



AGE : 12 - 14

# Designing a Mandala garden

Project number: KA201-050529

Activity n°1

Co-funded by the  
Erasmus+ Programme  
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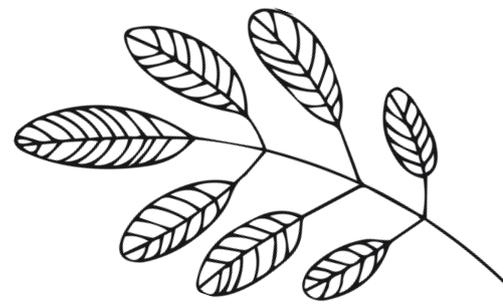


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# **Educator's guide**





# Introduction

This activity consists in measuring a bit of land with rope and measure tape, then estimating the amount of surface we could plant on, then imagining and designing a mandala vegetable garden, drawing it to scale, and planning what we will plant in it, when it will grow and when it will yield. We can already put rope and sticks in the ground to see what it could look like and implement it.

# Calendar

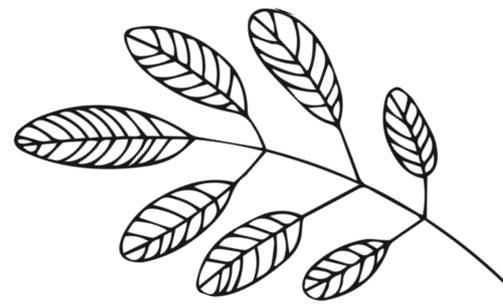
The appropriate time to do this activity would be during the end of autumn or during the winter season in your country.

This activity can be done over several lessons and the evolution can be documented.

# Duration

Over the span of several months depending on the scale of the project and on the permaculture plot. Depending on resources and investment of time possible, the teacher can choose to do only part of the task[1] [m2] s, such as only the measurements and design tasks (task 1 – 6) without implementing the design for real.

If you don't have a concrete plot of land, you could substitute tasks 1 and 2 by giving the ready-made plan of a plot of land. However, it is advised to make this into a concrete permaculture school garden in order for the pupils to see the results of their efforts.



## Gamification method(s)

The learning-by-doing technique will be fully integrated to this activity. The pupils will be presented with a concrete situation; the plot of land, and they will need to measure, document, observe and later design and draw to scale. The different designs of the different pupils can be used as a brainstorming and implemented together. Badges can be distributed throughout the whole process of the Activity (e.g.: Badge of innovation, badge of creativity, badge of initiative, badge of teamwork, etc.)

## Preparation

In order to carry out this activity, the first thing is to define the “field” in which the pupils are going to be designing a Permaculture garden for, as well as estimate the budget of time (and finance, if you plan to implement the design completely). It can either be a real place, a future school garden, a municipality green space that was allotted for the project, or, if you really have not found any real place, a fictive one, or the garden of the pupils if they want to.

# Challenges that will lead to the completion of the main task:

The main challenge will be to find a plot of land and to get the administration of the school behind your project. About the plot of land, we already gave a few leads. Another solution would be to contact a local permaculture organisation and see if the pupils could not participate in one of their projects. It is not necessary to “own” the land you will be working on. Also bear in mind that scale is not a problem. If really no soil is available, it is maybe possible to use the school flower beds.

Second challenge will be to find a solution for the watering system. Keep in mind that usually schools are empty during the holidays, but the garden will continue to need watering and tending. Should you implement the garden at school, it is something that needs to be thought about beforehand. Maybe local gardener, elderly people, parents, scouts, permaculture association or even voluntary pupils and teachers may be willing to tend to the school garden over the summer.

## Tips for successful facilitation, supervision and organizing:

Before the start of the activities with the pupils, please make the research for the plot of land and take care of all the administrative work if there is some.

Ideally, a real plot of land is needed. The ideal plot would have a water supply and be easily accessible by the pupils: a piece of land on the school grounds is great, especially as it can be combined with other activities of this program. You may also contact your city municipality and they may have some close-by unused land that can be used for it, or they may be willing to create a permaculture project with the school in a green space of the city. Or maybe even a close-by parent’s garden would do.

It could also be created with plants on the roof of the school, if it is flat and will hold the weight. Some school projects re-purposed old rundown tennis courts or school yard into a permaculture garden.

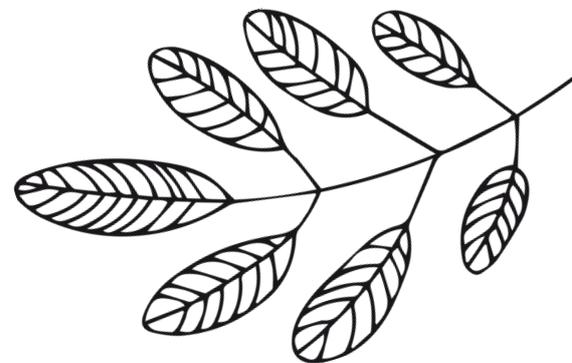
# Tips for successful facilitation, supervision and organizing:

If really, concrete space is not available, it is always possible to do the exercise virtually [UdMO1] [m2] , (meaning with an “imaginary” plot of land) but it is less efficient and relevant. You can also make the exercise with pupils who have a garden and design the permaculture garden with them (with permission of the parents of course). Keep in mind that scale is not the most important aspect. It can be small or big.

Also, before going into this project, it is good to have a rough idea of what you aim for. There are different types of design in permaculture. Regarding geometrical gardens, the ideal would be to make a mandala garden.



Example of a permaculture mandala garden on the famous “Ferme du Bec Hellouin” in Normandy. [fermedubec.com](http://fermedubec.com)



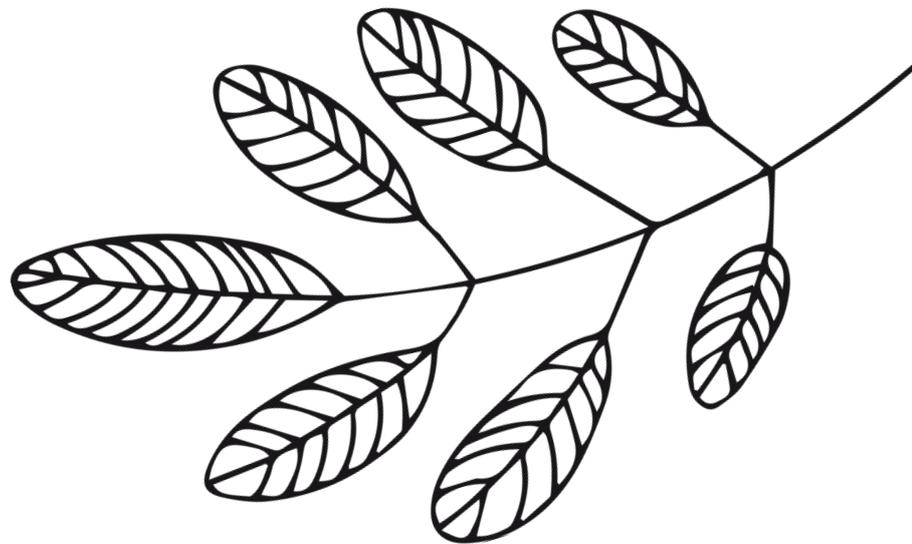
# Debriefing outcomes & obtained competences:

The students will learn or exercise the following competences:

- Observational skills, spatial visualisation and measurement
- Area calculus
- Geometrical design and calculus
- Artistic skills and design thinking
- Organization and planning
- Cooperation and teamwork

## Moment of formal education (optional)

There can be a debate/brainstorming session when all pupils pool their ideas for the design of the permaculture garden, directed by the teacher of course, in order to select the most relevant ideas.



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# Students' worksheet



# Related STE(A)M theory:

This particular activity calls for different fields of STEAM:

Science;

Geography

Mathematics: measurements, area calculus, geometry, etc...

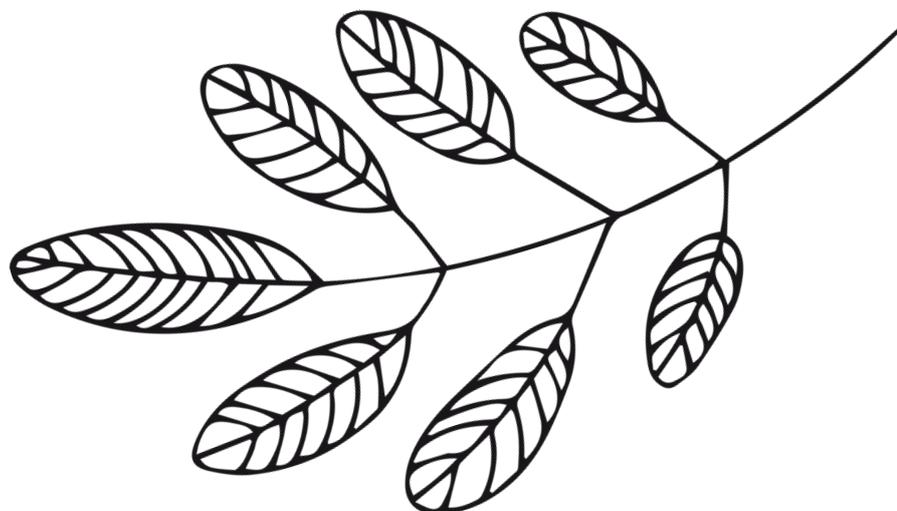
Arts

## Key words

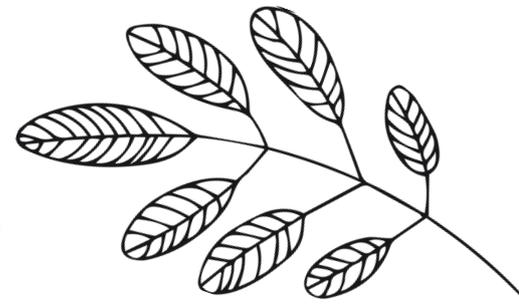
Mathematics, Geometry, design, observation, measurements, shapes, area, permaculture garden

## General aim

Use the Mathematical and scientific knowledge in order to design the most efficient permaculture design in a given area, while stimulating the creativity and imagination of the pupils.



# Educational Objective(s)



- Given a specific task to accomplish, the pupil will be able to structure said task in different subtasks and actions in the most time and cost-efficient way and justify how this design will help save time later.
- Given a set of shapes, the pupil will be able to measure and organise the shapes in a coherent ensemble.
- Given the measurements of a specific area, the pupil will be able to calculate surface areas and convert them from  $m^2$  to land measurements and back (acres, etc.)
- Given a set of requirements (here: width of passageways, number and size of planting plots, etc), the pupil will be able to divide a given space into usable sections assembled in a coherent and efficient system.

## Suggested Environmental Context

While the calculus and design of the permaculture plot need to be made, if not inside necessarily, at least in a sheltered and well-lit area, with desks and writing materials. Measurements need to be taken on-site beforehand by the teacher if this information could not be found in plot documents and maps, and all the implementation of the garden will be made on-site as well.

A simple technique of rope and a meter-long ruler can be used in order to calculate the area. Depending on the level of the pupils, they can assist with this task as well. For younger pupils, or pupils with less proficiency in measurements and geometry, a smaller plot of land, in a simpler shape can be used.

# Necessary Equipment and Materials:

- Plot of land
- Measuring tools: Measuring tape, rope, small wooden sticks
- Wide sheet of paper or large cardboard board
- Sharpies
- White sheets of papers and writing tools

Going further:

- Gardening tools: Shovels, rakes, ...
- Mulch, soil, ...
- Watering system

## Media and Resources

- Geoff Lawton introduction to permaculture  
[https://www.youtube.com/watch?v=opMht5gt\\_7U](https://www.youtube.com/watch?v=opMht5gt_7U)
- (French with English subtitles) An introduction to permaculture  
<https://www.youtube.com/watch?v=oNreOaTK4BU>
- (French) Website offering tips, techniques, tutorials and training:  
<https://www.permaculturedesign.fr/>

Example of a Permaculture garden school project:

- The Living Classroom:  
<https://www.youtube.com/watch?v=w6mXYL4wGLY>
- Food for thought (Africa)  
<https://www.youtube.com/watch?v=1iJKQUX7E5M>
- Tutorial to measure up a garden with rope by pupils:  
<https://schoolgardening.rhs.org.uk/Resources/Activity/Measurements-in-the-Garden?returnUrl=%2FResources%2FFind-a-source%3Fso%3D0%26pi%3D30%26ps%3D10%26f%3D1%2C1%3A%26page%3D10>

# Tasks

1

## Measurements

Measure the dimensions of the Permaculture plot that you plan to design by planting stick of wood at the different “angle point” of your plot of land and joining them with rope. Once done, mark of the places where the rope makes an angle.

With a square, measure the angle formed at each stick and report the measurements on your draft plan. Then, measure the lengths of rope in between each stick and report the measurements on you draft plan as well. The measurements do not need to be millimetre accurate; the idea is to have a general plan of space we have and how we are going to design the garden beds.

2

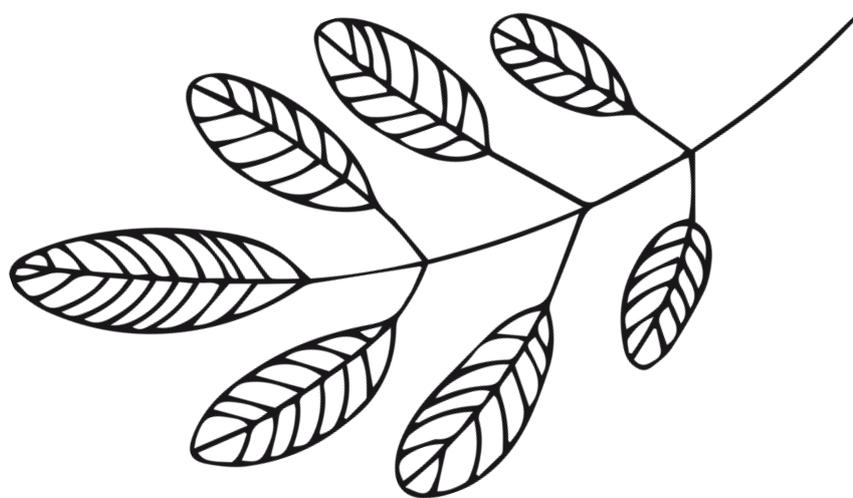
## Drafting

Using the real measurements, draft a scale plan of your plot on a wide sheet of paper or a cardboard board.

3

## Calculating

Using your geometry lessons, calculate the total area of Permaculture plot.



# Tasks

4

## Mapping

Create smaller drafts by groups of children. Then observe the terrain with them and make them mark the important elements of the landscape (presence of water, orientation N-S, orientation of an eventual slope, trees, natural forms, etc.)

Once everyone did, report them on the big map.

5

## Examples

Give examples of how a permaculture plot can be designed (mandala, etc.) and ask the children to draw their version of the plot as they think is best while giving directives: space between plants they intend to plant, space between rows, etc.

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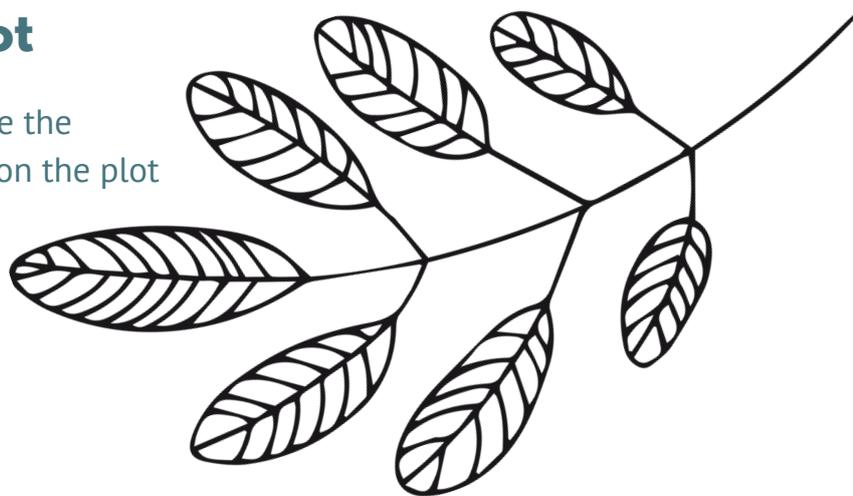
## Presenting projects

Each group present their project and reacts to other ideas. Once all projects have been presented, either choose one and modify it or use all presentations as a brainstorming and use the great ideas of everyone to design the beds. Explains why this or that is a great idea, or why this element needs to be displaced to this place.

7

## Marking the plot

With sticks and rope, make the children mark the design on the plot of land.



# Tasks

## 8 Let's begin!

When everything is marked and on scale, begin forming the beds, and the different elements of the Permaculture garden. Make it a school project.

## 9 Planting

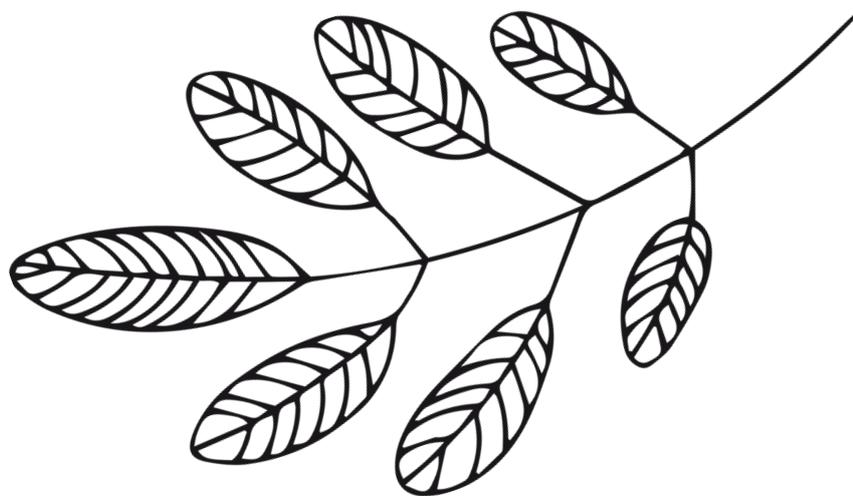
Once everything is ready, begin the planting and make a calendar.

## 10 Follow up

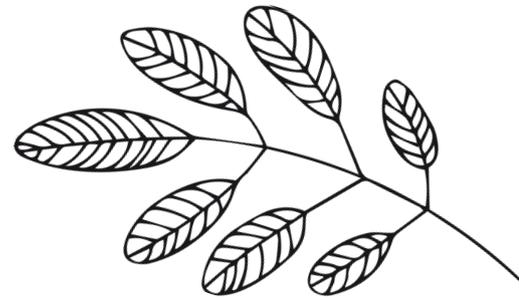
The next year, make a debriefing of what went well and worked and what didn't. Modify the design with the students and repeat process from Task 4 on.

# Safe and security checklist

(Note: This should be in alignment with safe and security checklist, given within the LivingSTEM Manual, Chapter 8)



# Project's partners



**Générations.bio**

## Générations.Bio (Belgium)

Web: [www.fermebiodupetitsart.be](http://www.fermebiodupetitsart.be)



## LogoPsyCom (Belgium)

Web: [www.logopsycom.com](http://www.logopsycom.com)

Facebook: @Logopsycom



## The Polish Farm Advisory and Training Centre (Poland)

Web: [www.farm-advisory.eu](http://www.farm-advisory.eu)

Facebook: @PolishFarmAdvisory



## EDU lab (Italy)

Web: [www.edulabnet.it](http://www.edulabnet.it)

Facebook: @edulabnet



## Ed-consult (Denmark)

Web: [www.ed-consult.dk](http://www.ed-consult.dk)

Facebook: @benji.leinenbach



## C.I.P. Citizens In Power (Cyprus)

Web: [www.citizensinpower.org](http://www.citizensinpower.org)

Facebook: @citizensinpower



## Trànsit Projectes (Spain)

Web: [www.transit.es](http://www.transit.es)

Facebook: @MakingProjectsCEPS, @TransitProjectes