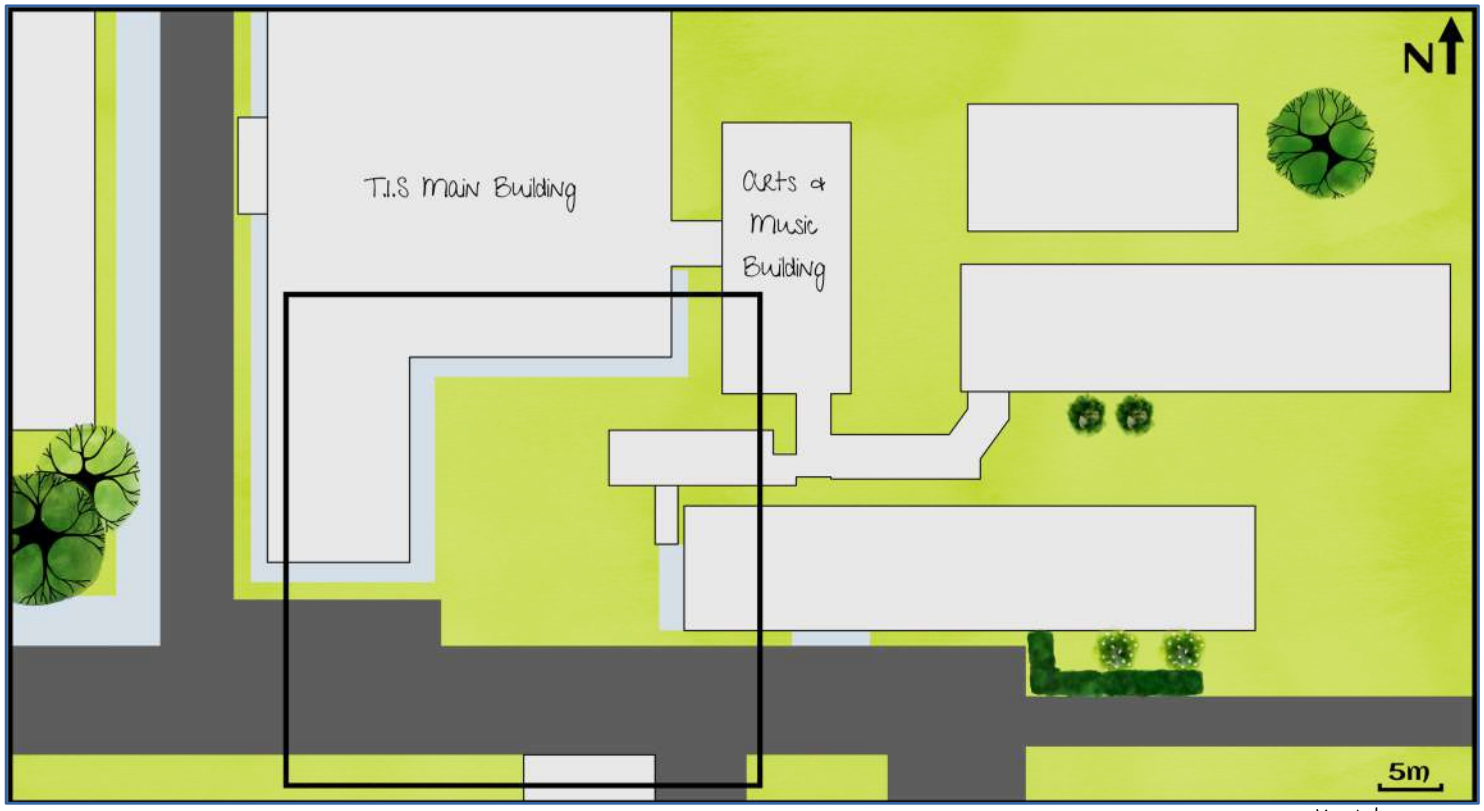
Goals:

- Create an outdoor teaching site that provides plenty of educational opportunities
- Start composting project as soon as possible
- Structures: outdoor class by 2020 and other structures (buddy bench, little library) by 2021
- Obtain first crop by 2021
- Use 100% of the available rainwater (roofs with open gutters) in the gardens from the first year
- Aesthetics: Embellish the space with the help of arts teacher and students by 2021
- Create new microclimates
- Enhance biodiversity by creating different habitats
- Allow students to become active participants in the school life
- Strengthen school spirit and build community

Why a school garden?

- ⇨ Address **multiple learning styles**
- ⇨ Help teachers incorporate **hands-on activities**
- ⇨ Provide opportunities for **interdisciplinary** lessons
- ⇨ Teach **environmental stewardship**
- ⇨ Make **responsible caretakers**
- ⇨ Allow students to become **active participants**
- ⇨ Enhance **appreciation** for food origins, nutrition & healthy lifestyle
- ⇨ Build classroom **relationship**, improve **teamwork** & strengthen **school spirit**
- ⇨ Enhance **biodiversity** and give **refuge** to different species
- ⇨ Work **cooperatively** & develop **responsibility**
- ⇨ Are safe places to **relax**, **enjoy** & **contemplate**
- ⇨ Increase students' **self-esteem**
- ⇨ Teach **patience** & **resilience**
- ⇨ Instill a **positive work ethic**
- ⇨ Develop **community**
- ⇨ **Beautify** the environment

General Base Map

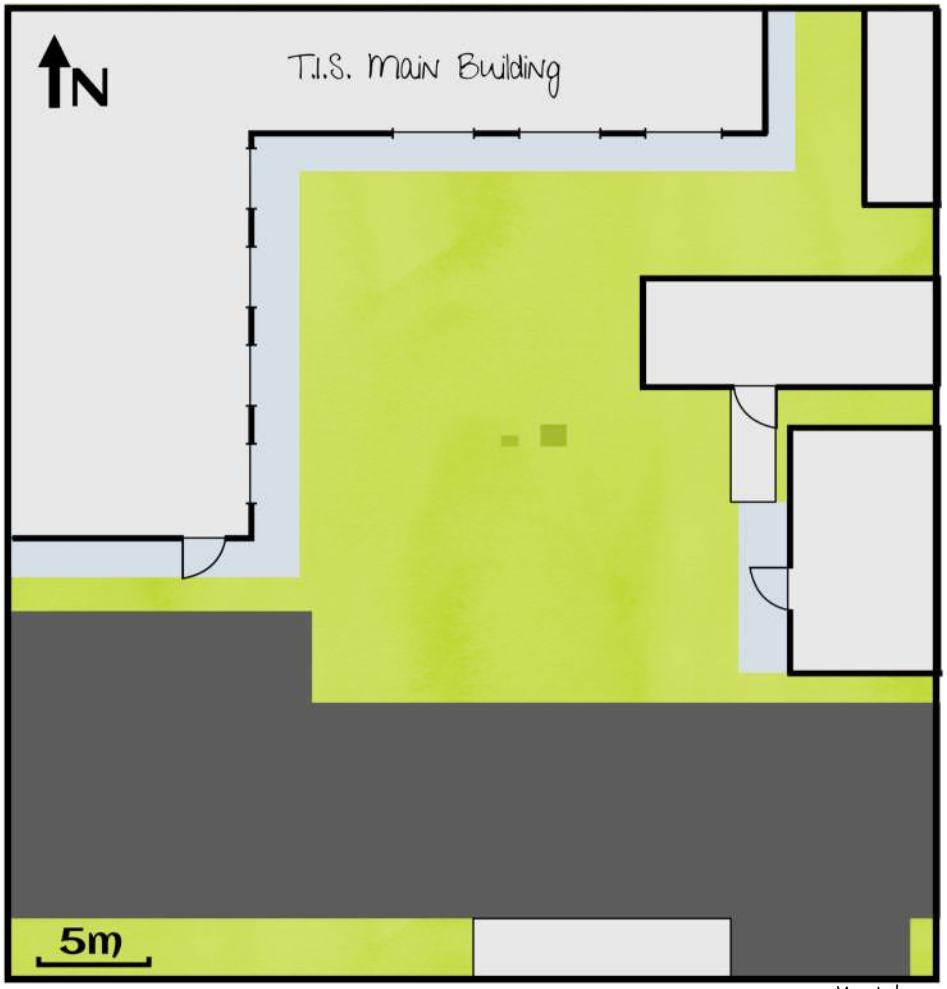


T.I.S. School Garden - General Base Map (June 2020)

Designer: Mayi Lekuona

T.I.S. shares the campus ground with T.H.S., a high school that follows Japanese curriculum.
The main idea is to start a school garden for T.I.S., and if the project works well, maybe expand it and make a collaborative project that would include both schools and help to create a bigger sense of community.
The local community centre is at only 5-minutes walk from the school, so this is also a great opportunity to open the project to the rest of the community.

Base Map: School Garden Site



T.I.S. School Garden - Base Map (June 2020)

Designer: Mayi Lekuona

Site dimensions: 14m x 20m

The location of the future school garden is facing South, and is surrounded by different buildings except on the southern side.

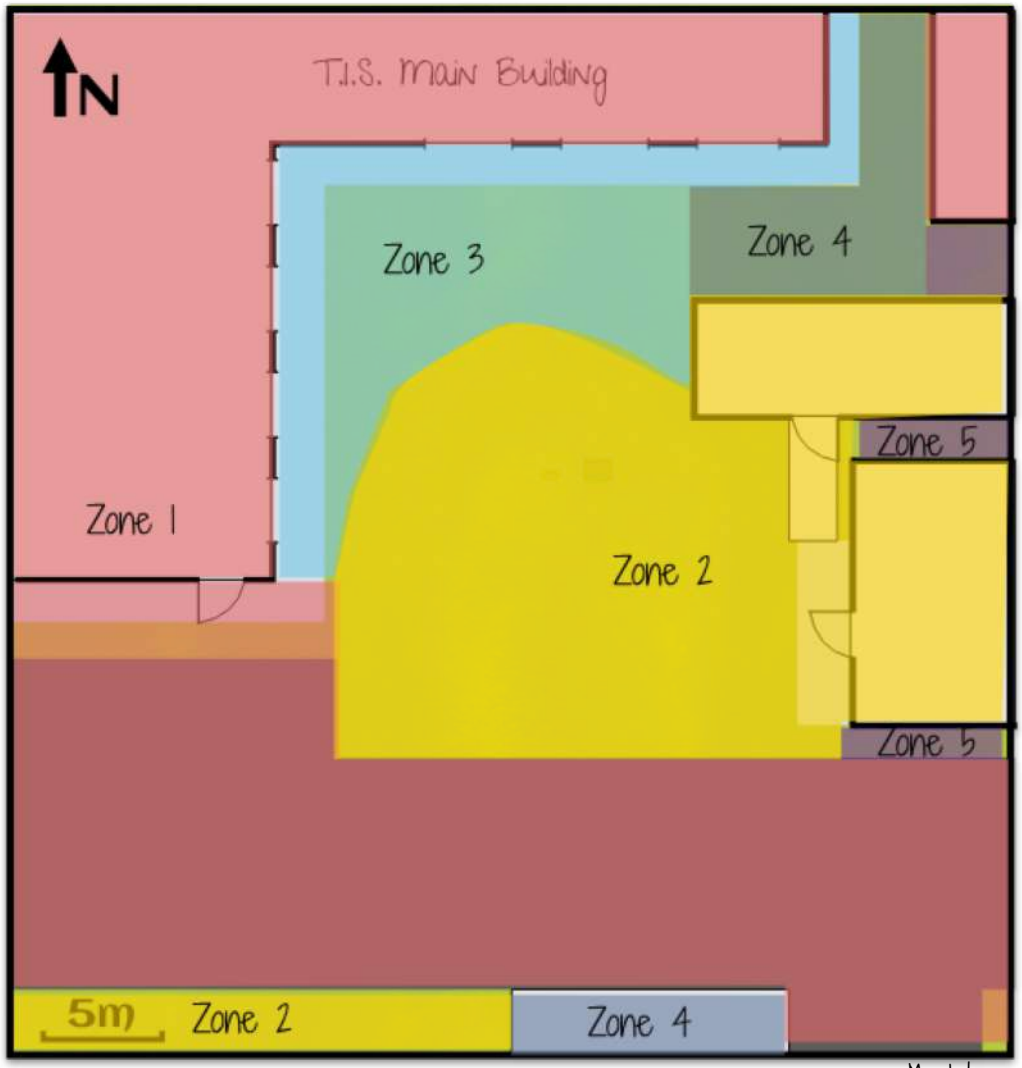
Motor-vehicles are usually not allowed inside the campus, so there is no traffic in front of the site.

Zones (before implementation)

Zone 1: Main building and pathway to athletics field (recess time & PE classes)

Zone 2: Other buildings, and part of the future garden (recess time)

Zone 3: Back pathway and part of the future garden



T.I.S. School Garden – Zone Map (before) (June 2020)

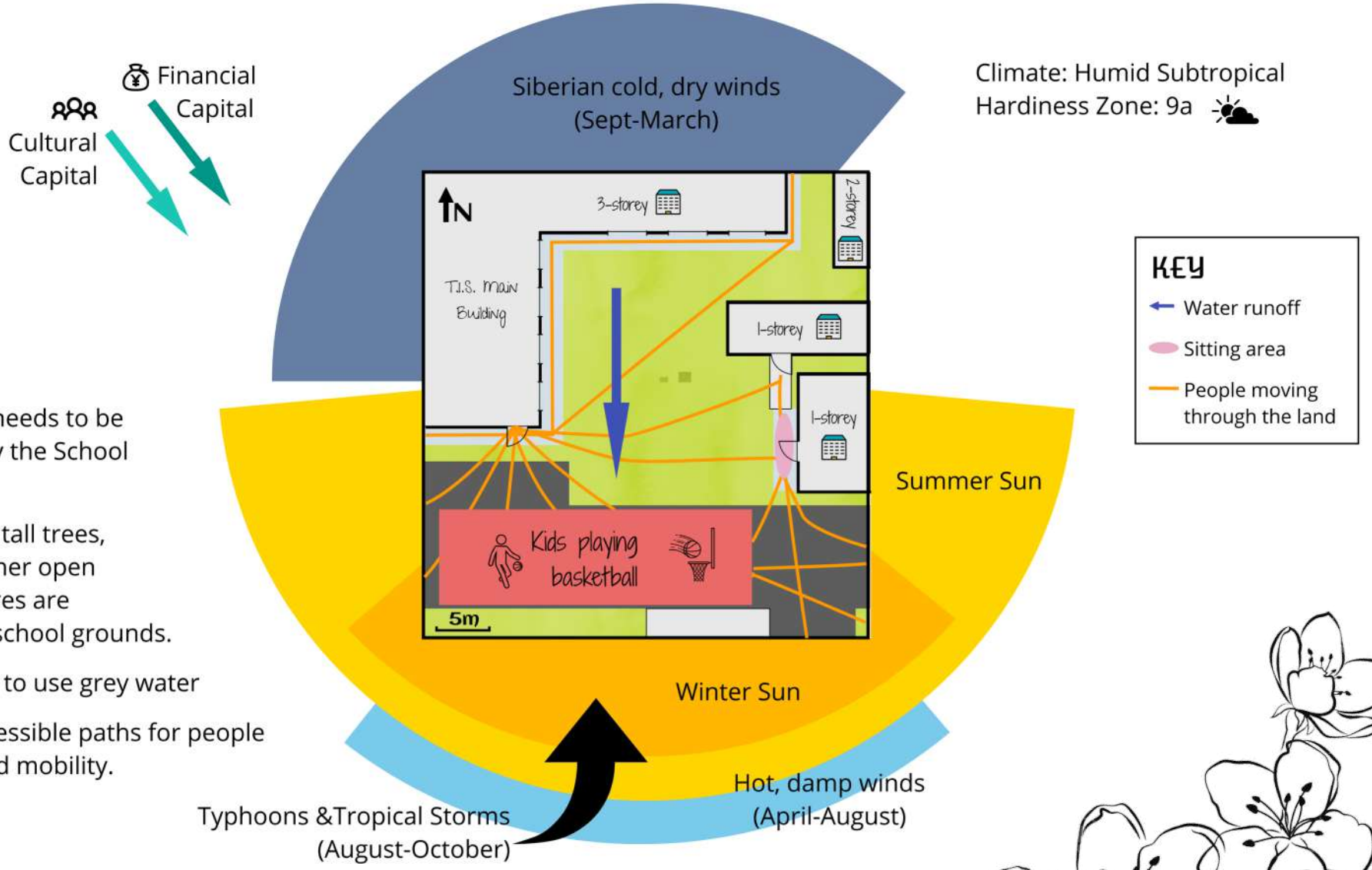
Designer: Mayi Lekuona

Zone 4: Space between main buildings. Very shadowy and humid. Some abandoned stuff on the ground

Zone 5: Narrow spaces between secondary buildings

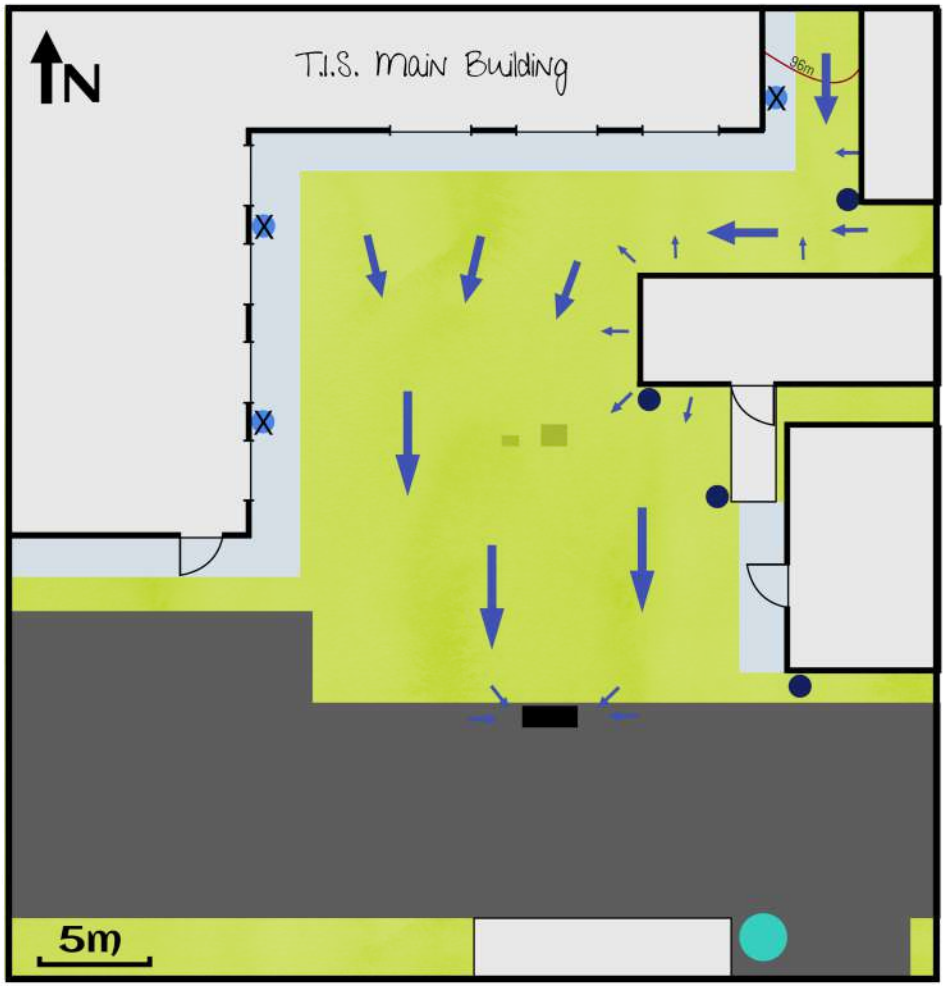
In school gardens, zones can be defined as: *Zone 1:* intensely supervised (classroom); *Zone 2:* observable from classroom; *Zone 3:* teacher initiated learning; *Zone 4:* child initiated learning; *Zone 5:* child initiated/directed free play (Nuttall & Millington, 2008). In this case, all the new garden zone is observable from the classrooms. So, in this map, zones are defined by human traffic.

Sectors Overview



- The design needs to be approved by the School Council.
- No animals, tall trees, ponds or other open water features are allowed on school grounds.
- Not allowed to use grey water
- Need of accessible paths for people with reduced mobility.

Water Systems



T.I.S. School Garden – Water Systems Map (June 2020) Designer: Mayi Lekuona

KEY

- Topographic line (every 0.5m)
- Water movement
- Downpipes connected to underground drainage system
- Accessible downpipes
- Water tap
- Drain

Very slight slope, almost flat

Average Annual Precipitation: 1254.1mm

Max Precipitations: May-September | Rainy season: late June-early July

No flooding risk. The nearest stream is 300m Eastward and there is a 30m elevation.

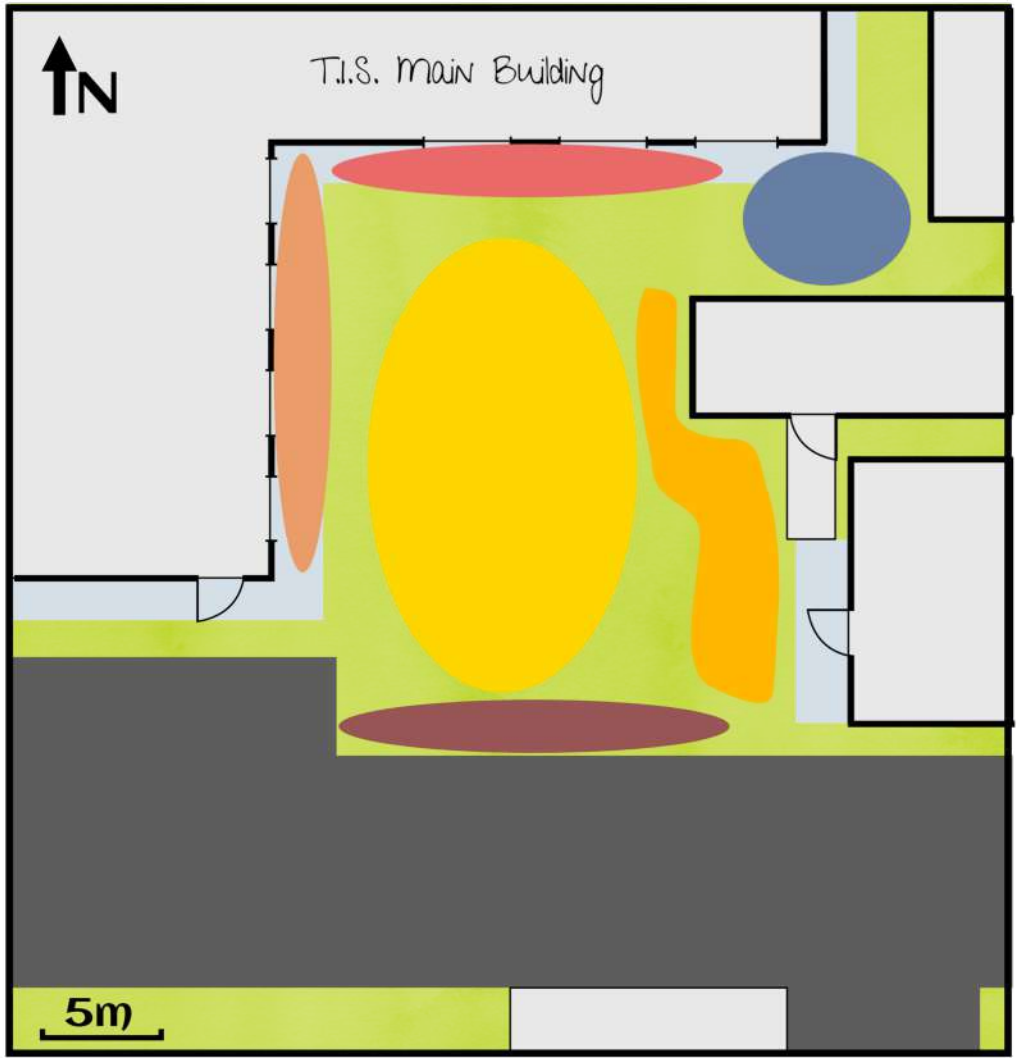
We are not allowed to use grey water in the school. So we will focus on reducing the overall use of water and using rain water. The school garden's playhouse will serve as a demonstration whole system (rainwater use, grey water use, and renewable energy use).

Edges & Microclimates (before implementation)

Cemented pathway
Protected from cold winds
Increased heat

Cemented pathway
Protected from cold winds
Increased heat
Less sun in the afternoon

Open lawn
Good sun all day
Exposed to southern winds in summer



T.I.S. School Garden – Microclimates Map (before) (June 2020) Designer: Mayi Lekuona

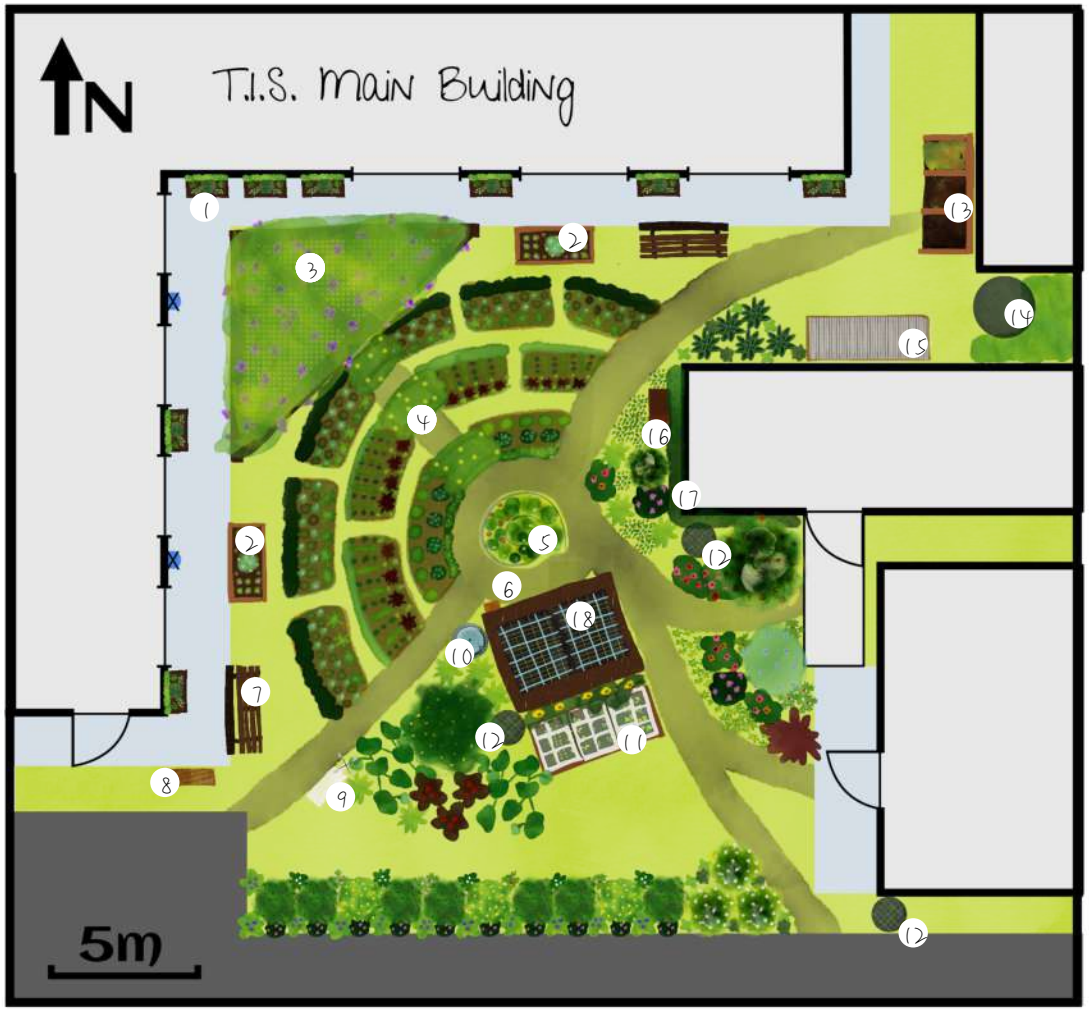
Shaded space between buildings
Cool northern winds funnelled between buildings.
No sun, moist soil

Eastern side
Good afternoon sun
Light reflected of wall
Protected from cold winds

Asphalt border
Increased heat

The whole garden is a microclimate as it is protected from cold Siberian winds from September to April.

Master plan & Components map



T.I.S. School Garden – Components Map (June 2020)

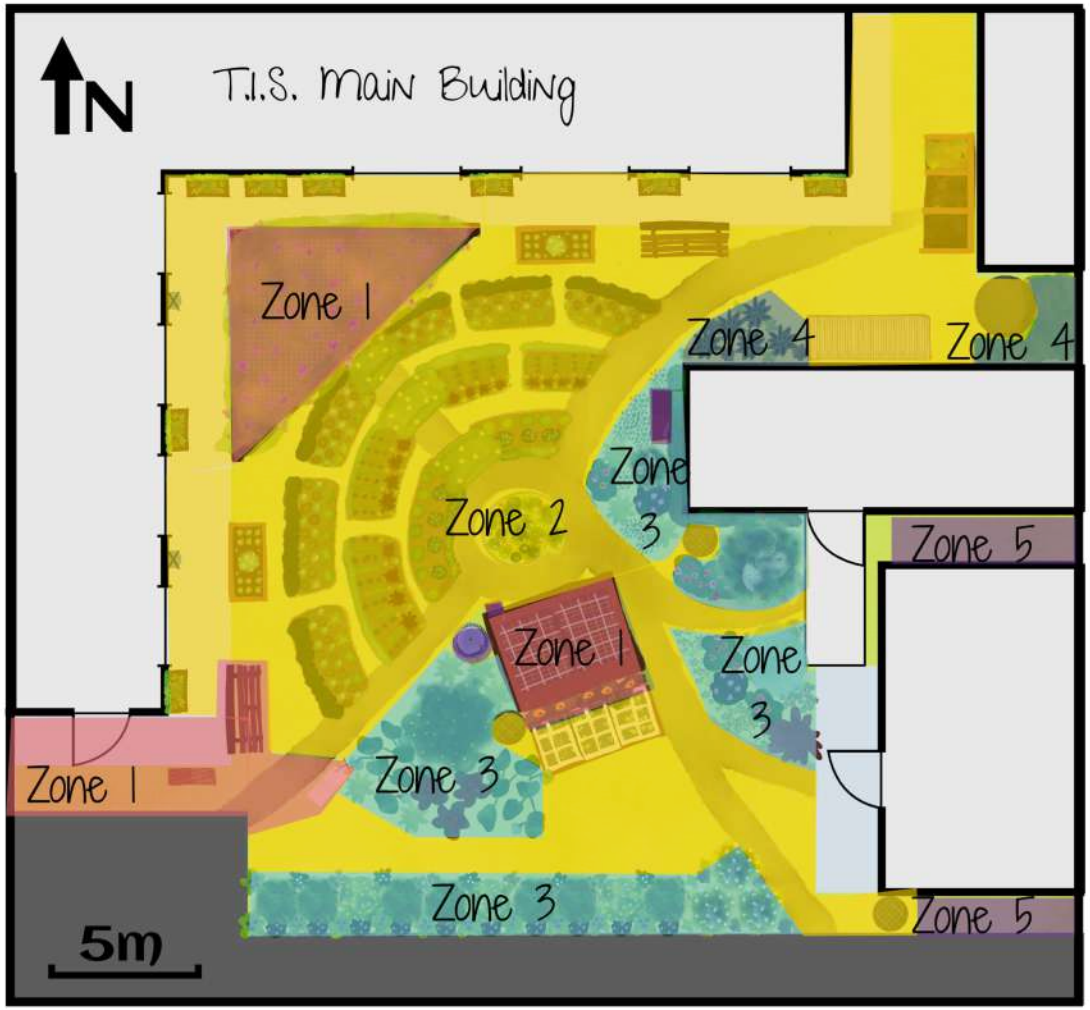
Designer: Mayi Lekuona

1. Containers with trellis
2. Raised containers
3. Outdoor classroom (wooden pergola)
4. Tunnel
5. Herb spiral
6. Birdhouse
7. Buddy bench
8. Little free library
9. Weather station
10. Bird bath
11. Cold frame
12. 200L Rain barrel
13. Compost bins
14. 5000L Rain barrel
15. Toolshed
16. Insect hotel
17. Trellis
18. Playhouse

Zones (after implementation)

Zone 1: Outdoor classroom, playhouse, and garden entrance (little free library and buddy bench)

Zone 2: Pathways, compost bins, rain barrels, toolshed, cold frame, and classroom garden beds



T.I.S. School Garden – Zone Map (after)((June 2020)

Designer: Mayi Lekuona

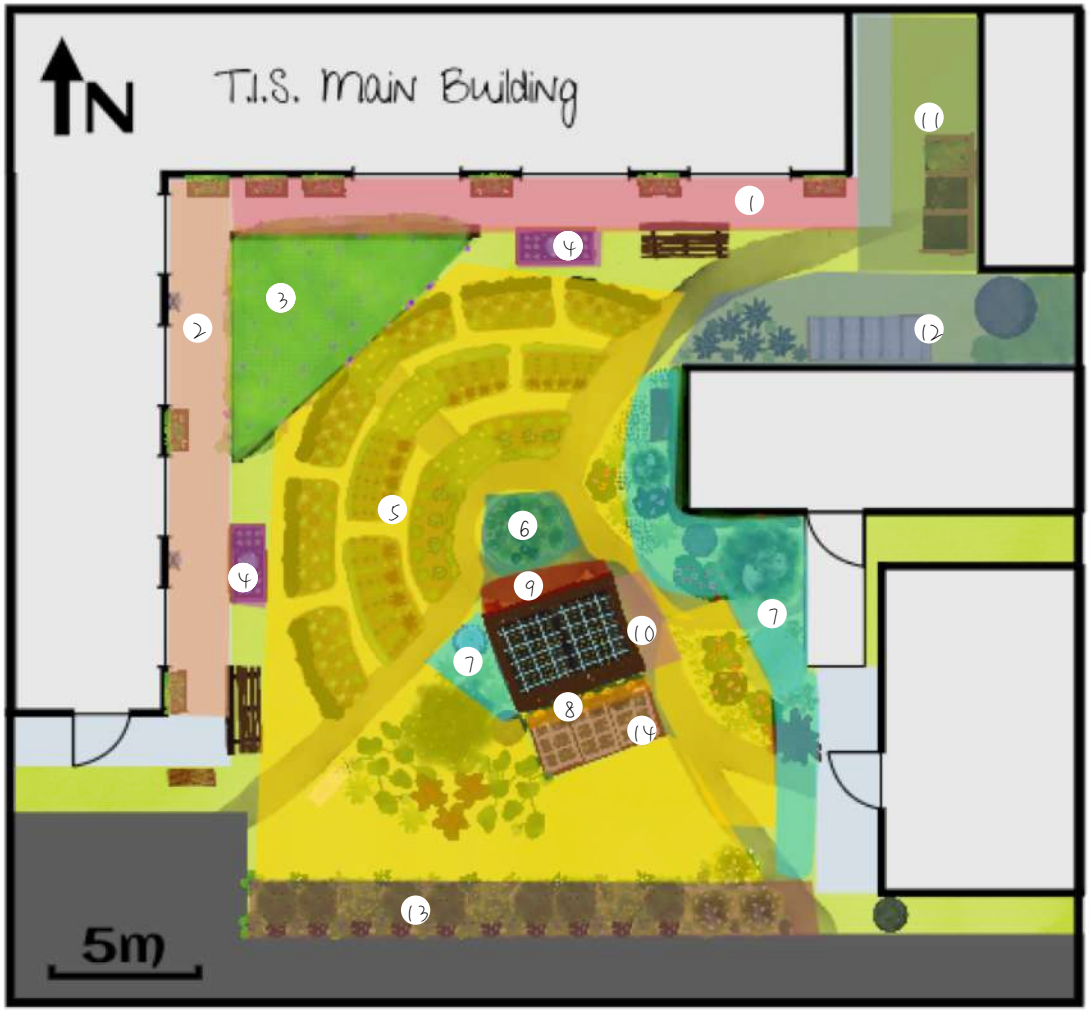
Zone 3: Perennial gardens

Zone 4: Bamboo plot and *Hosta* sp. guild

Zone 5: Narrow spaces between secondary buildings + insect hotel, birdhouses, fairyhouses

Edges & Microclimates (after implementation)

1. **Cemented pathway**
   Protected from cold winds
   Increased heat
2. **Cemented pathway**
   Protected from cold winds
   Increased heat
   Less sun in the afternoon
3. **Pergola**
   Cooler, shaded place
4. **Raised containers**
   Dryer space
5. **Open space**
   Good sun all day
   Exposed to southern winds in summer
6. **Herb spiral**
   Lots of microclimates in one place
7. **Western side of buildings**
   Good afternoon sun
   Light reflected of wall
   Protected from cold winds
8. **Southern side of playhouse**
   Increased heat, good sun



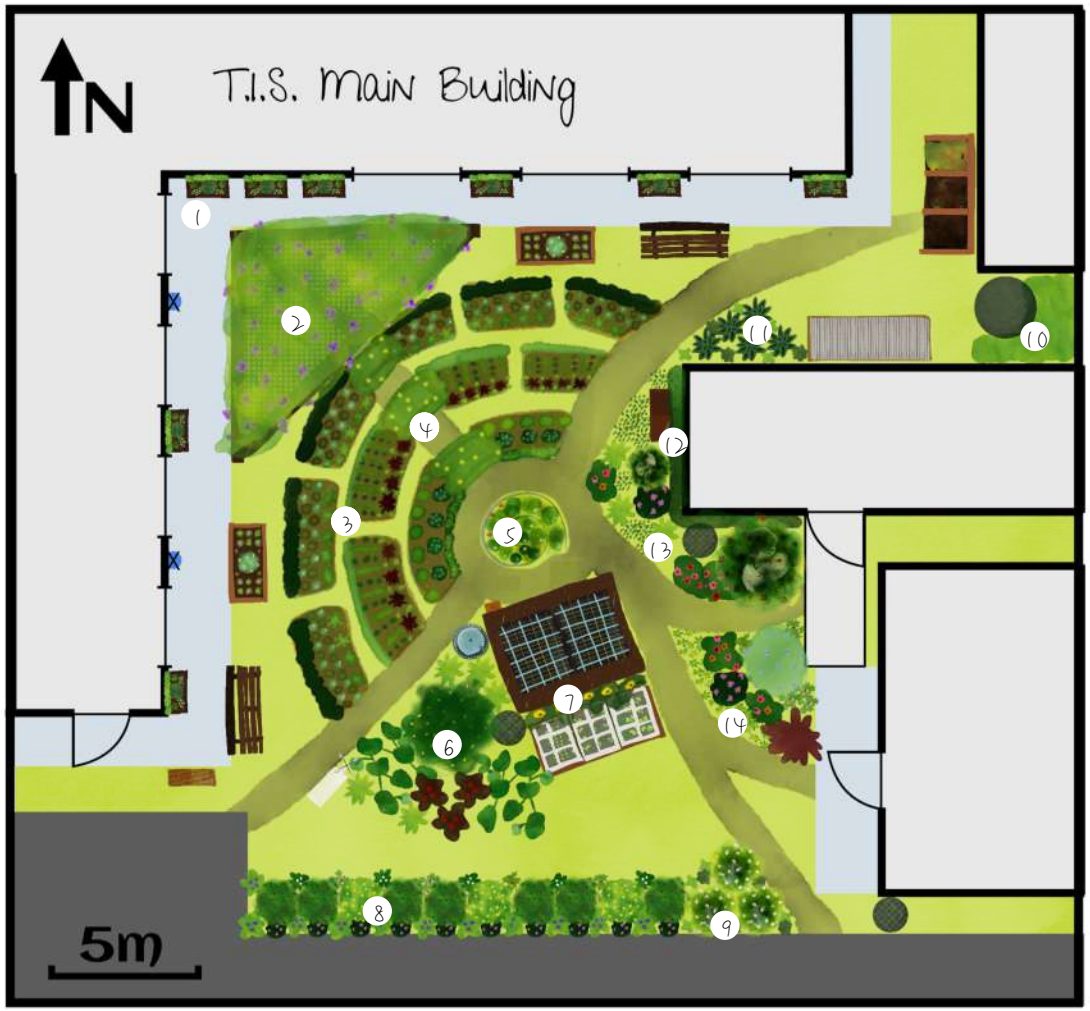
T.I.S. School Garden – Microclimate Map (after) (June 2020)

Designer: Mayi Lekuona

9. **Northern side of playhouse**
   Protected and shaded
10. **Eastern side of playhouse**
    Increased heat
    Less sun in the afternoon
11. **Space between buildings**
    Cool northern winds funneled between buildings.
12. **Northern side of building**
    Exposed to cool northern winds
    Limited sun, very moist
13. **Asphalt border**
    Increased heat
14. **Cold frame**
    Increased heat

Plants, Trees, and Gardens

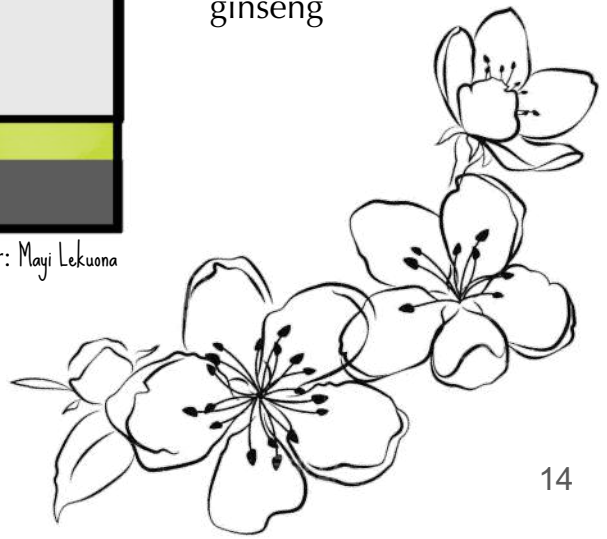
1. **Containers**
   Mix of herbaceous annuals and climber perennials/annuals (beans, cucumber, clematis, morning glory)
2. **Wooden pergola**
   Japanese wisteria
3. **Individual beds for each grade**
   Plants chosen the students with their homeroom teacher. Clover planted between beds
4. **Tunnel**
   Luffa, kiwi, Japanese yam
5. **Herb spiral**
   Mix of herbs, flowers & aromatics
6. **Kumquat guild**
   Kumquat, canna, comfrey, squash & ginger
7. **Sunflowers**
8. **Berries guild**
   Japanese wineberry, gooseberry, blackcurrant, lupins, mallows, foamflower, clover & ginseng
   Blueberries guild



T.I.S. School Garden – Vegetation Map (June 2020)

Designer: Mayi Lekuona

9. **Blueberries guild**
   Blueberries, strawberries, valerian, yarrow & spinach
10. **Bamboos**
11. **Hosta guild**
    Hosta sp., wild ginger, periwinkles & wasabi
12. **Trellis**
    Passion fruit, Japanese honeysuckle
13. **Goumi guild**
    Goumi, Dwarf pomegranate, comfrey, *Monarda* sp., *Equinaceae* sp., *Nasturtium* sp.
14. **Bush clover guild**
    Bush clover, *Berberis* sp., *Calendula officinalis* & ginseng



Built environment

The buildings are constructed to be extra safe in case of natural disasters, especially earthquakes (didn't have any scratch after the 2011 Big Japan Earthquake, magnitude of 9.0 Richter scale). Huge windows cover the walls (+++ passive heating).

The design of the new components in the project will be chosen by students, and the construction committee. Recycled materials (recycled wood, recycled windows...) and other local and natural materials as bamboo, stone... (most of them given by one of the families in the school who owns a farm) will be favoured.

The school garden's playhouse will serve as a demonstration whole system (passive solar building).

Technology, Transportation & Energy

Every year, the concept of responsible use of energy is worked at school. There are many signs within the school which explain the importance of not wasting water and energy and the importance of reducing our consumption. Thick curtains give extra insulation in winter, and shade in warmer months.
There is a huge bike parking in the campus.

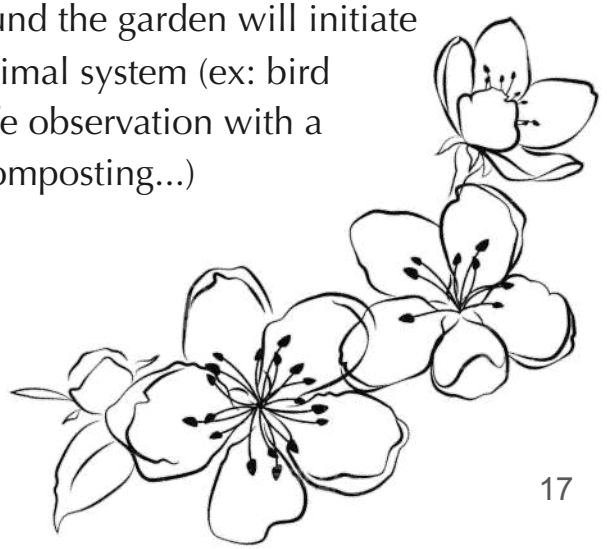
The school garden's playhouse will serve as a demonstration whole system (rainwater use, grey water use, and renewable energy use). Solar energy will also be used in the bird bath. Other features could be added with time, such as passive solar drier or passive solar oven.

Animal System

School council doesn't want any livestock in the campus. So the main idea is to encourage wildlife for the benefits they bring to the ecosystem.

We will attract pollinators, predators of insect pests, decomposers and birds by planting wildlife-attracting plants, adding plenty of different habitats, and increasing the biodiversity overall. We will provide a bird bath, birdhouses & bird feeders and build an insect hotel.

Several activities around the garden will initiate the students to the animal system (ex: bird sightings form, soil life observation with a microscope, worm composting...)



Chaos & Catastrophe

Japan is the land of natural catastrophes: earthquakes, tsunamis, volcanoes, typhoons, landslides, floods, heat waves... you name it. Everything is designed to face these hazards in an ultra-efficient way. The school has its own emergency plan, owns a clean water reservoir and generator, and the students are trained for an eventual disaster. Each student and teacher has its own emergency kit at school (extra clothes, dry food, extra water, flashlight/radio with crank handle, whistle, masks, helmet...).

In the garden, many activities will focus on resilience and on the importance of having a strong community to face catastrophes and climate change.

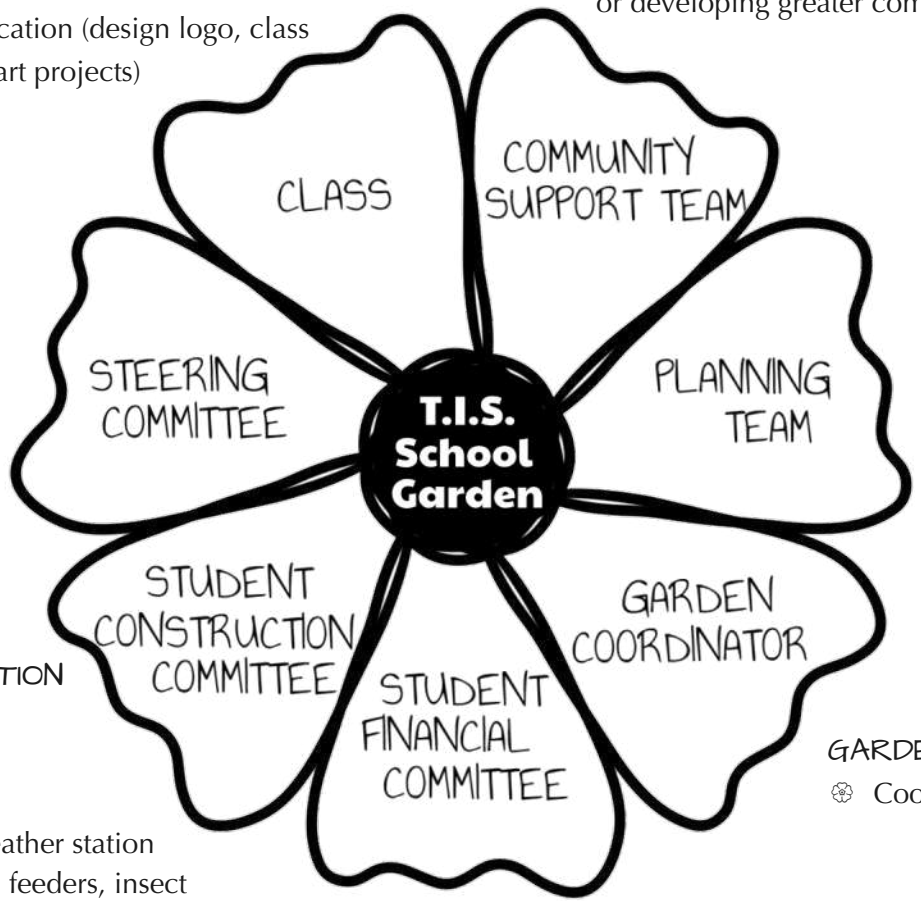
Social Structures

KEY
- Students
- Teachers
- School Principal
- Parents
- Community Members
- Me, the designer

CLASS
- Plan & design individual garden beds
- Help organizing annual events
- Garden maintenance
- Garden beautification (design logo, class bed sign, other art projects)

COMMUNITY SUPPORT SYSTEM
- Assist in coordinating activities such as soliciting donations, asking for volunteer aides, or developing greater community awareness

STEERING COMMITTEE
- Coordinate annual events (ground-breaking ceremony, garden fundraisers, annual harvest festival, community workday...)
- Create awareness about implementation of new composting system in the school
- Train & schedule volunteers
- Organize
- Recruit

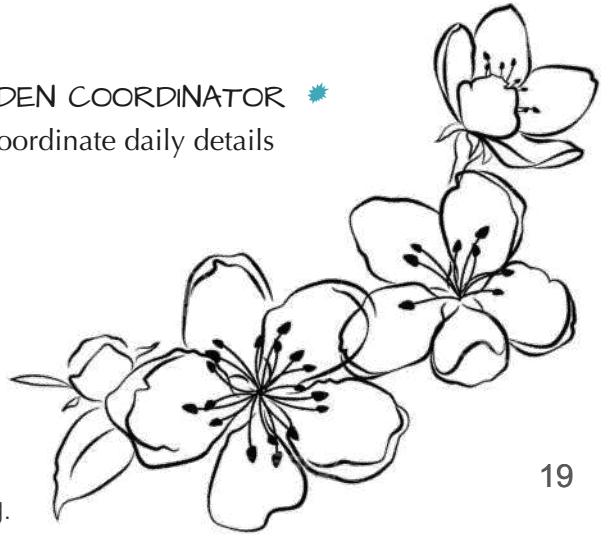


PLANNING TEAM
- Determine what the school garden will look like
- Determine how the school garden will be used
- Determine what resources & materials to collect
- Determine who will accomplish which task
- Oversee development & maintenance
- Evaluate successes
- Troubleshoot

STUDENT CONSTRUCTION COMMITTEE
- Make entrance sign
- Make compost bins
- Build Raspberry Pi weather station
- Build birdhouses, bird feeders, insect hotel...

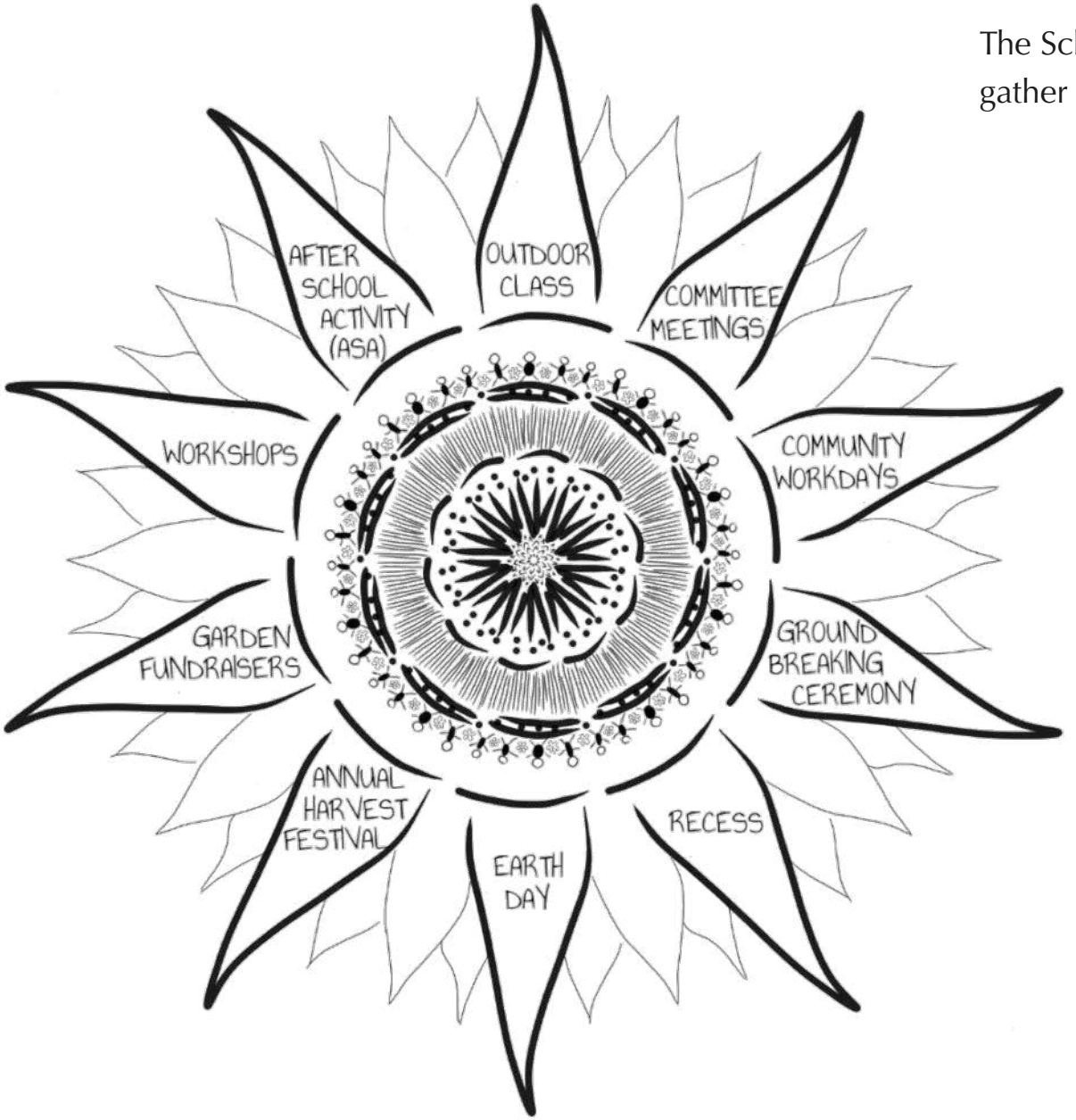
GARDEN COORDINATOR
- Coordinate daily details

STUDENT FINANCIAL COMMITTEE
- Manage yearly budget
- Search for financing opportunities & other types of capital



The school garden is owned and operated by the students. They will be part of the decision making.

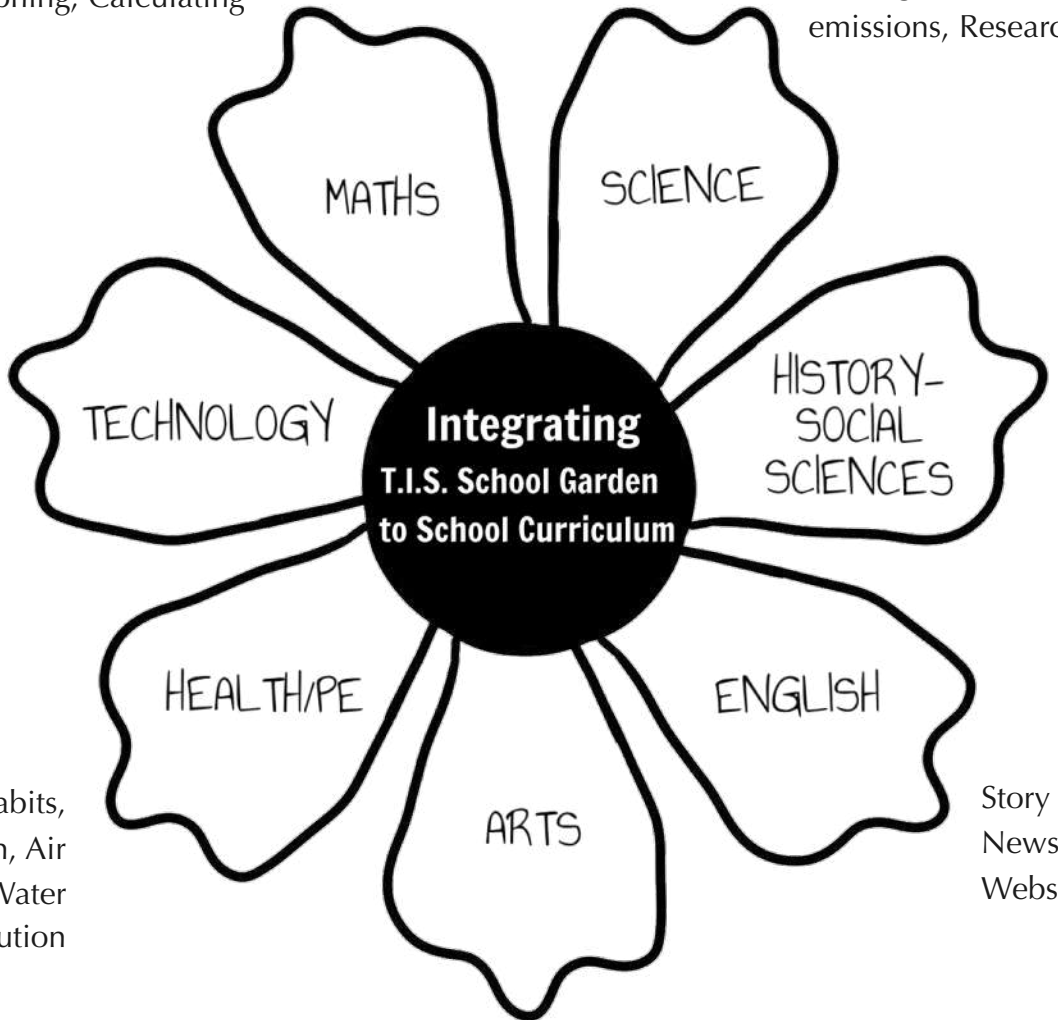
Community Gathering and Gardening



The School Garden will offer a lot of opportunities to gather the school community:

- Outdoor classes
- Recess time
- Different Committee meetings
- After School Activity or ASA. A school garden club will be created (weekly meetings)
- Workshops (to teachers, to students, or to the whole community)
- Community workdays
- Garden fundraisers (selling plants, seedlings, seeds)
- Ground breaking ceremony
- Annual harvest festival
- Earth Day celebration

Integrating the School Garden to the School Curriculum



Counting, Measuring, Graphing, Calculating

Life science, Ecosystems, Processes, Investigations, Earth science, Energy, Gas emissions, Research, Resources,Physical science

Design, Construction of compost bins, cold frames, Energy efficient systems, Electronics & Coding (weather station)

Specific historic events & cultures, Agricultural history, Origin of plants, Impact of biotechnology

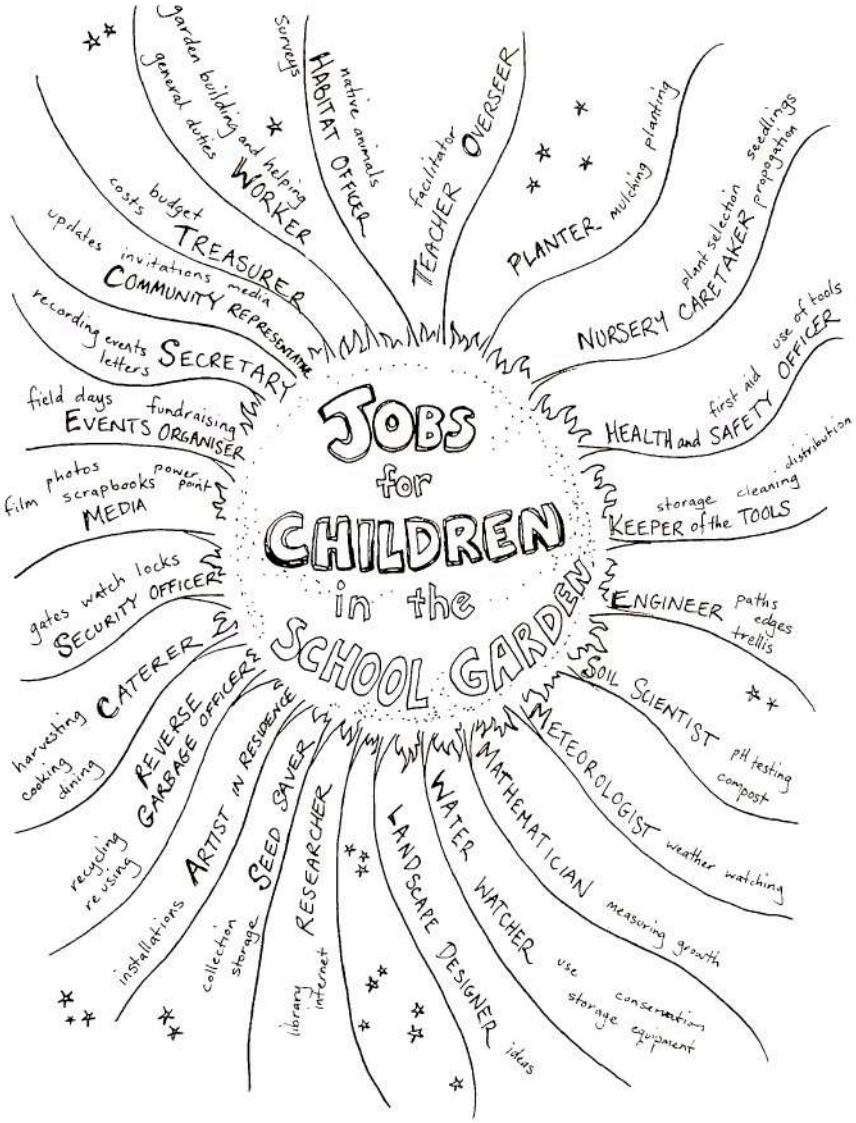
Nutrition, Healthy habits, Environmental health, Air monitoring, Water pollution

Story writing, Speaking, Newsletters, Posters, Website

Story writing, Speaking, Newsletters, Posters, Website

Although science is the most natural fit, the classroom garden can also act as a springboard for a wide range of lessons in mathematics, history–social science, English–language arts, visual and performing arts, and health.

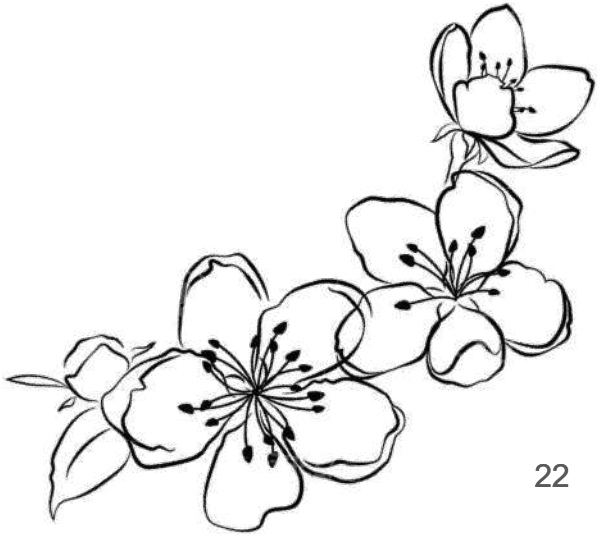
Jobs for children in the school garden



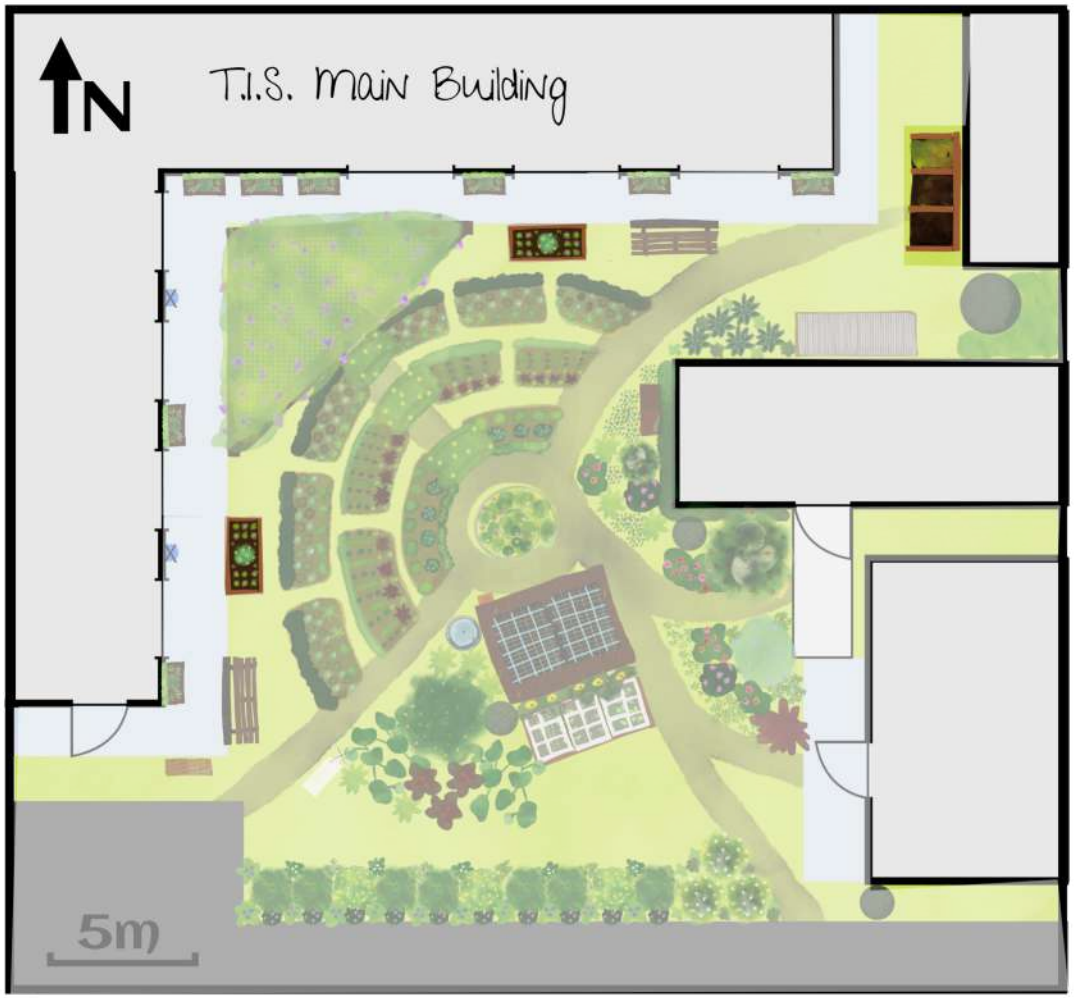
Nuttal & Millington, 2008

Teachers can allocate different jobs to the students, giving each a special role in which to develop some skill and knowledge through their own resources. The students will be encouraged to think about their role and be pro-active in its design.

Students responsibilities will increase proportionally with their age.



Implementation Phase I – 2020



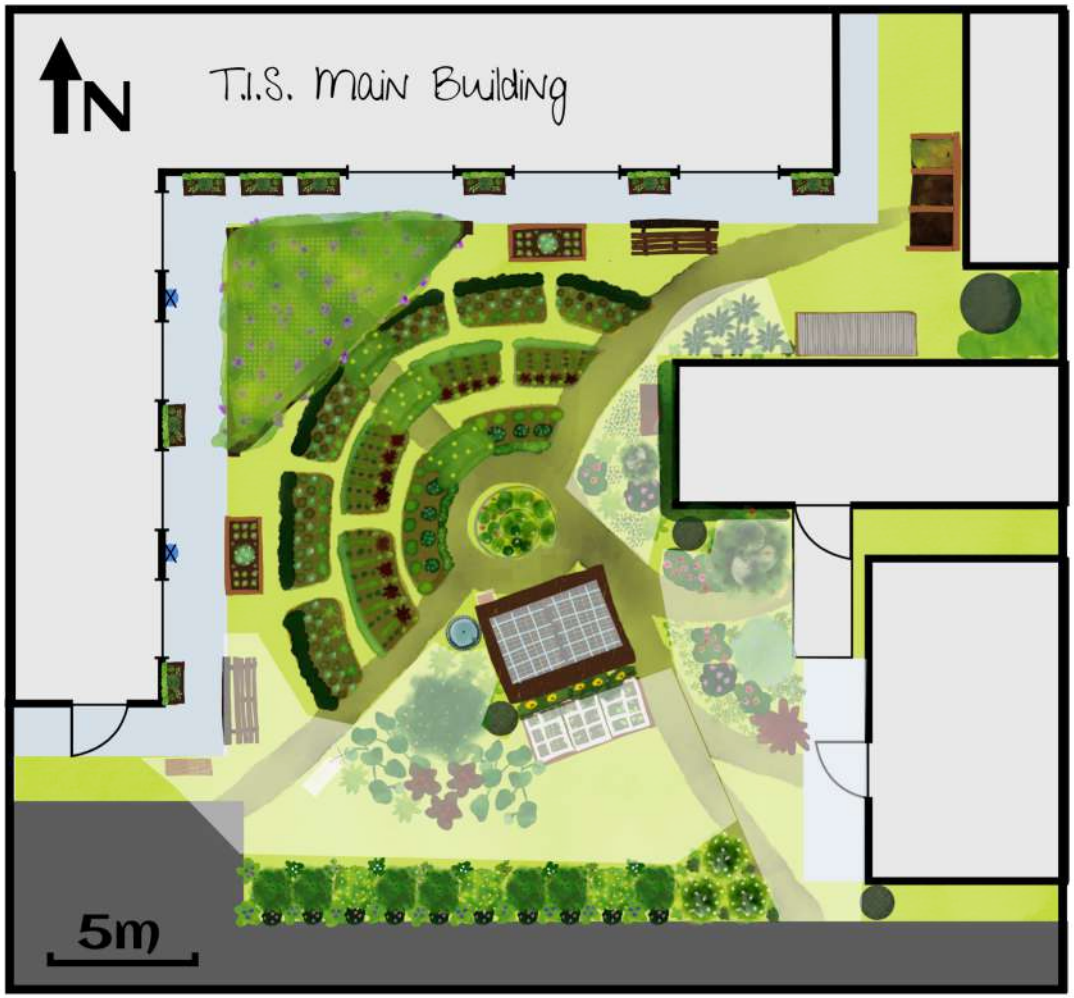
T.I.S. School Garden – Implementation Phase I – 2020 (June 2020)

Designer: Mayi Lekuona

Implementation Phase I – 2020

- Form Planning Team
- Plan intro workshop for teachers: Intro to permaculture & pedagogical tools for the garden project
- Organize a meeting to give an intro about the project and form all the different committees
- Form Steering Committee of students and teacher
- Form Construction Committee of students and adult
- Form Financial Committee of students and teacher
- Plan how to hold meetings
- Create a decision making framework
- Search for financing opportunities & other types of capital
- Create a supply ordering system
- Purchase tools and materials
- Create a community support system
- Organize first community work day
- Start Composting System (Build outdoor compost bins, install collecting bins indoors, make composting posters to hang everywhere in the school)
- Schedule class use of garden
- Design Garden logo
- Create website of the garden so donors & others can track progress
- Organize Garden Fundraisers
- Order seeds
- Test garden soil
- Plan & design class garden beds
- Build Raised containers
- Make an inventory and organize all the donated materials & tools
- Install the toolshed

Implementation Phase II – 2021

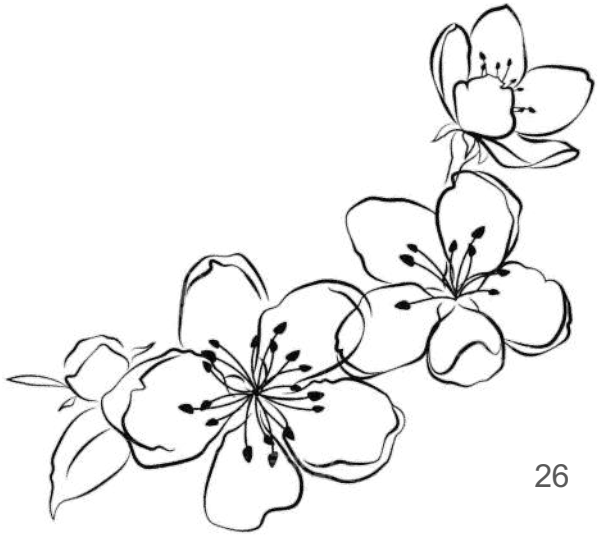


T.I.S. School Garden – Implementation Phase II – 2021 (June 2020)

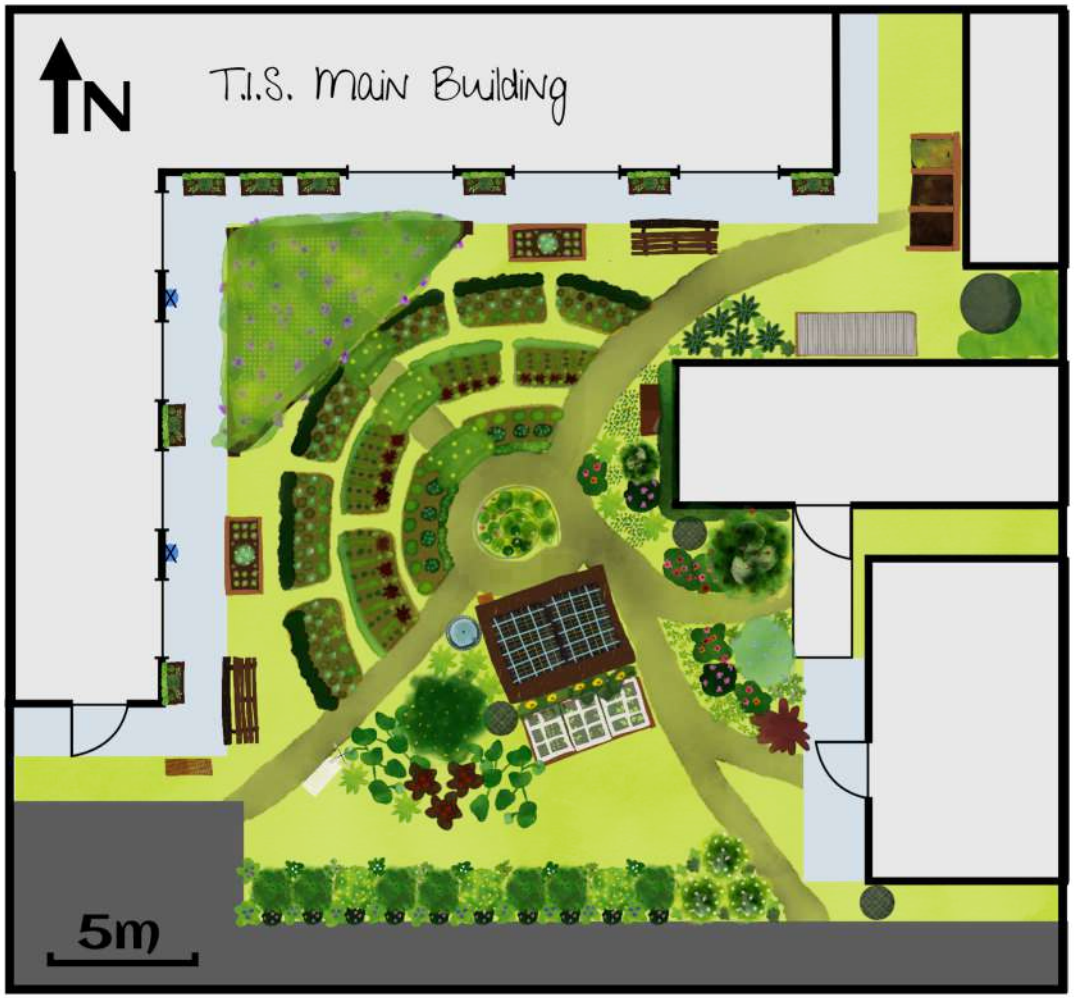
Designer: Mayi Lekuona

Implementation Phase II – 2021

- Build and install the Playhouse (install rainwater barrel of the playhouse & connect to the sink, make and install permaculture principle and ethics signs in the playhouse)
- Make and install garden entrance sign
- Start seeds
- Make garden beds & build tunnel
- Design class bed signs
- Plant garden beds & containers
- Plant cover crops in the future guilds' sites
- Build a pergola for the outdoor class & place logs as sitting places in the outdoor class
- Build & plant the Herb Spiral
- Install Rain Barrels
- Plant blueberries & berries guilds
- Install trellises on building walls and plant climbers on trellis
- Plant bamboo zone
- Install solar Bird Bath
- Garden beautification (art projects)
- Post garden maintenance tasks in outdoor area
- Develop a work schedule for volunteers
- Plan a garden club for the After School Activities (ASA)
- Plan holiday & summer maintenance program
- Write e-mail newsletter
- Organize Ground Breaking Ceremony
- Organize Annual Harvest Festival
- Continue staff & volunteer training & development



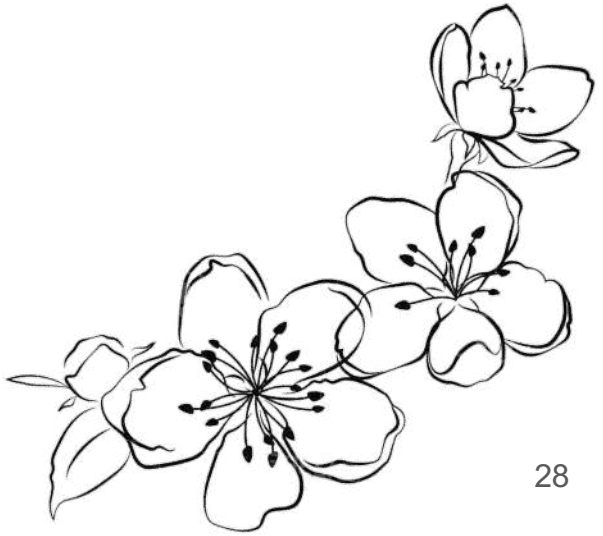
Implementation Phase III – 2022-2026



T.I.S. School Garden – Implementation Phase III – 2022-2026 (June 2020) Designer: Mayi Lekuona

Implementation Phase III – 2022-2026

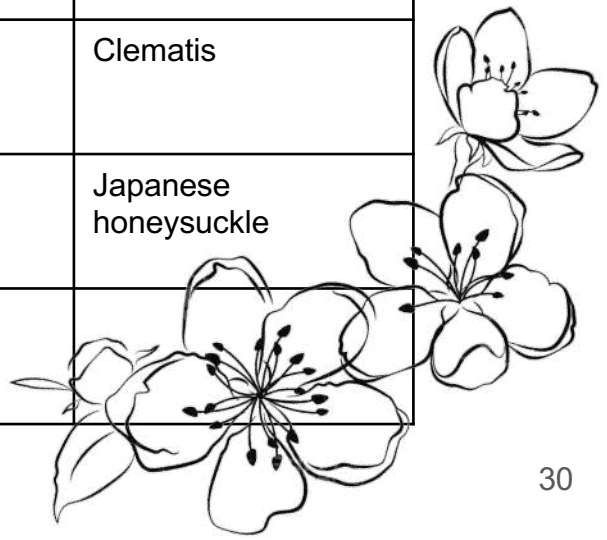
- Build and install Buddy Bench
- Build and install the Little Free Library
- Install solar energy feature on playhouse
- Build Cold Frame
- Build and install Weather station
- Plant Kumquat guild
- Plant goumi guild
- Plant bush clover guild
- Plant hosta guild
- Build & install insect hotel, bird houses, bird feeders & fairy houses
- Plan workshops open to the community (permaculture, agroforestry, plant propagation, composting...)
- Organize Garden Fundraisers
- Organize Earth Day activities
- Evaluate the project
- Take the project to the rest of the campus grounds and start a collaboration with the neighbouring Community Centre.




Notes, Diagrams,
Interviews

Species lists

LAYER OF FUNCTION	ROOTS	GROUND COVERS	HERBS & VEGGIES	SHRUBS	CLIMBERS
EDIBLES	Allium Carrots Radish Canna	Strawberry Watermelon	Hosta Asparagus Swiss chard Spinach Tomatoes	Kumquat Dwarf pomegranate Japanese wineberry	Passion fruit Japanese yam Cucumber Kiwi
MEDICINALS & AROMATICS	Turmeric Ginger Dandelion	Mints Plantain	*Calendula officinalis* *Equinacea* spp. Marigold Basil Coriander Parsley	Plum yews Lavender Rosemary Sage	Beans
N_2 FIXATION & MINERAL ACCUMULATORS	Ginseng Comfrey Liquorice	Clovers Squashes	Lupin Valerian Lemon Balm Sweet peas	Goumi Bush clover	Japanese wisteria
FIBER PLANTS	Dock	Grasses	Sunflower	Thornless blackberry Bamboo	Luffa
INSECTARIES	Daikon Wasabi	Nasturtium Thymes	Mitsuba Fennel Oregano	Gooseberry Blackcurrant	Clematis
HABITAT	Lady's mantle	Foamflower Wood sorrel	*Monarda* spp. Marshmallow Zinnia	*Berberis* spp. Serviceberry	Japanese honeysuckle
MULCHES	Comfrey Potato	Ground ivy	Yarrow	Bamboo	



Components list

- Perennial garden
- Individual beds for each grade
- Herb spiral
- Vertical growing
- Container gardening
- Season extension (cold frame)
- Composting bins
- Rain barrels
- Pergola
- Outdoor classroom
- Toolshed
- Playhouse
- Bird fountain & feeders
- Birdhouses
- Insect hotel
- Weather station
- Ollas
- Fairy houses
- Buddy bench
- Little free library

Physical Components

PERENNIAL GARDEN

- Create microclimate
- Obtain yield
- Create habitat
- Attract pollinators
- Beauty
- Learning patience, responsibility
- Connected to the classroom
- Waste for the compost

INDIVIDUAL BEDS FOR EACH GRADE

- Create microclimate
- Obtain yield
- Place for special projects
- Attract pollinators
- Nurture curiosity
- Build classroom relationships / Improve teamwork
- Learning patience, responsibility
- Connected to the classroom
- Waste for the compost

COLD FRAME

- Create microclimate
- Increase yield
- Season extension
- Connected to the garden
- Connected to the classroom
- Start seeds
- Recycle and repurpose material

HERB SPIRAL

- Create microclimate
- Obtain yield
- Create habitat & biodiversity
- Attract pollinators
- Beauty
- Pest management
- Learn about microclimates
- Connected to the classroom
- Waste for the compost

VERTICAL GROWING ON SCHOOL WALLS (CONTAINERS)

- Create microclimate
- Increase yield
- Create habitat & biodiversity
- Attract pollinators
- Beauty
- Connected to the classroom
- Waste for the compost

TOOLSHED

- Organize and protect gardening material
- Enhance safety
- Recycle and repurpose material
- Connected to every component
- Learning organization / responsibility / maintenance

RAIN BARRELS

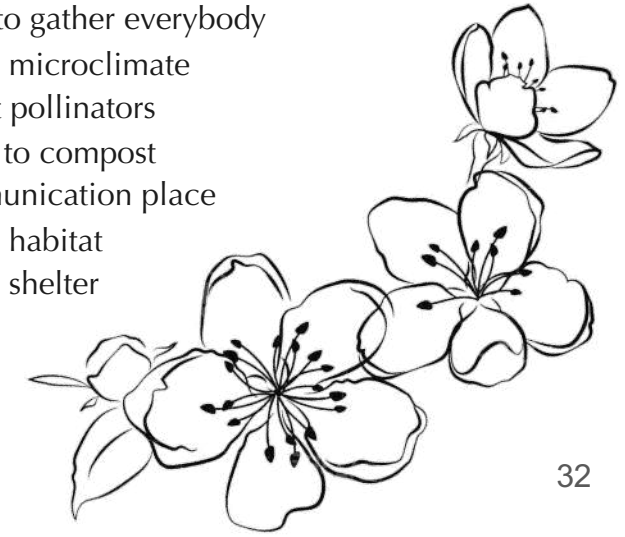
- Use rainwater from roofs
- Connected to the garden
- Learn about limited resources
- Connected to the classrooms

COMPOST BINS

- Recycle resources (garden waste, scrap food, scrap paper)
- Connected to the garden
- Help build soil
- Add micronutrients to the garden
- Boost the community of microorganisms
- Recycle and repurpose material
- Connected to the classroom

PERGOLA / OUTDOOR CLASSROOM

- Place to gather everybody
- Create microclimate
- Attract pollinators
- Waste to compost
- Communication place
- Create habitat
- Create shelter
- Shade



Physical Components

PLAYHOUSE

- Create microclimate
- Recycle & repurpose material
- Shelter
- Learning about whole systems
- Use solar energy
- Learning about renewable energy
- Rain barrel (learning about natural resources)
- Communication place
- Enhance imagination
- Play space

BIRD BATH & FEEDERS

- Attract wildlife
- Pest management
- Beauty
- Connected to the classroom
- Nurture curiosity
- Learning to respect wildlife
- Use solar energy
- Learning about renewable energy

FAIRY HOUSES

- Creative space
- Communication place
- Beauty
- Enhance imagination

BIRD HOUSES

- Create habitat
- Attract wildlife
- Pest management
- Nurture curiosity
- Beauty
- Connected to the classroom

INSECT HOTEL

- Create habitat
- Attract wildlife
- Pest management
- Recycle & repurpose material
- Connected to the classroom
- Nurture curiosity
- Learning to respect wildlife
- Enhance children imagination
- Beauty

WEATHER STATION

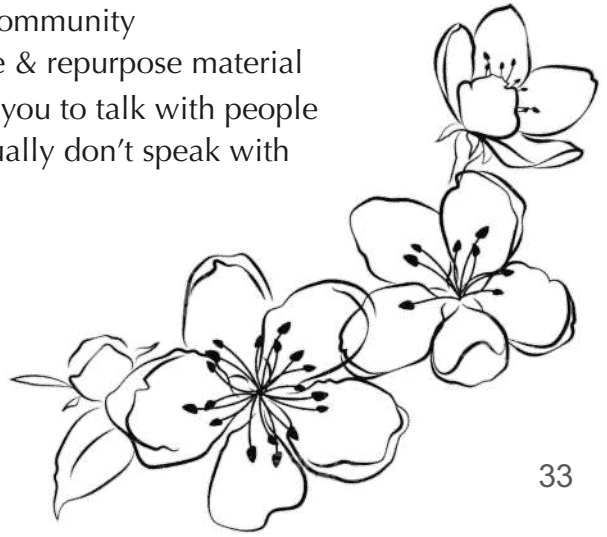
- Connected to the classroom
- Learning about meteorological concepts
- Code learning
- Electronic learning
- Monitor weather *in situ* (build knowledge for the garden)

BUDDY BENCH

- Place for relaxing / meditation
- Communication place
- Gathering space
- Anti-bullying space (Care for the people!)
- Place to express themselves
- Cultivate empathy
- Allow you to talk with people you usually don't speak with
- Place to appreciate beauty

LITTLE FREE LIBRARY

- When not using a book anymore, pass to the other (Fair share)
- Cultivate spirit of generosity (Care for the people)
- Enhance reading ability
- Build community
- Recycle & repurpose material
- Allows you to talk with people you usually don't speak with



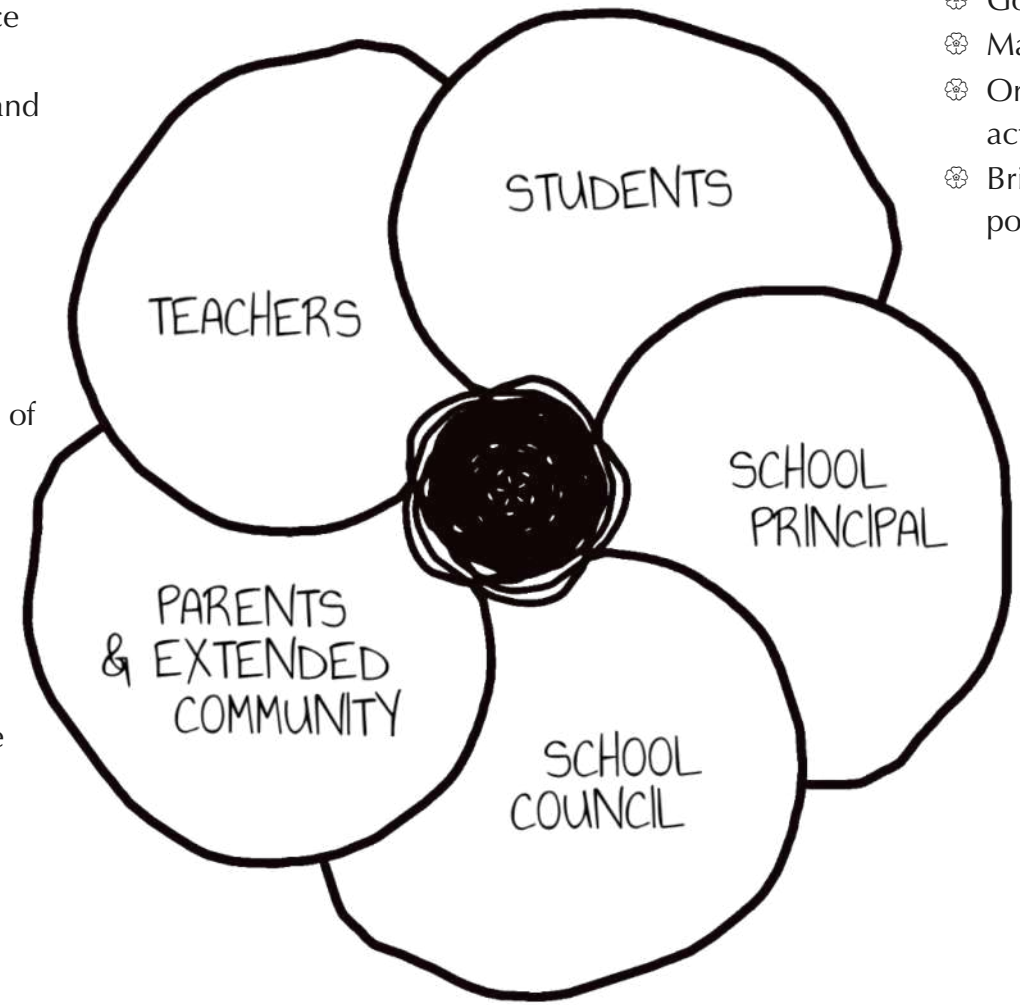
Social Components

TEACHERS

- Mentors / Knowledge source
- Scheduling
- Help plan & build garden and components
- Garden maintenance
- Give support
- Inspire students
- Organize activities
- Search for financing opportunities & other types of capital

PARENTS & EXTENDED COMMUNITY

- Mentors / Knowledge source
- Planning team
- Give support
- Help organizing activities
- Give extra help in special occasions (volunteering)
- Bring resources
- Help find different types of capital



SCHOOL COUNCIL

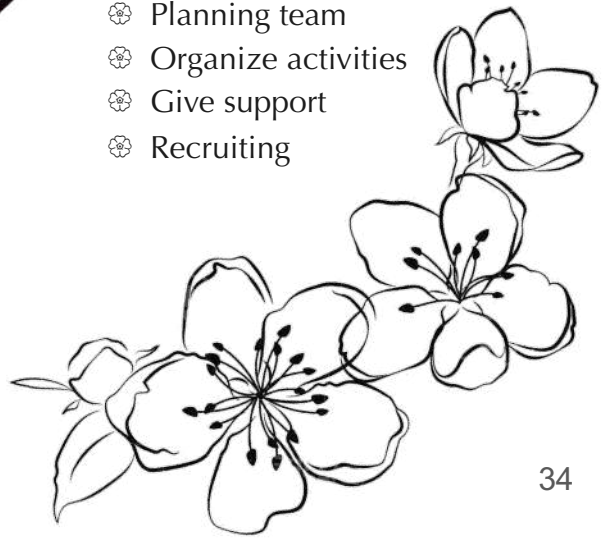
- Give final approval to the project & financing
- Look at legal, technical, safety guidelines and school policy documents

STUDENTS

- Plan & build garden and components
- Garden maintenance
- Good observers
- Make garden signs
- Organize social and financing activities
- Bring creativity (unformatted point of view)

SCHOOL PRINCIPAL

- Scheduling
- Search for financing opportunities & other types of capital
- Bridge between school council and the rest of the school community
- Planning team
- Organize activities
- Give support
- Recruiting



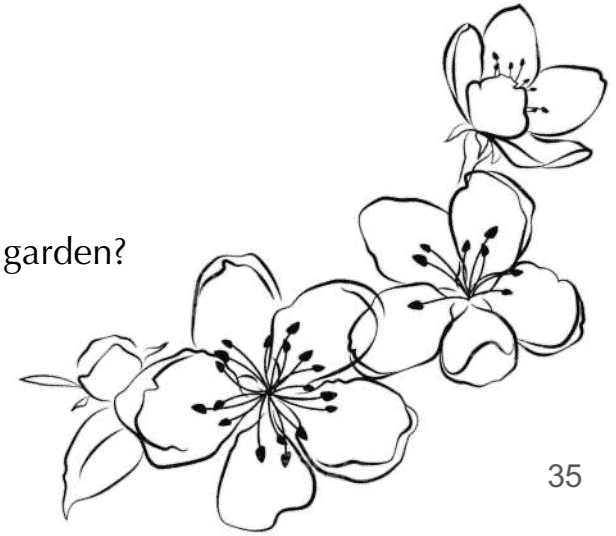
Stakeholder interviews

Questions to the School Principal: (Direct Interview)

- Why do you want a school garden?
- What are your expectations?
- How do you use the area presently?
- How many children attend the school? Age range?
- What topics do you want to teach through the garden?
- What possible features are important for you? What do you want in your school garden?
- Something that you really don't want?
- Are there any restrictions?
- What budget do you have overall? Are there any other resources? School parents? Friends?
- What kind of maintenance are you planning?
- Do you want animals?
- What do you want to do first?

Questions to the School Teachers: (Google Form)

- What do you think about creating a school garden?
- What are your expectations?
- How do you use the area presently?
- What topics do you want to teach through the garden?
- What possible features are important for you? What do you want in your school garden?
- Something that you really don't want?
- Are there any restrictions?
- Are there any type of resources you could provide?



Stakeholder interviews

Questions to the School Parents: (Google Form)

- Do you think creating a school garden is a good idea? Why?
- What do you think about creating a school garden in that specific space?
- What are your expectations?
- What possible features are important for you?
- Something that you really don't want?
- Would you be able to give some of your time to help creating the garden?
- Are there any other type of resources you could provide?

Questions to the Students: (Paper form provided during class)

- Do you want a school garden? Why?
- Do you use that space presently?
- Do you think that space is a good place for the school garden?
- What would you like to have in the school garden?
- Something that you really don't want?

Observation and site assessment notes

Climate:

Sendai has a humid subtropical climate that means warm and wet summers, and cool and dry winters
Sendai is situated in the cool temperate wet forest biome.
Hardiness Zone: 9a
Record High Temp.: +37.2C | Record Low Temp.: -11.7C
First frost: November 21-30 | Last frost: April 11-20
Average Annual Precipitation: 1254.1mm
Max Precipitations: from May to September; Rainy season late June-early July
Predominant winds:

- September to January: NNW, 3,33m/s
- February and March: WNW, 3.85m/s
- April to August: SE, 3m/s

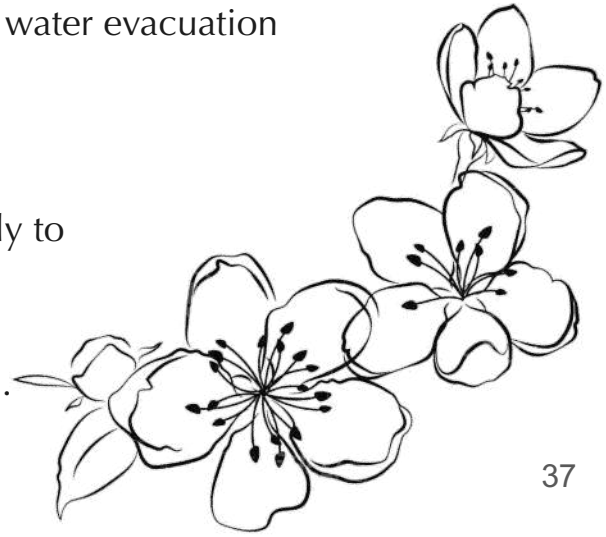
Potential Disasters: - Earthquakes (several/month; last big one: 2011 Big Japan Earthquake (magnitude 9.0))
- Typhoons from August to October (but often get to Sendai as tropical storms)

Landform:

The garden space is completely flat (Elevation: 96m), slight slope heading south for water evacuation
Soil type: Loamy soil, poor in organic matter

Water:

4 accessible downpipes on East buildings. The main buildings downpipes go directly to the underground drainage system.
Accessible tap in front of the garden (Southern side)
No flooding risk. The nearest stream is 300m eastward and there is a 30m elevation.
Summers are very humid. Vegetation does not need much watering except during drought periods.



Observation and site assessment notes

Invisible structures:
TIS is sponsored by Nanko Gakuen Corporation since 1988 and governed in conjunction with the TIS Council, an advisory board composed of the Head of School and representatives from the business, government, educational communities, and TIS stakeholders. The design needs to be approved by the Council.

Limiting factors:
Space (but possibility to add another garden if the first one is a success)
Budget
All the rainwater is not accessible and not allowed to use grey water
Less maintenance during summer

Access and circulation:
Even if cars are not usually allowed inside the school perimeter, we are allowed to use it punctually when bringing material to the garden.

Microclimate:
The whole garden is a microclimate as it is protected from eastern, northern and western winds
Cemented pathways surrounding buildings

Vegetation and Wildlife:
The space does not attract many wildlife.
Wildlife corridors nearby: neighbouring stream and pond surrounded by mature canopy
Many swallows nesting during late spring - beginning of summer (good predators)

Boundaries and Limitations

Personal Boundaries:

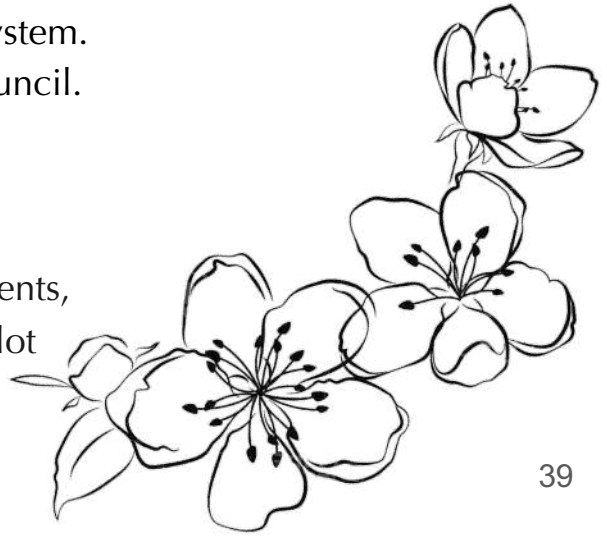
- I have back problems, so I cannot bend for too long.
- My 3 year old is still at home with me, so I don't have all the time I would like to have to allow to the project.
- I won't be able to take care of the garden in July and August, since we go to the Basque Country.
- I don't like being the centre of attention for too long.

Socio-Economic Boundaries:

- Students, teachers and parents will be involved in the project. Some parents and teachers will voluntarily work in the garden, but there will not be forced to give a certain amount of hours.
- We want it to be a collaborative project, so everybody's ideas and feedback are welcome.
- Respect is important and everybody has a voice. Being disrespectful will not be accepted.
- The Arts teacher will be responsible of the creative aspect of the project.
- No animals, big trees, ponds or other open water features are allowed on school grounds.
- Easy evacuation is necessary (in case of big earthquakes).
- We need accessible paths for people with reduced mobility.
- We cannot have access to the downpipes connected to underground drainage system.
- The design and every important decisions need to be approved by the school council.

Financial and Material Boundaries:

- Budget is limited to 200 000¥ this year.
- Not many material at the school. We are expecting some donations from the parents, and there are plenty of good second hand stores nearby, but we will still need a lot of things.



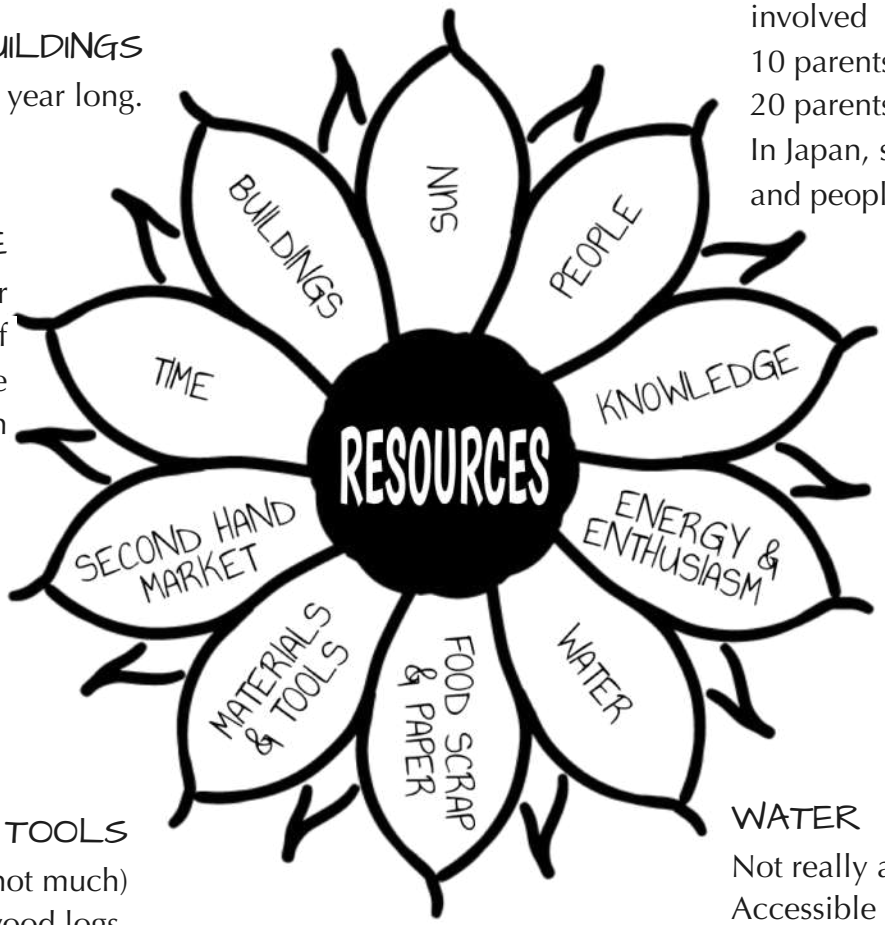
Resources

SUN
All day long

PEOPLE
More than 100 children (!!) and teachers ready to get involved
10 parents available a few hours/month
20 parents available for important day projects 2*year
In Japan, sense of community is extremely developed, and people love volunteering

BUILDINGS
Wind protection all year long.

TIME
At individual scale, time = limiting factor
At the group scale, there is plenty of voluntarily given time by adults + time given by children



KNOWLEDGE
Group of people specialized in a large variety of fields.

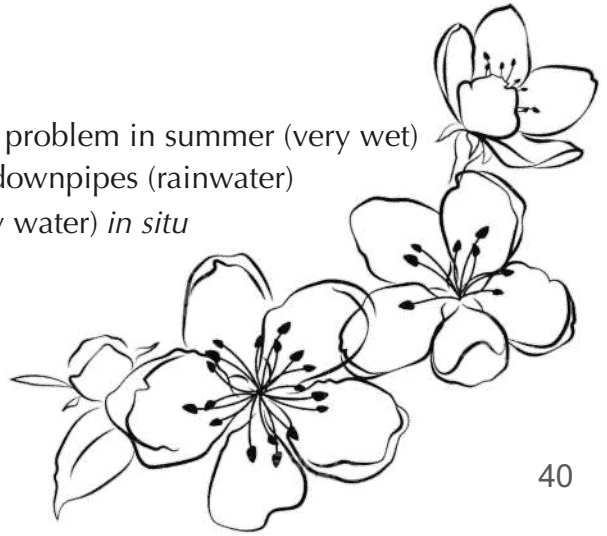
SECOND HAND MARKET
Plenty of well supplied second hand stores nearby

ENERGY & ENTHUSIASM
Kids have plenty of energy and enthusiasm

MATERIALS & TOOLS
Some gardening tools at school (but not much)
Parents and family donations (tools, wood logs, rice-straw, bamboo poles, seed,...)

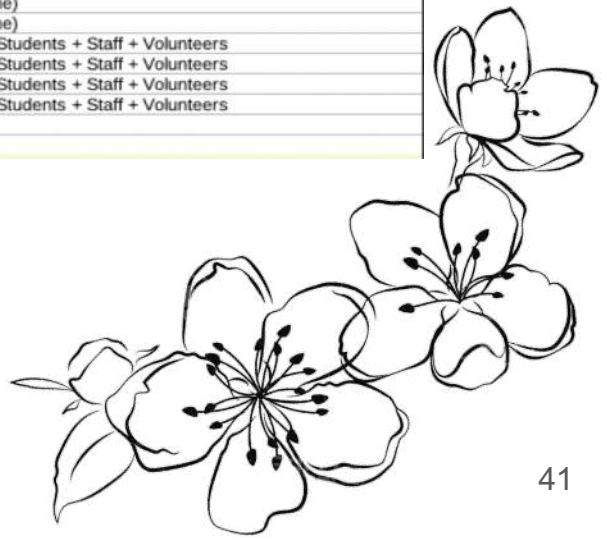
WATER
Not really a problem in summer (very wet)
Accessible downpipes (rainwater)
and tap (city water) *in situ*

FOOD SCRAP & PAPER
Plenty available for composting and building soil



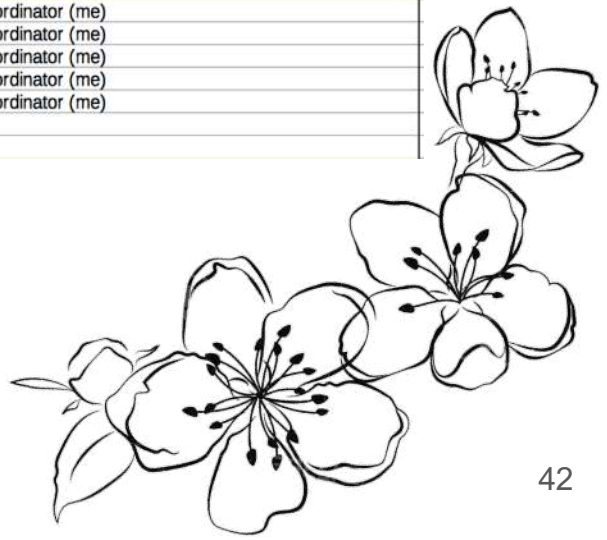
Implementation Timeline and Task Lists

TASKS	DUE DATES			WHO
	2020	2021	2022-2026	
Zone 1				
Form Planning Team				School Principal & garden coordinator (me)
Organize a meeting to give an intro about the project and form all the different committees				School Principal & garden coordinator (me)
Form Steering Committee of students and teacher				Interested people during first meeting
Form Construction Committee of students and adult				Interested people during first meeting
Form Financial Committee of students and teacher				Interested people during first meeting
Plan how to hold meetings				Planning Team
Create a decision making framework				Planning Team
Search for financing opportunities & other types of capital				Financial Committee
Create a supply ordering system				Financial Committee
Purchase tools and materials				Financial Committee
Create a community support system				Steering Committee
Organize community work day				Steering Committee
Install collecting bins in the school for compost				Steering Committee
Make composting posters to hang everywhere in the school				Class project
Build and install Buddy Bench				Construction Committee
Build and install the Little Free Library				Construction Committee
Build and install the Playhouse				Construction Committee
Install rainwater barrel of the playhouse & connect to the sink				Construction Committee
Install solar energy feature				Construction Committee
Make and install permaculture principle and ethics signs in the playhouse				Class project
Make and install garden entrance sign				Class project
Schedule class use of garden				Planning Team
Develop a work schedule for volunteers				Community Support System
Plan a garden club for the After School Activities (ASA)				Garden coordinator (me)
Plan holiday & summer maintenance program				Garden coordinator (me) + Community Support System
Design Garden logo				Class project
Create website of the garden so donors & others can track progress				Steering Committee
Write e-mail newsletter				Class project
Plan intro workshop for teachers: Intro to permaculture & pedagogical tools for the garden project				Garden coordinator (me)
Plan workshops open to the community (permaculture, agroforestry, plant propagation, composting...)				Garden coordinator (me)
Organize Ground Breaking Ceremony				Steering Committee + Students + Staff + Volunteers
Organize Garden Fundraisers				Steering Committee + Students + Staff + Volunteers
Organize Annual Harvest Festival				Steering Committee + Students + Staff + Volunteers
Organize Earth Day activities				Steering Committee + Students + Staff + Volunteers
Evaluate & troubleshoot				Planning Team
Continue staff & volunteer training & development				Planning Team



Implementation Timeline and Task Lists

TASKS	DUE DATES			WHO
	2020	2021	2022-2026	
Zone 2				
Order seeds				Financial Committee
Test garden soil				Class project
Start seeds				Students
Make garden beds				Volunteers during Community Workday + Garden coordinator (me)
Build tunnel				Students
Plan & design class garden beds				Class project
Design class bed signs				Class project
Plant garden beds & containers				Class project
Plant cover crops				Class project
Build Raised containers				Construction Committee
Build Compost Bins				Construction Committee
Establish compost pile				Students
Add compost to the soil				Students
Post garden maintenance tasks in outdoor area				Planning Team
Build a pergola for the outdoor class				Construction Committee + Volunteers during Community workday
Place logs as sitting places in the outdoor class				Construction Committee + Volunteers during Community workday
Build the Herb Spiral				Construction Committee + Volunteers during Community workday
Build Cold Frame				Construction Committee
Make an inventory and organize all the donated materials & tools				Garden coordinator (me)
Install the toolshed				Garden coordinator (me)
Install Rain Barrels				Volunteers during Community Workday
Build and install Weather station				Students
Garden beautification (art projects)				Class project
Evaluate & optimize				Planning Team
Zone 3				
Plant berries guild				Students + Garden coordinator (me)
Plant blueberries guild				Students + Garden coordinator (me)
Plant Kumquat guild				Students + Garden coordinator (me)
Plant goumi guild				Students + Garden coordinator (me)
Plant bush clover guild				Students + Garden coordinator (me)
Add mulch				Students
Evaluate & optimize				Planning Team



Implementation Timeline and Task Lists

TASKS	DUE DATES			WHO
	2020	2021	2022-2026	
Zone 4				
Install trellises on building wall				Construction Committee
Plant climbers on trellis				Students + Garden coordinator (me)
Plant hosta guild				Students + Garden coordinator (me)
Plant bamboo zone				Students + Garden coordinator (me)
Add mulch				Students
Evaluate & optimize				Planning Team
Zone 5				
Install solar Bird Bath				Construction Committee
Build & install bird houses				Class project
Build & install bird feeders				Class project
Build & install Fairy houses				Class project
Build & install Insect Hotel				Class project
Evaluate & optimize				Planning Team
Take the project to the rest of the campus grounds				Planning Team

Maintenance plan

As maintenance will be difficult during the summer, the recommendation is to put some mulch or plant cover crops and close the garden in summer. Fast growing crops should be planted in early spring (i.e. lettuces, carrots, broccoli...) to ensure harvest before summer break, as well as at the beginning of the school year for a fall-winter harvest. Slow-growing crops should be planted in late spring (pumpkins, corn, tomato...) for a harvest in fall.

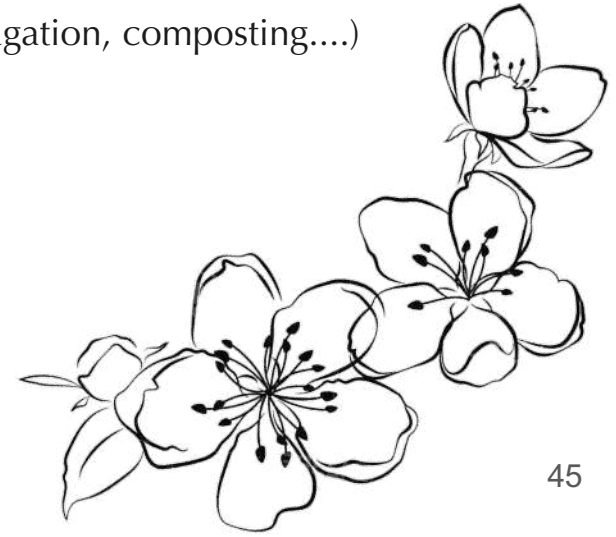
Daily garden jobs: Daily activities can be rostered using a simple task wheel for the daily work. The wheel can be adjusted for the grade level & planning scheme for garden use adopted by the school.

- Observe plant health, debugging
- Weed, chop & drop
- Soil preparation (mulch, till, add compost...)
- Watering
- Observation & recording
- Plan, plant & get resources
- Save seeds
- Propagate plants
- Harvest crops
- Maintain compost area
- Plan outdoor lessons & related follow-up lessons for the classroom
- Take pictures for the website, social media & newsletter
- Evaluate & troubleshoot

Maintenance plan

Special jobs (monthly-seasonal tasks):

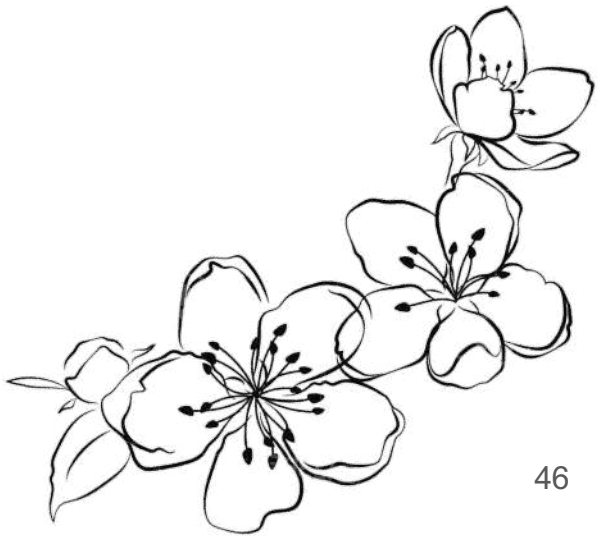
- Order seeds
- Prune plants
- Plant cover crops
- Garden beautification (art projects)
- Maintain built components (trellis, tunnel, pergola...)
- Maintain an inventory & organize all materials & tools
- Clean & repair tools
- Close garden before summer
- Reopen garden after summer
- Organize regular Planning Team meetings
- Organize regular Steering Committee meetings
- Organize regular Construction Committee meetings
- Organize regular Financial Committee meetings
- Organize regular volunteer meetings
- Organize community work days
- Plan workshops open to the community (permaculture, agroforestry, plant propagation, composting....)
- Search for financing opportunities & other types of capital
- Documentation
- Update website and school's social media
- Write e-mail newsletter
- Organize Garden Fundraisers
- Continue staff & volunteer training & development



Maintenance plan

Once a year:

- Organize a meeting at the beginning of school year to talk about the garden and form all the different committees (Steering Committee, Construction Committee, Financial Committee)
- Schedule class use of garden
- Develop a work schedule for volunteers
- Plan holiday & summer maintenance program
- Organize Annual Harvest Festival
- Organize Earth Day activities



Evaluation

During the last eight years, my inner landscape has been very neglected since I was extremely involved in my children's education. This course has been an utter regenerative journey for me and I am happy that I finally took some time for taking care of myself.

While living in Canada, we were lucky to have a yard. We were able to apply permaculture easily and raise environmentally conscious children. Moving to Japan brought us a few challenges, and space limitation was among them. This course allowed me to design a project that would be beneficial to both my kids and the rest of the school community by planning a school garden that everybody could use.

I have especially enjoyed the whole social permaculture aspect of the course and I hope I will be able to continue exploring these aspects.

I am very thankful to the whole team of the Permaculture Women's Guild and especially to Mandy who has taken the time to advise and encourage me during the process.

Moltes gràcis Mandy!! I hope I will be able to see your projects in Mallorca one day.

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