

Roof Gardens in Schools

Prepared as part of the
Food for Life Partnership



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Front cover: Food from the Sky (Photographer, Diane Fisher)



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I Introduction



As part of the Food for Life Partnership, Garden Organic, through our Growing Skills Programme, is helping schools start and/or develop organic food growing gardens. We aim to involve as many pupils as possible while also encouraging participation from staff and the wider community. By learning to grow food, pupils acquire an extremely important life skill, re-establish their connection to the food they eat and have often been found to value and enjoy foods that they previously would not sample.

Harvesting school food provides an addition to a healthy diet so can lead to a reduction in obesity and improved health. Food miles are drastically reduced, time spent learning outdoors engages pupils who may have become disengaged and addresses different learning styles. It is also a wonderful way of offsetting the increasing cost of food, as global prices for importation and fossil fuels continue to rise.

Many inner-city schools are short of land, but do have completely unused, sunny, flat roofs. In some old Victorian schools, these roofs had historically been used as play areas and already have several exits and suitably robust boundary fencing. These wasted spaces have the potential to be transformed into original outdoor classrooms producing fresh organic food for school lunches and cooking lessons.

This resource aims to give a school all the information it needs to plan, design, construct, plant and maintain a sustainable organic food growing rooftop garden. This differs from a 'green roof', which is a roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane. Generally green roofs are not designed to be regularly accessible to children and are fairly low maintenance.

Roof gardens reduce the school's carbon footprint, provide insulation, reducing heating bills in the winter and keeping the top floors of the school cooler in summer. They absorb rainfall, which can be recycled to irrigate plants. Growing plants improves urban air quality, and are a welcome oasis for butterflies, bees and other wildlife. In fact, roof gardens are ecologically cutting edge and enrich and inspire the whole school community immeasurably.

They can be used as communal spaces, providing a welcome island of calm in an inner-city environment. Traffic pollution (especially particulates) and noise pollution is less, the higher up you go. Well-designed roof gardens, if large enough, may provide unique spaces for small scale theatrical productions, musical and other cultural events or even school café space with a view!



Example of a green roof. Amelio Ancaya, Living Roofs, Inc.

Internationally, growing on roofs is actively promoted in a number of countries: Sweden's Scandinavian Green Roof Institute is dedicated to researching optimum high rise growing techniques, Germany provides government subsidies and Tokyo has introduced laws which stipulate that 20% of new buildings should have green roofs. In Canada and New York, roof garden projects are increasingly popular, despite the extreme climate. In the UK, there is growing interest amongst garden designers and city planners.

So, in response to this exciting new challenge, Garden Organic, the UK's leading organic growing charity, has produced this simple, school friendly guide on how to get growing on your school rooftop. The charity has over 50 years experience researching and educating in best practice organic growing. This booklet is aimed at Headteachers, school governors, other school staff and parents who may be involved in developing organic food growing and environmental education within their school community.



*Millfields Community School Children's Centre,
Hackney*



Maria Fidelis Upper School, Camden



North Harringay Primary School, Hornsey



2 Health and Safety



Headteachers, governors, school staff and parents have legitimate concerns over possible Health and Safety risks on rooftops. With strong, sturdy fencing, good drainage, a non-slip surface and adequate fire exits, a roof garden is no more dangerous than being in the ground level school garden.

The following are guidelines only and Garden Organic does not take any responsibility for incidents that may occur.

The Law

Section 3 of the Health and Safety at Work Act 1974 states that employers have a general duty of care to their employees. A proper **risk/benefit** assessment needs to be taken to protect all roof users, see page 6.

Workplace, Health and Safety Regulations 1992, Regulation 13, 129, states that if regular access is needed to a roof “suitable permanent access should be provided and there should be fixed physical safeguards to prevent falls from edges and through fragile roofs”. No height for the fencing is specified. Instead this is decided by the local authority Building Regulations. There is a British Standard for the Construction of Fences.

For more information see HSE Safety in Roof Work HSG33

HSE Books 1998 ISBN 0 7176 14255

Guidelines

- Consult a structural engineer to ensure that the roof is able to bear the load of soil and compost, water and regular use. They will be able to advise you about the best place to site heavy containers or water tanks. They should also tell you how many children/adults could safely go onto the roof at one time.
- In general, local authority building regulations require the minimum height of the periphery fence to be 1.8 metres. In the old Victorian school roofs, most are over two metres high. Fencing needs to be fixed sturdily to the roof so that it cannot blow over, even in very high winds.
- Your local authority Building Control department can tell you what the access requirements are in your borough. In general, two fire exits are expected.
- Another factor to bear in mind is that windows must not open out onto the roof in a way that could cause a hazard to anyone passing by.
- Roofs must have very good drainage, ideally with drains or guttering linked to a down pipe and into a water butt or collecting tank. Drainage channels need to be covered to prevent accidents.
- The roof surface must be non-slip. On top of the Reading International Solidarity Centre, there is a very well established ten-year-old temperate forest garden. It has mature fruit trees and the paths are covered with wood chips, non-slip and able to absorb excess water.

- Roofs are very windy, exposed places, so a covered area with shade and protection from rain is absolutely vital. This will ensure that your roof garden reaches its maximum potential as an outdoor classroom and is a relaxing and pleasant space to share food, meet with parents, listen to music or engage in other activities.
- Ensure that students wear the correct footwear, eg sturdy boots/shoes or Wellingtons. As part of your school's risk assessment a decision will need to be made regarding circumstances when it may be advisable to wear steel toe-capped boots.
- In sunny or hot weather ensure roof users wear hats and sunscreen to prevent sunstroke and burning. It is also important to have adequate fresh drinking water available to avoid dehydration. In cold weather, the roof will be much colder than at ground level, due to the wind chill factor. Ensure everyone has adequate warm clothing including hats, scarves and gloves.

Roof garden risk/benefit assessment (Assessment of slips, trips and falls and manual handling)

School name:

Date:

Carried out by:

The majority of workplace accidents and injuries come about as a result of slipping and tripping. Slips and trips can arise at any time throughout the working day. Users must have responsibility to be aware of the potential for those accidents to occur and report any slip /trip hazard they spot.

Hazards	Those at risk	Existing controls	Further controls	Risk level	Benefits/comments on using the roof to garden
<p>Slips, trips and falls: Slipping or tripping due to wet or icy floors, spillages, obstructions, uneven surfaces, and poor floor surface condition.</p> <p>Contact with sharp objects.</p> <p>Falling off roof.</p>	<p>Students School staff Visitors Volunteers</p>	<ul style="list-style-type: none"> Immediate clearing up of spillages. Maintenance of stairways, walkways, outdoor furniture and growing containers. Good 'house keeping'. Correct frequent cleaning of the floor. Training everyone regarding hazards and controls. Wearing of suitable non-slip shoes, no sandals, no high heels. Secure, sturdy periphery fencing that complies with British standard of fence construction. 	<ul style="list-style-type: none"> Regular reminders about the uneven surfaces and place necessary signage. Regular reminders of 'garden rules', eg no climbing on fences. 	Low/Medium	<p><i>This column is used to record possible benefits to the roof garden user. It can be a very useful tool to encourage over cautious staff, parents or governors away from just thinking about risks and acknowledging and recording important benefits such as:</i></p> <ul style="list-style-type: none"> Exercise value/preventing obesity by climbing up to the roof regularly. For inner city children, the opportunity to breath cleaner air. Pleasure Development of self-confidence and well-being. Engagement with natural environment and natural elements. All other gardening and food growing benefits.
<p>Manual handling: Injuries caused by bending, stretching or carrying too heavy a load.</p>	<p>Students School staff Visitors Volunteers</p>	<p>Train those at risk in manual handling techniques.</p>	<p>Remind all concerned as necessary.</p>	Low/Medium	

Information courtesy of Play Link 2010 www.playlink.org/pubs/Risk-bformWeb15.12.09.pdf



3 Planning and design



Planning and design of your ‘edible’ roof garden is the time to involve as many members of your school community as possible. This is when your creativity and vision can be given full rein! Enlisting the help of the professionals will then ensure that your vision becomes a safe, sustainable reality.

Assess if your school roof is suitable

<i>Access</i>	Determine what access you have to the roof. You will need at least one and ideally two access points (one as a fire escape). You should either have stairs leading onto the roof, or the possibility of constructing stairs so that the roof is accessible to parents, teachers and governors as well as the more nimble children! If you do not already have good access, you may need planning permission from your local council, in order to construct it.
<i>Aspect</i>	Is it mostly in full sun? Most vegetables need 8-10 hours of sunlight a day to thrive. Fruit needs some sun to develop its sugar content and herbs their essential oils. Most pollinating insects prefer sun as well.
<i>Structural limitations</i>	The structural limitations of the roof must be determined before any work is started. This will include the load bearing capacity of the roof, as soil and compost is very heavy, especially when wet. Drainage and roof surface materials must be taken into account.
<i>Structural engineer</i>	So, the first step after determining if there is access or could be, would be to consult a structural engineer. A school will need a detailed report and at time of writing, they charge from £90-£150 an hour, but this varies tremendously depending on where in the UK you are based. You will need to inform them about what sort of roof garden you would like to create (beds or containers). They can determine the influence of obstacles and the possibility of removing them, and they can advise as to which areas of the roof would be best for different purposes. They can determine whether beds and/or containers would need to be located around the edges, where the roof is strongest, or propose a framework for reinforcement.
<i>Insurance</i>	Contact your school insurance company about any changes to building usage or public liability.

Planning your design

Garden Organic recommends that your Garden Steering Group is enlisted at this stage, if not before. A Garden Steering Group (GSG) should consist of staff, including senior management, pupils and members of the wider community who work together to review and develop the school garden. The aim of the Group is to widen involvement in the garden and to build in processes and support to ensure the long-term sustainability of the garden. This means that the garden will survive when staff, pupils and parents

move away from the school. If you do not have a GSG, form a design committee and enlist support from interested parents, grandparents, teachers, learning support assistants, governors and at least one member of the catering staff. Invite anyone else from the school community who could be helpful, like those who are architects, landscapers or construction or roofing professionals. Don't forget to survey the children to find out what they would like! Make sure at least a few children are really involved, so that they can report back to the rest of the school. You might even want to get each class to submit a selection of designs! There is free garden design software such as www.gardendesignpro.co.uk/acatalog/free_garden_design_software.html, which could be used in conjunction with your IT curriculum.

Once you have a good idea about WHAT you want to use the roof garden for and WHO will use it and WHO will look after it and HOW MUCH time that it is likely to take, the next thing you may wish to do is to enlist the services of a designer who specialises in roof gardens. They can adapt the school's ideas and desires into a workable design, using the structural engineer's report as a basis.

The process

- Extreme weather is a given on roof gardens. Plants will dry out much more quickly due to exposure to sun and drying winds, even in overcast situations. Using windbreaks and assessing where to best place them is essential. Wind turbulence can be a problem so it is important to design permeable windbreaks that protect your garden from winter winds. Also, for children and adults to be comfortable, it is important to ensure there are areas of shade and protection from the elements, if possible.
- You will need somewhere to store equipment safely on the roof, eg a first aid kit and tools.
- Polytunnels or greenhouses will need to be bolted to the roof surface. Your local authority may have planning restriction on the height of any additions to your roof, including pergolas, especially if your school building is listed, so check first! If you have enlisted the help of an architect or professional roof garden designer, they can do this for you.
- Fences will need to be erected on all sides (see construction) but you do not want to block out light or cause wind turbulence, so permeable barriers are best.
- The roof surface needs to be non-slip.
- You will need to install a tap and if possible some water butts. Check that these are placed in an area that can bear their load.
- You may want access to electricity, for heating a greenhouse or operating other electrical equipment.
- Make sure to include a compost bin and/or wormery, so you will have a steady supply of good quality compost to feed and mulch your plants.
- You may wish to design your garden around a specific concept or theme, eg culinary and medicinal herbs, horticultural experiments, Heritage Seed Library planting (see 'Further information' below), ethnic food crops to reflect the school's multicultural mix, eco-systems, permaculture or forest gardening (see case study of Reading International Solidarity Centre roof garden).
- Make sure you design an area for people to come together and sit and relax and if space permits, a quiet shady area to read in! Freecycle or Ebay are great places to find unwanted heavy wooden garden furniture and even patio shade umbrellas! It is often forgotten when designing a garden to make sure there is a place for people to come together and socialise or just relax and enjoy the garden in peace.



Planning permission

The next step is to take your preliminary design and the report from the structural engineer, to your council to get planning permission. The Building Control department will need to know that the roof can support soil, water and any other structures that you intend to erect, such as a polytunnels, railings and windbreaks and/or a pergola for shade and wet weather protection. This planning process could cost at least £1000. Schools who have gone through this process have experienced that it can take a few months to be finalised.

Further information

Heritage Seed Library www.gardenorganic.org.uk/hsl

Garden Organic's Heritage Seed Library (HSL) conserves vegetable varieties from across northern Europe that would otherwise have disappeared – due to EU regulations and market forces. HSL works tirelessly to collect and conserve an ever increasing variety of historic and heirloom vegetables, which is directly contributing to a reverse in the decline of genetic diversity.

Unlike most collections, the HSL makes its seed available to gardeners – creating a living library.



4 Construction



Once the structural engineer's report has been completed, recommendations complied with, and the design for your garden has been approved, it is time to start constructing your roof garden! Be sure to involve the children, staff and other members of your Garden Steering Group in accessing recycled materials and choosing suitable fruit, vegetables and herbs to grow.

Points to bear in mind

- You will need to have a guaranteed, tough waterproof layer, professionally laid, to protect your roof surface. Ensure that the roof will still drain well, by going up and having a good look after heavy rain. Make sure you get at least three estimates from contractors who have experience of building roof gardens – your structural engineer or roof garden designer may be able to make recommendations.
- A perimeter fence will need to be attached to the parapet wall around the roof, if one is not already in place. Generally this will need to be extremely sturdy, so metal of some sort is best. Ideally, it will also be permeable, to reduce wind turbulence and allow your gardeners to enjoy the rooftop view! Check with your local Building Control department to discover if they have restrictions about how much of the fence may be visible from ground level.
- Building Control will need to inspect the fence and verify that it complies with building regulations.
- If possible, before the process of hard landscaping begins, ie building beds, paths, water features, etc get all your materials together. Then, when you are ready to get everything up to the roof, it will make the job much easier.
- Schools and projects have used several methods to get hard landscaping materials, compost and soil and single items like water butts, compost bins and polytunnels up onto their roof. These include:
 - Hiring a crane and driver - Food from the Sky paid about £1200 (in 2010) to do this to get their fencing, containers and compost up onto the roof.
 - Organising a community day, with food and refreshments and the whole school community carrying it up - this would only work for a fairly small container garden and depends on the level of support and fitness of your school community!
 - Enlisting the help of the corporate social responsibility departments of banks like Barclays, Lloyds or RBS or by contacting Business in the Community www.bitc.org.uk, who will help you find companies who volunteer their services for a day of team building and charitable activities. Very often these companies will donate materials and even pay for the extra administration and supervision time that the school will incur.

Materials

Raised beds, border edging, pergolas, benches and compost bins

These can all be constructed from recycled wood. Often scaffolders will donate damaged scaffolding boards or a contact from the Garden Steering Group may be in the building trade and be able to donate off-cuts of wood or other materials. Alternatively, contact The National Community Wood Recycling Project (NCWRP). Keep an eye out on Freecycle as well. **Note: make sure the wood has not been treated with toxic chemicals.** See Organic Gardening Guidelines, pgs 34-35 www.gardenorganic.org.uk

Soil and compost

Use a high-fibre, lightweight mix of soil and compost. Unfortunately, soils on roofs exhaust and erode quickly, so mulch every week with worm or garden compost during the active growing season, if possible. The RISC garden has found that this technique not only helps to reduce water loss; it also keeps the nutrient level topped up and sufficient for the plant's requirements. Municipal green waste or even better, composted food waste is often available very cheaply, in bulk. Food from the Sky paid about £90 for a ten tonne compost delivery from Haringey Council.

Paths

These need to be non-slip, child friendly and wide enough for ease of access and use. The RISC Permaculture Roof Garden uses wood chip. This can often be acquired free, by contacting a local tree surgeon and asking for a load to be delivered. Some designers like decking, but it can be very slippery in wet weather or when it is icy. Other (more expensive) options for paths and pedestrian areas include vulcanised rubber, exterior grade, or ship's decking, rubberised.

Growing containers

These can be any sort of recycled container that you have access to. If you use tyres, they need to be lined to be safe for organic food growing. Alternatively, you may be able to convince your local council to donate the deep recycling boxes that they supply to households. These are deep enough to grow most vegetables and all salads but will need holes drilling in the bottom for drainage. Your school caterer may have access to very large containers that would be suitable for growing trees or larger crops like sweetcorn. Maria Fidelis Upper School girls wove their own willow containers for food growing.



Windbreaks

These are important as wind speed is much higher on a roof and leads to plants drying out very quickly, soil erosion, lack of pollination and of course very cold gardeners, on a windy winter day! If you can use local materials and weave flexible windbreaks, this is an ideal Design and Technology project. One school planted a rather ugly chain link fence with an 'edible' hedge to provide an attractive, delicious windbreak. Split reeds are another option.

Barriers

You may wish to make decorative hurdles to surround your growing beds or other areas of the garden. The RISC garden used local hazel to weave both hurdles and an attractive obelisk for climbing plants.

Decorative artwork

Broken crocks and other unusual recycled materials can be used to design beautiful, one-off pieces of art, like the mosaic water feature on Harringay Primary School's roof garden or their perimeter fence decorations.



When collecting materials, aim to use as many recycled and renewable materials as possible to lessen waste, save money and help reduce the school's carbon footprint. If appropriate, students may wish to use the roof garden construction as a practical, hands-on project to learn about sustainable building technologies. Many aspects of sustainability, measuring the school's carbon footprint and energy use may be explored with your roof garden as a focal point and interactive resource.

Container growing

- Drainage is essential to keep plants from drowning. Ensure pots and containers have good drainage holes and are slightly raised up, off the surface of the roof, to permit excess water to drain away.
- Use lightweight, high fibre mixtures of compost and soil. In *'The Edible Container Gardener'*, Michael Guarra recommends a home-made recipe for roof gardens:
60% municipal compost, 25% lightweight filler to improve drainage (vermiculite or crushed brick), 15% well rotted manure. To each 4.5 litre bucket of this mixture add 15gms of a mixture of a mixture of one part wood ash, one part seaweed meal and two parts chicken manure. If you have a wormery on the roof, you can regularly feed the container soil with worm compost mulch and the plants with 'worm tea' liquid, diluted one part 'tea' to ten parts water.

BUT

- Plants in containers are much more vulnerable than those in beds to drying out or being malnourished. So, they do need regular, appropriate attention! This is a good way to teach children responsibility – giving them their own plant or plants to water and care for, with support so that they succeed. The reward is in the harvest!
- Nearly anything will grow with at least 30cm depth of soil or compost. For fruit trees and large bushes, aim for 45cm depth, but be sure to weigh down or attach pots so they do not blow over in strong winds.
- You may want to consider an automatic watering system for school holidays and weekends. This is essential if you decide to have a polytunnel or greenhouse on the roof.
- If you are growing fruit trees in containers, choose a more vigorous rootstock than you would choose if you were growing in soil at ground level because constraining root space reduces the size of the tree.
- Make sure large, heavy containers are sited on areas of the roof that are able to withstand the extra load – consult structural engineer's recommendations.
- See the excellent *'Guide to Setting Up Your Own Edible Rooftop Garden'*, published by Alternatives and the Rooftop Garden Project, section 6 *'Growing in Containers on the Rooftop: a Technical Guide'*, for fantastic information, instructions and plans for creating a variety of self-watering containers
http://rooftopgardens.ca/files/howto_EN_FINAL_lowres.pdf.

Planting in beds

- Have at least 30cm depth of soil/compost.
- Line any wooden parts with plastic and treat them with linseed oil (non-toxic) to preserve them. This needs to be done every year.
- In general trees and large plants do better in beds because their roots can grow sideways and have a larger potential area from which to access water and nutrients.
- Soil and compost will erode much faster than at ground level. Keep topping it up with good quality mulch, such as garden compost. This will also feed the plants and help to retain moisture.
- Consider installing a 'porous pipe' system to help with irrigation, but read up on this first, to decide if it is for you. Because the pipe clogs easily in hard water areas and also is easily damaged by enthusiastic children (which you want!) it may not be the best option for your school.

Growing in polytunnels/greenhouses

- **Get professional advice from the manufacturer to ensure your polytunnel/greenhouse will be safe and stable in extreme and windy conditions.**



- Consult your local Building Control department to ensure there are no height restrictions on erecting a polytunnel/greenhouse on your school roof.
- Consult your school insurance company to make any necessary changes to your policy.
- Have it securely attached to the roof so it won't blow off in storms!
- Having said all that, it is a wonderful addition to your school roof garden, to be able to raise plants under cover in a polytunnel or greenhouse! Having a cropping area protected from wind, frost and heavy rain is good news. It enables you to extend the growing season at both ends: courgettes planted into a tunnel in May are ready to harvest in mid-June, 6-8 weeks ahead of outdoor crops and before the summer holidays. Similarly, potatoes planted in mid-February will be ready by the end of May. At the other end of the year, a polytunnel can provide welcome crops of fresh, green salads from November to the following spring.
- Another benefit is the opportunity to grow crops that would not normally flourish outdoors - all sorts of exotic possibilities present themselves: peppers, cucumbers, melons, aubergines, okra, cape gooseberries, sweet potatoes and callaloo! Growing food familiar to children who have travelled here from abroad, often not yet speaking English, is a wonderful way for them to feel included and motivate and inspire them to become a valued part of their year group. Their families may find coming in to school to grow familiar foods is a less daunting way to become involved in the school community and share their skills and knowledge. See Saving New Seeds website for more information and growing instructions for a selection of exotic crops that can be grown in the UK www.sowingnewseeds.org.uk



Watering

- It cannot be **over-emphasised how important** it is to collect as much water as possible and to recycle it back onto the garden. Most climate scientists agree that climate change is a reality and we are likely to face increasing erratic and extreme weather. Some predict a drought every three years on average. So, the roof garden environment is an ideal outdoor classroom to teach techniques of water conservation and reuse that will become essential to future generations.
- These techniques include:
 - Using water butts to harvest rainwater.
 - Watering economically by ensuring water goes directly to the roots of the plant. This will encourage the roots to grow down deeply, whereas watering with a sprinkler, onto dry soil, encourages surface rooting which is more vulnerable to drought. Making a small hollow around a plant also helps to direct water to the roots.
 - Watering in the morning before the sun gets too hot, to reduce evaporation.
 - Retaining moisture in the soil by incorporating garden compost, which acts as a sponge to hold water in the soil where the roots can access it.
 - Mulching thickly with organic matter, which can also feed the plants.
 - Protecting plants from drying wind and too much sun.

Electricity

- Having a power outlet up on the roof is well worth it. It means you can use power tools and install lighting for evening events or to light the tool storage area.
- Ensure your electrician or building contractor installs a fused exterior plug socket, complete with a cover on a spring. Check that it is on a separate circuit with its own fuse box.

Further information

Food for Life Partnership Food Growing Manual

www.gardenorganic.org.uk/growyourown/activities.php

A2 Organising a gardening day

A8 Where to grow plants

A10 Building a raised bed

A11 Planting in containers

A12 Growing potatoes in containers

A16 Building a garden path

A36 Planting a tree

A37 Making a herb spiral

A39 Mulching plants

A45 Assessing greenhouses/polytunnels

A46 Installing a water butt

A64 Creating a wildlife pond



5 Planting and maintenance



Choosing suitable crops to grow and a prioritised, timetabled and well-organised maintenance plan is crucial to the success of your roof garden. So is involving the whole school community and delegating effectively, so that no one person feels overwhelmed with the responsibility to keep it all alive!

Planting

- Make sure you have consulted the whole school community on what they would like to see growing and what they actually would like to eat! This can be done through informal chats, surveys, assemblies, lessons, letters home, talking to the school cook, text messages and the school notice board.
- Delegate a small sub-committee of your Garden Steering Group to choose suitable plants from the survey. Try to have at least a few vegetables, herbs and fruit growing in your roof garden.
- Remember to choose plants that can cope with extremes of temperature and wind, unless you have a polytunnel or greenhouse. Look for plants like Mediterranean herbs (sage, rosemary, thyme) that naturally thrive on windswept, exposed, hot and dry sites.
- Choose plants that have a high yield and take up less space to optimise available resources. For example, rhubarb and strawberries might work better than fruit bushes. Tomatoes, peppers, lettuce and herbs might be better than broccoli or artichokes.
- Use dwarf varieties for containers.
- If planting fruit or vegetables that will need pollination from bees or other insects, plant in a more sheltered part of the roof, surround them with some flowers that will attract insects and don't forget to provide suitable habitats for these very valuable garden helpers!
- Favour vegetables that are more rare or expensive, so you have real treats to add to the school lunches and cooking lessons. Garden Organic's Heritage Seed Library has a fantastic selection of unusual and delicious vegetables. Think purple carrots and peppers or yellow and pink striped tomatoes! The Sowing New Seeds website can introduce you to many more. Or just try some edible flowers to add to your salads!
- When planting fruit trees, be sure to stake them well so they cannot blow over. You may even wish to attach them to the periphery fence.
- Periphery fences can be used to grow espalier fruit, but yield will depend on wind (which can reduce pollination) and how well the plant is kept watered and fed.
- Areas closer to the edge of the roof will dry out more quickly, as will pots, compared to beds. A group of containers and pots placed close together will conserve some moisture.

- Have a look at the self-watering containers in the 'Guide to Setting up Your Own Edible Roof Garden'. Whether you decide to use these or not, do not forget to mulch, mulch and mulch, after you have planted and watered in all your new crops!
- When you have finished planting, don't forget to celebrate! Have a picnic, or a feast, document and photograph what you have done and invite school staff, families and even your local press.

Suggestions for year-round school roof garden maintenance

January/February (before half-term)

- Plan what you want to grow, with your Garden Steering Group. Assign responsibilities, such as blogging and/or keeping regular photographic and written records of the year in the garden.
- With senior management, plan your timetable, so that the students have regular times to work on the roof, set times for collecting compostable materials from around the school to add to the roof compost bin and time for crop maintenance.
- Order seeds and plants.
- Make a list of tools and ensure they are in good condition for the beginning of the growing season. Purchase garden tools or sundries you will need.
- If you have a polytunnel, you can still be growing herbs, winter salads, garlic, etc.



February/March

- Have a whole-school information session to get started and get enthusiasm going! Sign people up for regular sessions throughout the spring and summer term.
- Start planting suitable crops such as broad beans, shallots, spinach, salads, peas, etc.
- Decide how crops will be watered over the Easter holidays and at weekends, when the weather gets warmer.
- Have a good look into your wormery and do what you need to do to keep your worms happy over the next few months!



April/May

- Plant in earnest, start regular watering and tie or stake plants that need it. See Garden Organic's website for more details on what to do, crop by crop, each month.
- Mulch crops with compost if this has not yet been done. Do this after everything has been well watered.
- Put fine mesh netting over any crops susceptible to birds, especially soft fruit and brassicas.
- Start making comfrey and nettle liquid to feed your plants.



June/July

- Continue regular watering and feeding.
- Harvest crops as they are ready and enjoy!
- Have a garden party or summer solstice party to celebrate the beginning of the summer – Ideas:
 - Get the older children to deliver training on composting, worm composting or growing salads in containers as a feature of the summer fair and use this to enlist more support. Make sure older children share their enthusiasm and status by teaching the younger children how to do their garden tasks. Attract people up to the roof with music and food the school has harvested and cooked.
 - Use the garden as a venue for theatre, music or an art display.
 - Fundraise for the garden when enthusiasm and pleasure in the roof garden is at its highest.



September/October (before half-term)

- Have an assembly to introduce new children and staff to roof garden safety, responsibilities, etc.
- Plan term's activities in Garden Steering Group, including any festivals or harvest celebrations. Introduce new students and staff as others move on.
- Harvest, cook and enjoy any crops that are ready.
- Save seeds from appropriate plants and teach students and staff how to do this.
- Plant green manures into any areas that are empty, to protect them from erosion and to increase their fertility.



November/December

- Plant bare-rooted fruit trees or large shrubs and water in.
- Clean tools, pots and all equipment. Clean polytunnel or greenhouse very well to destroy pest eggs and to ensure it will take in as much light as possible.
- Treat any wooden raised beds, containers and the compost bin with linseed oil.
- Review the year's activities and compile photographs and other records to display during the Christmas Fair or other events.
- In class, reinforce outdoor growing activities with indoor lessons on composting, plant and pest life cycles or other suitable topics.



Further information

Garden Organic www.gardenorganic.org.uk
Food for Life Partnership Food Growing Manual – activities and games
www.gardenorganic.org.uk/growyourown/activities.php
Guide to setting up your own Edible Rooftop garden
http://rooftopgardens.ca/files/howto_EN_FINAL_lowres.pdf



6 Funding



The following information and contacts may be useful but we cannot guarantee the validity of any of the information provided by these contacts and websites. The information supplied was correct at time of writing. You could also try approaching local businesses and groups, eg large DIY stores or garden centres/nurseries, building societies or community organisations.

Organisation	Details
Awards for All www.awardsforall.org.uk 0845 600 2040	Grants of between £300 to £10,000 which are awarded to groups to help improve local communities and people's lives that are most in need. Emphasis is given to projects, which strengthen communities and improve rural and urban environments.
Capital Growth www.capitalgrowth.org	The campaign to support 2012 new food-growing spaces for London by end of 2012.
Esmée Fairbairn Foundation www.esmeefairbairn.org.uk 020 7812 3700	The foundation aims to improve the quality of life in the UK. This is achieved through improving cultural life as well as improving educational opportunity. There are two funds, a main fund and a strand fund. The funding strands focus on four areas, two of which are food and biodiversity.
European Union Funding http://europa.eu/policies-activities/funding-grants/index_en.htm	Grants are available through the European commission and are monitored at a national level. There are many categories and types of funding available.
Reaching Communities: England Big Lottery Funding 0845 4 10 20 30 www.biglotteryfund.org.uk/prog_reaching_communities	The Reaching Communities programme has two strands: Reaching Communities revenue and small capital – funding from £10,000 to £500,000 for revenue projects and/or smaller capital projects up to £50,000. Reaching Communities buildings – funding of between £100,000 and £500,000 for large capital projects. Reaching Communities funds projects that help people and communities most in need. Projects can be new or existing, or be the core work of your organisation.
The Sainsbury Family Charitable Trust www.sfct.org.uk 0207 410 0332	Comprised of 18 grant making trusts, which are individually managed, with different boards of trustees. The trust therefore has a wide range of interests. Research into each trust should be undertaken, as some do not allow unsolicited proposals.

Organisation	Details
Young Roots Heritage Lottery Fund: www.hlf.org.uk/howtoapply/programmes/pages/youngroots.aspx	Grants of between £3,000 and £25,000. Young Roots is a grant programme designed to engage young people aged 13-25 with their heritage. Young Roots projects stem directly from the interest and ideas of young people, who are supported by youth and heritage organisations to develop skills, build confidence, and connect with their local communities.
Project Dirt http://projectdirt.com/page/funding-1	For schools in London, Project Dirt has an up-to-date funding section.
The National Lottery www.lotteryfunding.org.uk	Lottery Funding is a joint website run by all Lottery funders in the UK. This site allows you to search information on current funding programmes across the UK.

Top tip



Funding application

One London school received part funding for their roof garden through a climate change Fund, by putting the emphasis on 'green coverage' to absorb carbon, recycle run-off water and prevent flash flooding.

Further information	Garden Organic www.gardenorganic.org.uk
	Food for Life Partnership Food Growing Manual www.gardenorganic.org.uk/growyourown/resources_for_schools.php Bronze Award booklet, B7.7 Funding, pgs 84-86



7 Case studies



Although two of the following case studies are not roof gardens at a school, they are included because they are very successful examples of roof gardens that could be replicated by a school. Both are willing to host visits and/or talk with school heads, governors or staff who would like more information about the process and technicalities of growing organic food on a roof.

Harringay Primary School

This roof garden was the inspiration of Melissa Robertson, community herbalist, parent and leader of the school gardening club who visited the roof and was inspired by its potential as a garden. She dreamed of a unique space for the students, their families and the school community to grow kitchen herbal remedies and learn about them.

Ms Robertson was at the time involved in setting up a not for profit group, London Community Herbalists, whose mission was to make herbal medicine accessible within their community. The group eventually became an Industrial and Provident Society. This was the platform from which the school was able to seek external funding.

With parents, governors and school staff working together, Harringay Primary was able to access over £40,000 of funding. They received grants from the Big Lottery, Awards for All, the Scarman Trust, The City Bridge Trust and the Community Fund. They were even able to convince the council to remove asbestos tiles safely and pay for the roof repairs! Harringay Council also helped with smaller items like child sized picnic tables and the water butt. Other local groups helped to fundraise for an automatic watering system to use during the holidays, reused decking for the roof surface, railings and mosaic tiles. Right from the beginning the school focussed their fundraising applications on a remit of sustainability and community inclusion. 'We dreamt of an international roof garden featuring plants that were food and medicine from around the world.'

'Our unique roof garden at North Harringay Primary school opened in June 2005. We have a tropical bed, a native English bed and vegetable beds. We have a wormery to make compost. We also plan to build an outdoor classroom. The older children were closely involved in building the garden. There are regular workshops for pupils and parents. All materials are from sustainable and/or recycled resources.'

Melissa Robertson
Community herbalist, parent and school gardening club leader



Because they created a bed system, they needed a lot of soil and lifted 40 tonnes of soil by crane and winch, supervised by a 'Dads in Hardhats' party. Involving the community has been crucial and early on grandparents were enlisted to help with the maintenance.

Maria Fidelis Upper School

This is an inner London, girls' secondary school. They set up their container rooftop garden, with the help of Global Generation, a charity 'dedicated to giving young people opportunities to play a part in creating a sustainable future'. The food growing edible roof was designed as part of the first land-based skills BTEC programme based on green roof and urban food production. The rooftop vegetable garden was installed with volunteers in November 2008. They were awarded some funding from Capital Growth.

The girls on the course wove their own containers from willow and then lined them with heavy-duty black plastic. The garden is at the top of a very tall Victorian school building so they started out small and actually carried all the compost/soil mix up by themselves!

The roof has a water butt and also an outdoor tap. The girls have been most successful growing herbs and rhubarb. The food they grew went into school lunches and some of it was sold to a local restaurant.



'The girls are much more involved with their learning; they are quicker to engage in discussions, they are focused on deadlines and also enjoy working out in the cold. They have had exposure to the local community, which has enabled them to improve their communication, presentation and interpersonal skills. They are also more aware of the environment and climate change, for many of our girls this can seem very abstract and little to do with them.'

Ursula Norbert

Reading International Solidarity Centre (RISC)

This is the most mature roof garden featured, established in 2001. It is unique, in that it is a temperate forest garden on a roof. It was designed as an educational tool, using Permaculture principles. There is a wide selection of mature, fruit bearing trees, including a large cherry tree, growing successfully in beds with no more than 30-45cm of compost. There is also a wonderful selection of fruit bushes, vines, herbs, vegetables, edible flowers and more unusual food plants from around the world, with excellent interpretation and labelling.

The RISC roof garden was funded partly by lottery funds and partly by the European Fund for Global Education. Working in partnership with other organisations was cited as a key factor in being awarded funding.

Sustainable features such as locally sourced materials are key, including oak, willow and coppiced hazel that have been woven into hurdles to edge the beds and used to make an obelisk for climbing plants. Another key is the measures taken to harvest and conserve water. The RISC roof garden collects rainwater in a 2000 litre container and this is pumped through a drip irrigation system at night (to reduce evaporation), using renewable energy. They also mulch heavily with woodchip to keep moisture in.



Food from the Sky

Food from the Sky is a world first – A pioneering Permaculture food growing and educational initiative on the rooftop of Thornton's Budgens supermarket.

All the crops are grown in recycled containers donated by the local council. The 10 tonnes of compost needed to fill them came from local municipal compost and was lifted onto the roof by a large rented crane.

Food from the Sky is registered as a 'company limited by guarantee not for profit'. The supermarket has given them use of the roof free, as part of their commitment to corporate social responsibility. Other funding has come from holding a high media profile 'Feast from the Sky' and from Capital Growth.

Every week, dozens of bags of fresh organic salad, edible flowers and heritage seed varieties of vegetable join exotic crops grown by supermarket employees to be bagged up and sold 10 metres below – truly local food with a difference! What an example and inspiration for any school that would like to use their 'edible' roof garden to teach business and enterprise skills for the future.



'Food from the Sky is about inspiring and growing a healthy and sustainable relationship with food in cities and with our supermarkets. We are doing this through food growing on roofs and running educational programmes for individuals, schools, supermarket's team members and organisations.'

Azul Thomè,
Co-creator Food from the Sky

8 Useful contacts



This section contains information, contacts and websites to help you realise your dream of a productive organic food growing garden on your school roof. These contacts are for reference only. Garden Organic is not responsible for the content of external websites.

Name of organisation	Type of resource
FindanEngineer.com Tel: +44 (0)20 7235 4535 www.findanengineer.com	Find an Engineer is a subsidiary of the Institution of Structural Engineers. This is a national site that will help you find a structural engineer that specialises in roofs, in your area.
Sustain www.sustainweb.org/cityharvest/edible_roof_gardens/	Sustain has been researching inspiring examples of edible (and other) roof gardens. This is such a fantastic summary of inspiring examples of edible roof gardens from around the UK and internationally, plus very useful contacts and links to other projects and publications, including many RISC publications.
Reading International Solidarity Centre (RISC) www.risc.org.uk/gardens/ Tel: (0118) 9586 692	Mature (10 year old) edible forest garden on a roof of a conference centre. Plus very good resources for schools and links to other projects.
Environment Agency www.environment-agency.gov.uk/business/sectors/91967.aspx www.environment-agency.gov.uk/business/sectors/92000.aspx	The Environment Agency's green roof toolkit plus contacts for other organisations working with roof gardens.
The Green Roof Directory http://greenroofdirectory.com	A comprehensive online directory of green roof related businesses and resources in a direct, easy to follow format. Includes architects and designers with experience in roof gardens.
Global Generation - London www.globalgeneration.org.uk	Jane Riddiford is the expert in setting up a roof garden.
Guide to Setting Up Your Own Edible Rooftop Garden http://rooftopgardens.ca/files/howto_EN_FINAL_lowres.pdf	This comprehensive booklet published in Montreal is packed with practical information, diagrams and instructions for making self-watering containers, a rainwater collection system, a seedling table with water reservoir, etc.
Living Roofs http://livingroofs.org/	The number one green roof website in the UK. Includes the very good, downloadable DIY Guide to Green and Living Roofs.

Name of organisation	Type of resource
Wendy Allen Designs Ltd Tel: 07970674615 www.wendyallendesigns.co.uk	Expert in green roofs. Won the 'Best Sustainable Design' award at Hampton Court 2009.
The Blackdown Green Roofs Consultancy Company Tel: 01460234582 www.blackdown.co.uk	Will translate children's designs into green roof design.
River of Flowers www.riverofflowers.org	A social enterprise working to preserve wildflowers in the challenging city environment. They have a database of native plants that can cope with hot, dry conditions.
Dr Nigel Dunnett www.nigeldunnett.info	Urban horticulturist and Director of the Green Roof Centre, University of Sheffield.
D & V Fuels www.dvfuels.co.uk	Suppliers of a large range of re-used containers suitable for water harvesting.
Porous pipe www.porouspipe.co.uk	Made from recycled car tyres, porous pipe can be used in a low cost irrigation system using harvested rainwater.
National Community Wood Recycling Project (NCWRP) 01273 20 30 40 www.communitywoodrecycling.org.uk	They can link you to local projects in your area selling recycled wood.
The Edible Balcony: Growing fresh produce in the heart of the city by Alex Mitchell	This book mixes inspirational ideas with practical advice on how to achieve flourishing outdoor areas however many floors up you maybe and however small your space. An essential guide for both beginner and experienced gardeners alike.
The Edible Container Garden: fresh food from tiny spaces by Michael Guerra (Gaia Books 2005)	Highly recommended permaculture approach to container gardening with specific recommendations for roofs.
Richard Jackson, structural engineer www.richardjacksonplc.co.uk	Covers the London area and recommended by Global Generation.

Garden Organic is the UK's leading organic growing charity, and is dedicated to researching and promoting organic gardening, farming and food. We are driven by an enduring passion and belief, founded on over 50 years of research and practice, that organic methods provide a healthy, sustainable life for us all.

Garden Organic Ryton, Coventry, Warwickshire CV8 3LG

Tel: 024 7630 3517 Fax: 024 7663 9229 Email: enquiry@gardenorganic.org.uk

www.gardenorganic.org.uk

Registered charity no 298104 Garden Organic is the working name of the Henry Doubleday Research Association.

The Food for Life Partnership is a network of schools and communities across England committed to transforming food culture. The Partnership is led by the Soil Association with the Focus on Food Campaign, Garden Organic and the Health Education Trust. Together we work to revolutionise school meals, reconnect young people with where their food comes from and inspire families to cook and grow food.



food for life PARTNERSHIP

LOTTERY FUNDED | **BIG LOTTERY FUND** | **Soil Association** | **The Focus on Food Campaign** | **HEALTH EDUCATION TRUST** | **garden organic**

food for life PARTNERSHIP
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