permaculture users guide

and

lessons file

organic classroom programme

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What is Permaculture?

Permaculture comes from the combination of two words: ‘permanent’ and agriculture’, but also implies permanent culture.

It is a design approach to human living that grew out of the knowledge that we are using up natural resources at a dangerous rate. The founder was Bill Mollison, an Australian ecologist, who partnered with a student called David Holmgren in the late 1970s to create this approach to sustainable development.

As a design science Permaculture integrates ecology, geography, architecture, technology, agriculture, building science and social sciences.

So how does this look on a practical level?

- Natural buildings made from local resources
- Green technology for energy and sanitation
- Agriculture is organic and ecological
- Settlement design is more socially healthy
- Social structures empower people rather than disempowering them
- Water and soil resources are better managed
- The use of useful indigenous species is encouraged
- Traditional approaches to living are honoured

Permaculture is very relevant in the new curriculum and at schools for a range of reasons:

1. the educational approach is outcomes-based and encourages applied knowledge
2. within the framework learners can choose areas that really interest them
3. schools will be greened through the Permaculture garden, and people will learn greening skills
4. a productive food garden will be established
5. this food garden can also be a living classroom in which all the learning areas can be brought to life.

Welcome to the SEED Organic Classroom Programme.

This guide has been written so that you can partner with SEED to create the best learning environments imaginable!

Your school has been selected to participate in this programme because your school fulfils the following criteria:

- ✓ A school that is committed to integrating Environmental Education across the learning areas
- ✓ A school that has space for a garden, or is gardening already and has enough water to maintain a garden
- ✓ Teachers are committed to using the outdoor classroom to teach OBE.
- ✓ Teachers have vision and passion
- ✓ You have people involved who want to make this partnership happen

The aim of the programme is to:

- Invest in and set up a Permaculture garden system and outdoor classroom structure which the school can interact with, to bring alive their curriculum outside the classroom.
- Enrich the curriculum and especially bring alive the environment as a cross curricular subject
- Enable educators and learner to experience OBE in an action learning context
- To foster skills, attitudes and values that improve the natural environment for the benefit of humans and the environment
- To stimulate children to be life-long learners
- To provide and continuously develope Learning Support Material that educators can use to enrich their curriculum.

Our methodology:

SEED facilitators work at your school on the SEED day.
The facilitators will put up a **booking schedule** so that you can book lessons with them.
They will also give the school a detailed schedule of what SEED will be doing at the school – with reference to the learning areas, so that you can make best use of their time, and the garden.

SEED facilitators will engage with three groups of learners and educators on the SEED day. During this time SEED facilitators give a brief introductory lesson that guides the implementation and leads into an action learning session with the group.

This session will enable you as an educator to use the Learning Support Material to enrich your teaching.

After these 3 formal lessons/implementations, the SEED facilitators will work with learners who are keen and can be drawn from any grades. These learners may well form the **seedling club.**

Your roles and responsibilities in this partnership:

1. To book and attend the SEED workshops with your learners so that you as an educator can gain the knowledge and skills to effectively use the Permaculture system to further enrich the curriculum. In other words to enable yourself to work in the system in the time between visits.
2. To maintain garden development as part of your curriculum activities
3. To hand in at the end of each term any lesson plans that have incorporated Permaculture , as well as a copy of three learners' work, per lesson plan.
4. To attend the SEED day planning meetings at the end of the school day.
5. to make full use of the *free* SEED Academy programme on offer
6. On a practical level, the school will need to build the tank stand for the water tank early on in the programme. Facilitators will assist with a design for this, and SEED will supply the materials.

Your successful participation is very important as it enables your school to move into the second and third years.
In addition, if you are a successful partner, it will also assist SEED to fundraise for further work at your school and others.

The SEED Organic Classroom Programme works like this:

Year One – Green Beginnings

SEED partners with your school to set up the Permaculture system.
Facilitators work with you at your school for a full day every week.
During this year we will implement the following at your schools:

- Water tank/s and other water harvesting systems
- Outdoor classroom structure
- Permaculture garden systems including windbreaks, an orchard, an herb and vegetable garden with worm farms.
- An environmental outing with your school
- Educational signage for the system
- Weekly lessons that bring the curriculum alive

Obviously the implementation items will depend on your school's unique circumstances.
If the project is a success on the ground and in terms of curriculum integration, you can qualify for Year Two.

Year Two – Green Business

SEED partners with you to build on and improve the Permaculture system so that we can look at creating small enterprises based on natural resources.
A facilitator will set up the two weekly cycles with you. In order for this to happen, your garden systems need to be fully functional.
This means that we can focus on EMS as linked to the garden, and start creating Green Business opportunities.

What should happen is:

- Continuing development of the garden
- Identification and start up of small businesses related to the Permaculture garden
- Improvements and expansion on economic aspects of the garden

Part of the Green Business phase involves participation in the SEED Market day – a monthly event to stimulate entrepreneurship in our communities and schools.
Success in this year can lead towards one more year of support from SEED.

Year Three – Green Achievers

SEED then schedules six support and trouble-shooting visits with you in this last year.
These visits can provide technical assistance to the school, or comprise training in areas the school would like to specialise in.

Before we start with the garden:

Good Foundations

After many years of working with schools and trying many different approaches to success, we have realised something. It is the RELATIONSHIP that we have with our partners that is fundamental to the success and meaningfulness of the SEED partnership programme.

Afternoon workshops

Afternoon meetings after the SEED day are crucial to the ongoing success of the partnership. Our first three or even four SEED days with you will have a morning component for curriculum based interactions with educators and learners. However, the afternoons of these initial days are crucial. In these first meetings we will need to meet with YOU – the Seed partners – principals, educators, caretakers, concerned parents, community members and even other organisations doing work that relates to the school grounds.

In these initial meetings we hope to build a collective vision of our partnership. We will also get to know each other better, and understand the skills pool we share. We will also understand each others needs, and weak points that need support. During this time we will work with you to create a design of the garden that is going to suit your needs.

Good planning and design is fundamental to our success.

We need to schedule 30 mins for every following SEED day to plan for the ongoing work we do after this phase.

Site visit to SEED Head Office

During the first part of getting to grips with the partnership, we invite you to an afternoon at Rocklands Primary – the SEED Head Office. This visit means that we can show you how and what we do, and inspire you in your vision for the school. It is extremely important that you attend this orientation workshop, as it will deepen your understanding of the Permaculture vision, and the opportunities it offers.

SEED Academy

Throughout the year, SEED is offering free Permaculture workshops to partners – we have made a calendar which indicates the dates of the workshops. These workshops are designed to capacitate educators and partners in Permaculture. This means that educators will be able to use the Permaculture garden much more effectively in the curriculum.

SEED MARKETS

We run markets on a monthly basis, at Rocklands, to stimulate entrepreneurial skills and local business development. The calendar spells these out.

The seedling club

The facilitators will be working with many of your learners. During this time they will identify kids who are really keen on the Permaculture approach. This selection process is informal and based on kids' commitment and passion.

These learners get a SEED passport that is a record of their learning and applied knowledge– something like the Cubs movement where youth earn badges based on competency.

As they go through the SEED programme, they will need to participate in a number of activities and show that they have the knowledge and skills to earn the following badges.

- **I'm secure with sectors –** the Permaculture design process
- **I'm sussed about soil –** working with soil tests and fertility
- **I am wise with water –** water systems
- **I am a systems thinker-** food forests
- **I am a food gardening fundi –** vegetable and herb gardens
- **I am a Permaculture pro** is the ultimate badge, with it comes a SEED t- shirt.

These learners will also get seedlings in spring to kick-start their home garden projects. Often we find that the seedlings club kids are from difficult home situations, or are children with learning challenges. This club helps to affirm them as positive and contributing members of schools and families. They are often the learners who stay after school to work with the SEED facilitators.

Agricultural tertiary institutions have pointed out to us that less and less students sign up for degrees in agriculture. Food production is an absolutely necessary part of human life, and if we can identify learners who have a passion for that, and steer it in a sustainable direction, we will be able to assist with this crisis.

SEED PERMACULTURE GARDEN SYSTEMS

The gardens we implement with you are specialised systems. The gardens are designed with three main things in mind:

1. a food, fruit and medicine producing system that can eventually provide all its own needs on site
2. a living classroom in which educators and learners can learn absolutely vital life skills
3. a special space in which you can teach almost any of the learning areas in a beautiful and productive Garden of Eden, in an integrated way

In addition the garden can be a living library with each plant marked in different languages.

Learning support materials:

1. The Organic Classroom – Foundation Phase
2. The Living Laboratory – Intermediate Phase
3. Creating Abundance – Intermediate Phase EMS focus
4. Designing for Abundance – Intermediate Phase Geography focus

These will help you with using the garden systems we will create with you to bring your curriculum outdoors and into the practical realm. They contain practical lesson plans that try to integrate as much of the learning across the curriculum as possible.

So we are going to briefly explain the different elements we put into the garden systems so that you will find it easier to link your curriculum to what SEED has to offer.

After each section you need to file your lesson plans that related to the theme, as well as three examples of learners' work. This can happen in any order.

THE DESIGN

The map of your school design is a picture of our collective vision for the school.

It is the communication tool that the facilitators and educators can use to plan garden and curriculum activities.

Our Permaculture design is a very specific end-product. When we come to your school we look at a whole lot of factors which help us to come up with a design that serves your school best:

1. your current gardening practices which we can build on
2. factors like wind direction, slope, summer and winter sun angles and shadows
3. the staff who are interested in the project – from caretakers to principals, and how much interest and time everybody has for the project
4. so we then tray and create a garden system that adapts to all these factors to create a system that works for you and the curriculum

The design map will be to scale so that you can use it as a resource. We will also identify the different garden elements on one map, and then the learning opportunities on another copy of the map.

ACTVITIES

Mapping and measuring the space.
Compass directions
Scale mapping
Understanding local ecologies
School interview and stakeholder analysis

LEARNING OPPORTUNITIES

- Geography – reading scale maps, and understanding weather as well as compass points
- Mathematics - scale
- Arts and Culture – creating designs
- Languages – new vocabulary
- Natural Sciences – analysing local ecosystems

OUTDOOR CLASSROOM

This building will be constructed early in the year and provides an open space for educators and learners to use as a classroom. As we develop a garden around it the outdoor classroom melts into the garden, which becomes the living classroom.
Usually it is constructed from natural materials with no chemical or poisonous products used on it.

ACTIVITIES

Observing building the structure
Planting up shade and windbreak plants directly around the classroom to moderate climate and create a fragrant and protected learning space
Making decorations for the classroom.

LEARNING OPPORTUNITIES

- Mathematics - calculating
- Natural sciences – indigenous plant uses
- Technology – understanding construction and problem solving
- Languages – naming plants, and building components
- Arts and culture – decorating the classroom

PERIMETER WINDBREAKS

Wind is a natural element that can cause a lot of destruction and make production difficult, so we often start with planting windbreaks around our SEED gardens. This element offers us a lot of learning opportunities, and will often look like this:

- a mixture of indigenous species that are multifunctional
- all the plants we use will be wind tolerant, but will have many other uses too
- they can bear edible fruit, have thorns for security, provide nutrients to the soil..
- a lot of smaller windbreak species can also be used for making traditional medicines
- windbreaks also attract birds, lizards, frogs and chameleons who will hunt the pests that go for our vegetables and fruit
- they reintroduce biodiversity to our schools and preserve indigenous species
- they will help to create a softer environment so that our food production can flourish
- we can take cuttings from the plants to generate more plants for our systems or communities

ACTIVITIES

Measuring the perimeter of the garden
Working from a design map
Measuring distances between trees
Learning about trees and their uses
Planting trees

EDUCATIONAL OPPORTUNITIES:

- Language – plant names in Latin, English, Afrikaans, Xhosa, Sotho and Zulu, or whichever mother tongue language. Poems can also come in here
- Mathematics – measuring the distances between plants, and looking at the planting patterns
- Social Sciences – traditional plant uses
- Social Sciences – responding to climate, soil and landscape
- Natural Sciences – Biodiversity and food webs
- Arts and Culture – any uses of plant leaf shapes, poetry about cycles, posters to create awareness about the processes
- EMS – costing plant orders

WATER MANAGEMENT

Water is a key issue at many schools and in the whole country. We approach water in a number of ways, depending on what your school needs.

- Usually, with your help, we put up a rain tank to harvest rainwater to use on the garden and nursery, if you have one
- If you are on a slope, we make ditches on contour, using the A Frame tool
- We use mulch (dry grasses and similar) to cover the soil to prevent evaporation
- We choose species that can manage difficult water situations like drought or flooding
- We may re-use water from hand basins and kitchen sinks to feed certain parts of the garden that don't mind this kind of water
- If you have any wetland situations, we may be able to help with species for that

ACTIVITIES

Constructing a plinth for a water tank
Putting up and connecting a water tank
Building a tool to measure contours and levels
Measuring and marking contours
Making contour ditches if appropriate

EDUCATIONAL OPPORTUNITIES

- Mathematics – calculating surface area and rainwater catchment, as well as school water usage
- Social Sciences – geography and contour lines, soil types etc
- Technology - constructing measuring instruments like the A Frame
- LO – health and using the water appropriately
- Biodiversity if we are working with wetland plants
- EMS – costing water savings, and looking at job creation opportunities, as well as sustainable development opportunities

FOOD FORESTS

We are all faced with the challenge of climate change and changing rainfall patterns. Our food forest systems are all about producing crops that can handle rainfall and watering variations better. The crops we chose here live from 5 to 50 years. Food forests are systems that produce some kind of fruit, and smaller fruiting and productive bushes.

- We choose fruit trees that suit your climate
- We set up rain water harvesting systems that will supply these trees with more water in the rainy season
- A selection of plants that feed the soil, chase away pests and can be used for mulch are planted with each fruit tree
- In the spaces between, we also plant shorter lived fruiting species that can supply food too
- Our bigger windbreak species will be protecting these areas
- Vegetables that need more space and take longer to harvest can also be planted in this system

ACTIVITIES

Measuring and marking out the orchard design
Planting fruit trees
Making water catchment for the trees
Planting cover crops to feed the fruit trees
Working with herbs for pest management

EDUCATIONAL OPPORTUNITIES

- Mathematics – measuring the orchard layout, and working with patterns
- Geography – working with slope, if there is one
- Natural sciences – understanding biodiversity, insects and their predators, the role of legumes in the ecosystem
- Languages – plant names
- History – the origins of fruit
- Food preserving – EMS opportunities
- LO – healthy diets
- EMS – costing investment and projecting on returns

SOIL

Understanding our soils and their different makeup is vital to the success of our garden projects. Our local geology and history of soils is also important. Some of our schools have original soils, and others may have been built on dump sites, or have lots of rubble…we need to find out!

ACTIVITIES

Testing soils
Erosion tests
Traditional classifications of soil
How soils deal with water
Improving soil through green manure plants

EDUCATIONAL LINKS

- Natural sciences – soil types and characteristics, experimentation
- Geography - erosion
- History – traditional soil classifications and the history of the school grounds
- Technology – setting up soil testing apparatus
- Languages-soil type names, adjectives…

VEGETABLE AND HERB GARDENS

Now we get to the stuff that means a lot to all of us – good healthy food, grown at school for our feeding schemes and for people to take home.
Our garden systems look a bit different. Often we have challenging spaces to work in so you won't see the normal big square beds or straight lines we are all used to. Our landscape will dictate what shape the beds are, especially if we are on a slope.
We also mix bigger medicinal herbs into the vegetable garden to create small windbreaks and sources of medicine.

- Garden layout is quite important – we spend quite a bit of time on measuring the beds and making sure that the spaces are right for everyone.
- Sometimes we get really creative and work with circular gardens, wavy beds and shapes that mean something symbolic to the schools
- We incorporate a strip of medicinal herbs between every two or three vegetable beds to provide windbreak, medicines and pest management
- We try to introduce some vegetables that people don't eat to often to increase variety in the diet, and a better range of nutrients
- We only use natural pest sprays to avoid chemicals in the garden
- The garden is completely covered in mulch to keep the soil moist
- All weeds are put into a compost heap to feed the garden again

ACTIVITIES

Measuring the beds according to the design
Marking out and digging the beds
Planting cover crops to improve soil fertility
Mulching the beds
Planting up mixed crops for maximum food production
Planting herbal shrubs to control pests
Constructing supports for tomatoes beans and similar

LEARNING OPPORTUNITIES

- Mathematics – measuring and patterns
- Geography – directions and slope
- Natural sciences – food plant biology, plant life cycles
- Languages – plant names, writing recipes
- Technology – construction of supports for plants
- Arts and culture – images of food crops, stories about special foods
- History – where do crops come from, what were they used for
- EMS food markets, food selling projects, savings on chemical pest management

ORGANIC PRACTICE

We need to look at different ways of creating and maintaining fertility in our gardens. That way we don't have to rely on fertilisers and poisons to create healthy food systems. Here are some things we may implement in your gardens

WORM FARMS

Earthworms are the most amazing way to build soil fertility, create high value compost and harvest liquid manure.

- We often build worm farms in old baths, or stacks of tyres
- We can also use them in pit beds which can then slowly disperse them into the garden

Educational links

- Technology
- Natural sciences
- EMS – making worm fertilisers for sale

COMPOST HEAPS

If your school can collect enough materials we can also build compost heaps

- compost heaps in chicken wire cages, or free standing heaps
- space required about 1,5 m by 1,5m
- roughly 2 months of standing before we can use them

Educational Links

- Natural Sciences – decomposition, soil life
- EMS – commercial opportunities in large scale composting

LIQUID MANURES

To help in situations where the soil is quite poor, we can use animal manures and plants to create 'teas' to feed plants and the soils.

- 200 litre drums with water, manures or plants
- these stand for two weeks before we use them by sprinkling them on plants to boost fertility, growth and help them fight diseases

Educational links

- Natural sciences – using local resources
- EMS – small businesses from sales
- Technology – designing different systems of manufacture

PEST MANAGEMENT

A Permaculture system uses no poisons or chemicals for managing pests.
We use biodiversity and good soil management to deal with pests and diseases.

- The mixed indigenous windbreaks will grow into habitats for pest predators who will manage some of the garden pests. Birds, lizards, chameleons and predatory insects can live in the windbreaks.
- The medicinal herbs planted in the vegetable gardens will also attract predators, and chase away pests because of their strong smells
- In the Food Forest systems, we plant the pest management plants directly around the fruit trees.

ACTIVITIES

Identifying pests and their predators
Planting bio-diverse gardens
Creating predator niches like stone piles for ‘lizard hotels’ or small ponds for frogs
Making natural pest sprays, if necessary

EDUCATIONAL LINKS

- Natural Sciences – web of live and food chains
- EMS – making and selling sprays
- History – traditional ways of dealing with pests and diseases – IK
- Languages – names of creatures
- Technology – problem solving and testing out methods
- Arts and Culture – posters of food webs, insects, dramas role-playing food webs etc