# Compost

## School special

## Junkmail's Guide to Composting in Schools: How to start a food waste composting system

**This Compost Special is designed to help all the schools in Devon that would like to run, or are already running an initiative connected with composting and food growing. If you are involved with your local school and they are not yet composting perhaps you could take this guide to a staff member you know and suggest they have a look at it. It is also available as a PDF on the website address below: www.dccn.org.uk**

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# Exciting times!

Devon is leading the way with the highest recycling and composting rates in England and is now pioneering schools' food waste composting.
In Devon, there is a wealth of support for schools. Devon County Council, in partnership with the District, Borough and Unitary Councils, offers the 'Cutting your wasteline' School Grant, which can be used to purchase composting and recycling equipment. For further information, email recycle@devon.gov.uk . Schools can have free waste audits and workshops from a team of Waste Educators and technical and practical advice from Devon Community Composting Network. (See contacts page)

School gardens used to be an integral part of school life but then sadly they were seen as less relevant to the modern curriculum and many were abandoned. Now they are coming back as part of a much-needed and more joined up agenda involving growing food, cooking healthy meals, procuring locally grown food and teaching children about where their food comes from and how it reaches their plate. Schools are also investigating reducing energy consumption, and reducing their waste overall and composting is a natural part of this commitment.

The government's fruit scheme, which enables many primary school children to eat fresh fruit every day, has meant that many schools now have fruit peelings and cores to dispose of, or compost.

Traditionally this fruit waste has been put into a plastic Dalek composter. These are fine for a household situation, but they are rarely up to the task of composting school waste efficiently. Experiences of using Daleks in schools have shown that they are quickly filled up and then overwhelmed with dense, oozing, sticky fruit waste, which attracts fruit flies. Children and adults are left with negative experiences of the composting process, and opportunities for using composting as a teaching resource are missed.

However, the good news is that by using the RIGHT composting system all the school's food waste, both raw and cooked, can easily be converted into compost for the school gardens. Pupils can be actively involved, learning about scientific processes as they take practical action to reduce their school's waste.

If you are a parent, governor or teacher, who wants to start a composting system or improve your current system, then this guide will help you get started.



# Why compost at school?

**Food waste is a major component of a typical school's bins, and in most cases this valuable resource is sent to landfill.**

**This booklet will tell you how to compost all of your school's food waste, both cooked and raw. Cooked food composting has been tried and tested by many schools across Devon, resulting in the following benefits:**

## Reduce your school's environmental impact

Composting food waste cuts down on the amount of waste that vehicles collect and take to landfill sites, thus reducing vehicle exhaust emissions (air pollution). Landfill sites are filling up fast and all the compostable waste that goes there rots which produces methane and other harmful greenhouse gases. Instead, food waste should be treated as a resource that can be made into compost your school could use.

## Save money – stop paying to have food waste taken away for disposal

Schools pay a significant amount of money to send their waste to landfill and much of this 'rubbish' could be

reused, recycled or composted. Reducing landfill waste will save your school money by cutting the number of bins you need, or reducing the frequency of their collection. For example, by composting all its food waste, as well as working hard to reduce waste throughout the school, Bradley Barton Primary School, with 266 pupils, have reduced their waste so much they have stopped using two of their landfill bins - one 1100 litre wheelie bin, costing £270 a year to empty and one 660 litre bin which cost £230 a year – making a yearly saving of £500.

### Save money - create a valuable resource – compost!

Making your own compost will save your school money as you won't need to buy it in.

### Bring the curriculum to life – use your school grounds as a learning resource

Teachers know that many children's personality changes the moment they go outdoors. Some of us learn better outside and school gardens are a fantastic, often underused resource for learning. The curriculum links section later on shows how well composting can be linked into many parts of the curriculum both inside the classroom and outside.

### Give pupils a sense of ownership and responsibility

With appropriate adult supervision, pupils can take on much of the day to day responsibility for composting tasks - collecting up caddies of food waste, feeding the composter and of course using the compost to grow more fruit and vegetables. Many schools set up teams of pupils to lead their composting work, often with a mix of ages so that older pupils can pass on their expertise to their younger composting colleagues. The practical tasks involved in composting are enjoyed by all children, whether or not they are high achievers in the classroom.

### Support your Healthy Schools work

By seeing fruit and vegetable waste recycled into new compost and used to grow more healthy food, pupils will develop a positive attitude to healthy food – hopefully this will be taken through to adult life.



# Before you start

# Legislation

In order to comply with government legislation, the food waste composted at your school must be created on the school site. It must be composted on the school site and the finished product must be used within your school grounds. Only by composting food waste 'in situ' are you exempt from the legislation.

To clarify: Food can be brought to eat at the school (e.g. packed lunches) and any leftovers can be composted, however 'food waste' cannot be brought in from home to be composted at the school. The resulting compost cannot be sold / given to anyone to use off site. Therefore, a school considering cooked food composting must ensure there are adequate grounds or an on-site garden in which to use the compost.

# Staff time

Cooked food composting is straight forward and does not involve any specialised skills. However, composting tasks need to be carried out daily, so your school will need to give time to a designated adult compost operator for this.

In a small school, if some tasks are delegated to pupils (e.g., collecting up caddies from around the school) the compost operator will need about 10-15 minutes per day. Giving the pupils responsibility is great, but they will need to be adequately supervised when using the composter itself. In larger schools, the compost operator will need up to 25 minutes daily.

Schools in Devon are composting successfully with compost operators who are teachers, teaching assistants, caretakers, school cooks and even a few Head Teachers! Ideally the composting responsibilities should be incorporated into the compost operator's job description and plans should be made for an alternative person to carry out composting tasks when they are not at school. If your compost operator leaves, it is important to consider who else will take on the composting tasks. It is essential to ensure that everybody using the equipment has had proper training, including new adults / children who are taking over the responsibility or helping out.

# Waste audit

Before you start composting you need to know the types and amounts of waste your school is producing. This information can be gained by doing a waste audit, where the pupils and adults sort through the previous days school waste and separate it out into its different categories (all the paper in one pile, all the card etc). These piles are then weighed and the data recorded – perfect for data handling aspects of numeracy and ICT. Devon schools can book a free waste audit with experienced Waste Educators (see resources section.)



If you are confident that your waste audit results are typical of your daily food waste production they can be used to decide which composting system would be most appropriate for your school's needs. Multiply the weight of food waste found in your waste audit by five to find out how much compostable waste you are generating in a week.

However, a more accurate way to decide the best composting equipment for your school is to do a detailed investigation into how much, and what types of, food waste you are generating by weighing all your food waste each day for a week.

**Remember to include:**

- **fruit from the fruit scheme and children's snacks**
- **vegetable peelings etc from the kitchens**
- **un-served canteen food**
- **plate scrapings**
- **packed lunch food waste – if your school has not adopted a take-home policy for this.**

This will give you a more accurate figure that incorporates fluctuations from day to day that are not captured using a one-off waste audit (e.g., due to menu variations, changes in the number of pupils having school meals.) You don't want to spend excessive money on a composter that is too large and also you wouldn't want equipment that is struggling with more food waste than was expected.

When your pupils see the amount of waste the school produces, it can spark off a desire to implement waste reduction schemes within the school. With guidance they can think about ways to 'reduce' the amount of waste the school is producing; how it can be 'reused' and finally set up or improve the existing 'recycling' collections (see your local council in contacts section) Go to recycledevon.org/kidszone for ideas on how to reduce, reuse and recycle your school's waste.

The good news is that, with the appropriate equipment, all this food waste can be converted into useful compost. Your school gardens and grounds will also produce compostable material, such as plants and grass cuttings. However, if you are setting up composting for cooked food waste you should continue to use separate compost bins and leaf-mould containers (depending on the size of school and grounds). Food waste composting equipment is expensive and it would be a shame to fill it up with leaves, grass and hedge cuttings and then not have space for the food.

## Choosing the right composting equipment

Before you choose composting equipment a brief explanation of the composting process is useful. Composting comes in two stages – an 'initial' stage and a 'maturation' stage. Each of these stages requires its own piece of equipment.

## Initial stage

This stage is rapid and eventful. If you have added the right mix of materials, then heat will be generated and steam will be visible. Initial stage composters are designed to allow you to tumble or turn the mix every day – this increases airflow which stimulates heat production. Temperatures inside the initial stage composter should reach 50-60°C which is enough to rapidly kill off potentially dangerous pathogens and fly larvae.

It is vital that wood pellets, sawdust or woodchips are added at the same time as the fresh and cooked food waste; more on this later. After the food waste has been through the initial stage equipment, it still needs time 'to mature' before it can be used on the land – this is where the next stage begins.

## Maturation stage

Food from the initial stage composters is not ready to be used on the land and so should be transferred to another composter for the maturation stage.

This stage is slower, cooler and will generally take 9 - 12 months or even longer.



**Specifications of the different systems**

# Turning systems

These composters are designed to compost food not garden waste, however freshly cut grass is probably the best compost activator around and the odd bucketful will raise the temperature quickly and so can be used to rectify compost that will not heat up! Be careful not to overload it with grass though, as this will be counterproductive.

## Ridan series

**(Initial stage composter)**


| | |
|---|---|
| Description | Insulated turning compost bin |
| Size | Three different sizes |
| Dimensions | Mini Ridan = L2.1m, H1.5m and D1m<br>Standard Ridan = L2.2m, H1.6m and D1m<br>Large Ridan = L2.4m, H1.7m and D1m |
| Amount of food waste per week | Mini Ridan = up to 40kg<br>Standard Ridan = up to 75kg<br>Large Ridan = up to 200kg |
| Delivery format | Pre assembled |
| Locality | Designed and manufactured on Exmoor, Devon |
| Number of chambers | 1 – it has a rigid plastic pipe running through the whole length with paddles which turn and ease the food waste through the system towards the outlet pipe at the far end. |
| How they work | - Fill at one end and turn handle, each time the handle is turned partially composted food waste that has reached the end falls out. This is then emptied into the maturation bin.<br>- Never fill the Ridan more than three quarters full and always replace the lid properly as this affects the airflow inside |

| | |
|---|---|
| Number of turns daily - ideally | 15-20 – don't worry about the weekends |
| Wood source needed? | Yes! Every time food waste is inputted add a wood source |
| Additional information | - The Ridan differs from the two systems below in that materials are harvested every time fresh materials are added and the handle is turned.<br>- 6 buckets of food waste in = 1 bucket of compost out |
| Website | www.ridan.co.uk |

*"I am amazed at how well the Ridan works, how easy it is to use and how quickly it composts, as a result we now only have one bin collected every week instead of two and we have plenty of rich compost for the garden".*
**Wayne Hack, the Site Manager, Stowford Primary School**

# Jora 270

## (Initial stage composter)

Jora 270 on long legs



| | |
|---|---|
| Description | Tumbling compost bin with insulated lining |
| Size | 270 Litres |
| Dimensions | L116 x H88.6 x D88.6 cm overall with stand |
| Amount of food waste per week | Up to 15kg |
| Delivery format | Flat packed – ideally needs two people to assemble |
| Locality | Designed in Sweden and manufactured in China |
| Number of chambers | 2 |
| How they work | Fill one chamber until three quarters full, then start to fill the second chamber. Turn each day. When the second chamber is three quarters full, empty the first into the maturation system and start to refill |
| Number of turns daily - ideally | 6ish – don't worry about the weekends |
| Wood source needed? | Yes! Every time food waste is inputted add a wood source |
| Additional information | - The Jora comes in two leg lengths. The shorter legs make it easier for the children to see inside, however, the longer leg option means it stands high enough for the contents to be emptied into a wheelbarrow.<br>- The website says they can be mounted on a wall, however due to health and safety issues, we would not advise this. |
| Website | www.smartsoil.co.uk/jk270.htm |

*"If schools realised they can get all their composting and recycling managed really effectively by re-deploying a committed mealtime assistant, I'm sure a lot more of them would be doing it, especially because schools need to take an active role in reducing the costs of school meals."*
**Gary Read, Head Teacher, Landscore Primary School, Crediton**

| **ScotSpin –**<br>**(Initial stage composter)** |  |
|---|---|
| Description | Insulated tumbling compost bin |
| Size | 400 Litres |
| Dimensions | L116 x H100 x D88.6 cm |
| Amount of food waste per week | Up to 40kg |
| Delivery format | Pre assembled |
| Locality | Designed in Devon, manufactured in Yorkshire |
| Number of chambers | 1 |
| How they work | Fill until three quarters full, turning each day. When full, empty contents into a maturation system. |
| Number of turns daily - ideally | 6ish – don't worry about the weekends |
| Wood source needed? | Yes! Every time food waste is inputted add a wood source |
| Additional information | - It stands high enough for the contents to be emptied into a wheelbarrow.<br>- Moving hinges need to be kept greased to stop corrosion. |
| Website | www.dccn.org.uk |



# Maturation Stage

When food has been through the initial stage composter, it has only partially degraded and needs to be transferred into a maturation stage composter to allow time for it to mature into compost.

| **Scotty's HotBox**<br>**(Maturation stage composter)** |  |
|---|---|
| Description | Insulated maturation bin made from recycled plastic |
| Size | 1000 litres |
| Dimension | 1m x 1m x 1m |
| Delivery format | Pre assembled or flat packed |
| Locality | Designed in Devon, manufactured in Yorkshire |
| Number of chambers | 1 |
| How they work | - The HotBox has a fitted base and a fitted lid.<br>- Rake food waste flat after it has been added.<br>- The front planks slide up for easy access to the compost. |
| Number of turns daily - ideally | Does not need turning. Empty when full or if you have two or more on site, leave until all are full before emptying the first. |
| Wood source needed? | No |
| Additional information | - Monitor moisture levels regularly<br>- A full HotBox holds approx 625kg of compost<br>- To reduce the likelihood that rats can get in, place the HotBox on a solid flat surface. |
| Website | www.dccn.org.uk |

## Maturation Stage

When you transfer the contents from your initial stage composter into the maturation bin there is very little that you need to do other than regularly checking the moisture levels. If you can squeeze a couple of drops of water out of a handful of the compost, then it is fine. When opening the lid, stand back and observe – watch out for any rising spores which are a sign that it is too dry. Dry, musty compost releases airborne particles, including some mould and fungal spores, which can be dangerous to inhale, especially for susceptible people such as those with respiratory issues. If the compost in your HotBox becomes too dry, saturate it until water comes out the bottom. Preferably use rainwater through a sprinkler or rose on a watering can and leave for a few days. Or you could simply take the lid off when it is raining! Adding a layer of freshly cut grass will also increase moisture levels, as well as boosting the composting process.

## Worms

The HotBox is really a big wormery! Compost or manure worms (the striped 'tiger worms' are the most obvious) naturally find and colonise compost heaps during the maturation stage, they squeeze in somehow. The worms transform the contents into dark humus over several months, alongside fungi that break down the tougher woody materials. You may also see masses of small white worms known as pot worms. These are harmless but can indicate that your compost is getting a bit wet, acid and airless. See trouble shooting guide if this is the case.

When emptying a HotBox, scoop off the top layers of compost and put this and any worms you find in the lower section to one side, or into another HotBox if you have more than one. The finished compost in the bottom section can be used immediately on the gardens or bagged up until needed. It is strongly advised that you only apply this compost to the surface of the soil. If you dig it in you run the risk of 'nitrogen robbery'.



This is where soil micro-organisms use nitrogen from the soil, which would be better used to grow plants, to break down woody material. (See 'Using your compost' section)

If you have two or more HotBoxes, when the first is full, start filling the second and so on. When all of them are full, empty the first to be filled and the whole bin should be ready.

HotBoxes are designed to deal with food waste but they work very well with garden waste too. However, you will quickly run out of space for your food waste if you fill it up with garden waste. Therefore, we recommend that you have a separate composting system in which to compost garden waste.

## How many maturation boxes will I need?

Obviously larger schools with larger amounts of waste being composted will need more maturation capacity. It makes sense to buy at least 2 maturation bins, that way when you have filled one you can leave it to continue to compost whilst filling another.
Other food waste composters are available – however this guide has been written based on the equipment that has been tried and tested successfully in Devon schools.

*"We are completely filling one Hotbox (750 Litres) each term. This term we have started using the compost that has matured for the last 6 months, we are thrilled with quality of the compost we have made!"*
**Stoke Hill Infant School**

# Other equipment

As well as your initial stage composter and maturation bin, there are other pieces of equipment you will need to ensure your composting runs smoothly:

- **Food caddies / buckets:** you will need collection containers for your food waste situated around the school wherever food waste is generated. These need to be emptied daily, so do not need to be very large. Most schools find that a couple of 23 litre food waste caddies are sufficient for the school dining hall, while classrooms need a 7 litre caddy. Don't forget a caddy for the staffroom! Choose easy to clean containers with lids (to keep out flies if left outside) and handles. Lining them with newspaper will reduce the amount of cleaning needed, and the newspaper can go into the composter. It is helpful to have them clearly labelled (with words and an image for the younger children) so that adults and pupils know what should go into them.

- **Probe thermometer:** healthy composting needs warmth, so you will need to monitor the temperature of your initial stage composter on a regular basis. A probe thermometer costs about £10 and is easy to use by adults and pupils (under supervision.) Like all thermometers, they need to be handled and stored with care to avoid damage. A cardboard tube, such as the ones used to store posters, will protect your thermometer and prolong its life.

- **Gloves:** when you do your school compost risk assessment (contact recycle@devon.gov.uk for a template that you can amend for your schools needs) you may decide that your compost operator(s) should wear gloves. Strong waterproof gardening gloves can be sourced from garden centres or online.



- **Antibacterial soap:** even if your compost operator(s) are wearing gloves, good hand-washing procedures are essential, so make sure you have a good supply of soap. Ensure that any pupils helping with any aspect of the composting process get into the habit of washing their hands afterwards.

- **Storage bin:** your wood chips / pellets need to be kept dry and located near / next to your initial stage composter for daily inputting. A plastic bin with a well-fitting lid is ideal and can be sourced from a garden centre / DIY store for about £10. Alternatively you might be able to get an old wheelie bin from your local recycling centre (see resource section).

- **Scoop:** a simple scoop is useful for transferring wood chips or pellets into your initial stage composter. You can make one from a 2 litre plastic milk bottle, or buy one for about £5 from a wide variety of shops such as those selling dry pet / animal food.

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  **Wheelbarrow:** if you are using a tumbling composter such as a Jora or Scotspin you will find a wheelbarrow very useful when emptying your composter. A wheelbarrow is also essential if your HotBox is located any distance from the area where you will use your compost.

- **Bucket:** if you are using a Ridan composter you will need to place a bucket or similar container underneath the outlet pipe to collect the compost.

- **Spade:** a spade is very useful for emptying the compost out of your HotBox.

# MANTRA

Composting is a living process carried out by countless macro and micro organisms. To keep them happy and healthy follow the four point composting mantra:

**Food**
**Air**
**Water**
**Warmth**

## Food – balanced diet

The materials you add to any compost system become food for the organisms that create the compost. Getting the right mix of these materials provides air, water and nutrients which are vital for the wellbeing of all the life in the system.

**A healthy compost system needs a balanced diet of both:**

**Nitrogen** – green, wet items such as vegetable peelings, fruit waste, grass cuttings, weeds (but avoid tough roots) and cooked food. These add moisture and are an easy source of food for compost organisms to grow and reproduce. When adding cooked food, aim to include it with equal amounts of raw 'green' materials as too much cooked food can lead to a cold and lifeless compost.
and
**Carbon** – brown, dry items such as wood chip, wood pellets, dry plant stems and small twigs. These add structure, air gaps and are a longer lasting energy source for the compost organisms. Avoid adding large twigs and garden clippings to your food waste system as these will take longer to break down than other materials.



## Air

Most important compost organisms need oxygen to thrive. Air gaps are provided by the woody material (wood chip or wood pellets) that are mixed with the food waste.

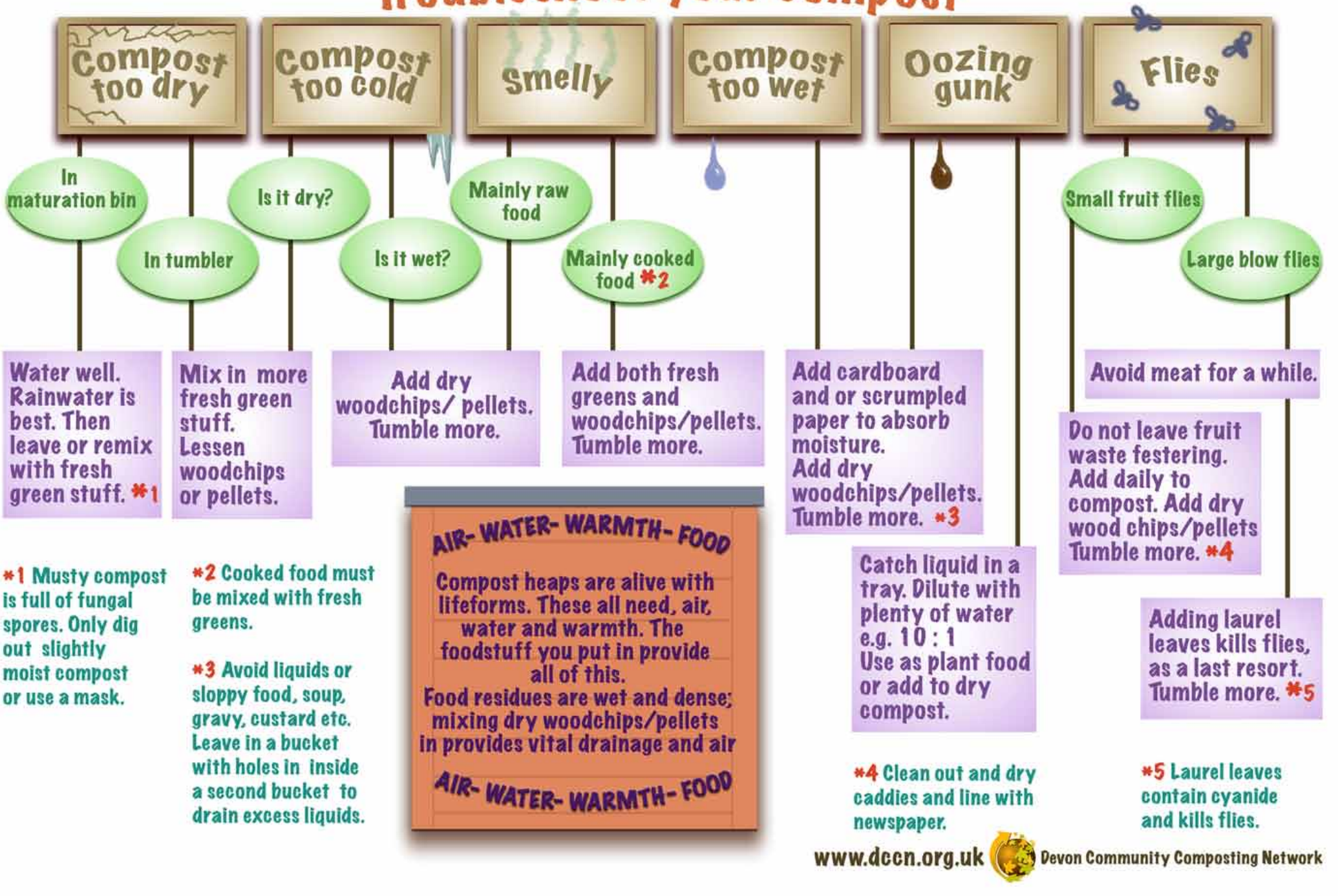
## Water

Compost organisms also need water. Raw fruit and vegetables are mostly water so it is rare that you need to add more to the initial tumbling stage of composting. However, the maturation stage composter (e.g. HotBox) can easily dry out. If this happens then add water, preferably rainwater – and leave the lid off in a rain shower until the compost is saturated.

## Warmth

Compost organisms generate heat, but they also need warmth to get going. The composters described in this booklet e.g. Jora, Scotspin, Ridan and HotBox are all insulated to maintain warmth.

# Troubleshoot your compost




*1 Musty compost is full of fungal spores. Only dig out slightly moist compost or use a mask.

*2 Cooked food must be mixed with fresh greens.

*3 Avoid liquids or sloppy food, soup, gravy, custard etc. Leave in a bucket with holes in inside a second bucket to drain excess liquids.

*4 Clean out and dry caddies and line with newspaper.

*5 Laurel leaves contain cyanide and kills flies.

www.dccn.org.uk Devon Community Composting Network

# Carbon - the magic ingredient!

Wood chips, wood pellets, sawdust or wood shavings, are vital for effective composting. They are carbon-rich and add structure to the composting process, which allows air and liquid flow. To work their magic, they must be kept dry, and added to the initial stage composter in the right proportions.

**Either**

**1 bucket of food waste : 1 bucket of wood chips**

**Or**

**6 buckets of food waste : 1 bucket of wood pellets**

## Wood pellets or wood chips?

The main advantage of wood chips is that they can sometimes be sourced free e.g., from local tree surgeons. However keeping large volumes of wood chip dry can be a challenge, and many schools find wood pellets, purchased in convenient bags, an easier option, as is demonstrated by the quote below from Okehampton Primary School:

"I just thought that I would also let you know how pleased I am with using wood pellets instead of wood chip for my composting needs – it is so much easier, less bulky, quicker and still makes lovely compost – a real winner. This could certainly be the answer to your "oh where do we get the wood chip, where do we store the wood chip?" etc type questions. Also it is less problematic to deliver wood pellets to schools than wood chip due to its smaller bulk. "

When considering the financial implications of buying wood pellets, think about getting together with other local composting schools to put in a bulk order – economies of scale. Also remember that your school may well save money on rubbish collections once your composting is firmly established. However, if you want to find a free carbon source you could consider some of the following options:

**Wood chip:** ask parents / governors / staff if they have any friends or contacts that can supply either fresh or dry woodchip – or contact local tree surgeons who may be very happy to support your school's composting. It is important to store your woodchip where it will not get wet.

**Wood shavings:** uncontaminated wood shavings are fine on their own or in combination with other wood sources, but make sure they do not come from tanalised wood or MDF.

**Sawdust:** uncontaminated (no MDF, tanalised wood etc) sawdust will work well in conjunction with wood chip, and may be available as a 'waste' material from carpenters. It is advisable to wear a face mask when using it as the dust could be a health and safety issue.

## A final thought about wood chip

The downside of using large, structural materials to aid the composting process is that when you take your finished compost out of your HotBox to use in your school grounds, some large bits will probably still be present, as they decompose very slowly. If you dig them into your beds the micro-organisms will continue to break them down, using nitrogen from the soil in the process. This is called 'nitrogen robbery.' Nitrogen is vital for plants to grow, so to avoid this, it is essential to leave any woody bits on the surface of the soil. You can either adopt a 'no dig' method or sieve out the large bits of wood before using your compost.

## Sieving

If you have large chunks of wood chip you could also consider seving these out. Sometimes this can be done before transferring material into a maturation bin, or before you put the compost onto the land. The wood chip can be reused and when returned back into a compost system it will add valuable microbes. However, sieving can be laborious with a small sieve; instead it could be a task that the children can do. Ask them to hold either end of a length of chicken wire so that it

forms a U shape, a foot or so from the ground. One of them holds the chicken wire while the other puts a forkful of compost at a time on to it. Then rock the wire up and down, rolling the compost through. The larger pieces will be left on top of the wire can be used again.
(N.B. doing it like this enables you to keep your back straight thus not straining it unduly)

## Paper and cardboard as a carbon source

Waste paper and cardboard are abundant in schools and you might think you can use them as a carbon source in your composter. However, they will quickly ball up inside the tumbling system which will not help with air flow. Therefore we advise that you do not put paper or cardboard into the initial stage tumbling composting system.

## Starting a new compost system

On day 1, add the following to your initial stage composter:

- a bucket of dry woodchip / wood pellets (a mix of both is fine)
- a bucket of fresh 'greens' such as fruit and vegetable peelings.
- a bucket of composting material from an active onsite compost heap, if at all possible, as this will kick start the microbial populations

If you have a tumbling system, tumble well to ensure the materials are thoroughly mixed and plenty of air is incorporated. If you are using a Ridan, turn the handle 15-20 times.

On the following days, add fresh food waste and wood chips / pellets in the right proportions, and tumble / mix well. Always add your food waste daily - do not leave it lying around in buckets to go smelly!

Start your composting with just raw food (fresh peelings and fruit waste), with the all-important wood source, and take the temperature of the mix each day. When it reaches 50°C, start to add cooked food: 1 day the first week, 2 days the second week, 3 days the third week etc. Continue to monitor the temperature – if it drops, have a day or two without adding cooked food waste. Over time, aim for roughly equal volumes of cooked and raw food waste as this mix will provide the best conditions for composting.

If you do not have a production kitchen at your school (where meals are cooked, not just heated up) you may find you have a shortage of fresh peelings to balance your cooked food. In this situation, add small amounts of grass or other leafy garden waste to give your initial stage composter a boost. (See the case study from West and East Putford for more information.)

During the start up phase, for the first few weeks, it's best to make sure that the air supply, in the form of wood chip / wood pellets is more than the advised amounts rather than less. If you start a system without enough structure, it can easily go airless, start to smell and then it's difficult to get it back on track. Keep adding a balance of wet / green materials (e.g. fresh fruit and vegetable peelings) with dry / brown structural material (e.g. wood chip or wood pellets)

Avoid putting lots of very wet materials such as gravy, custard, milk or soup in, as this will block up all the air spaces and can make the compost smelly. Chopping up whole vegetables and fruit with a spade in a bucket is advisable to increase the food surface area and so help the microbes to do their job.

# Top Tips for successful cooked food waste composting

1. Add fresh materials daily to your initial stage composter – do not leave waste hanging around in buckets/caddies getting smelly and attracting flies.

2. Tumble and mix every time you add fresh materials.

3. Start using wood pellets until you are confident in using your composter, then you could consider changing to wood chip which you might be able to source for free. At first, err on the side of too many rather than too few pellets.

4. Ask if any parents or governors have a tree surgery business and could supply and deliver DRY woodchips to you on a regular basis.

5. Store your wood source in an old plastic dalek composter or dustbin to keep it dry. You may be able to get one of these from your local recycling centre. Place your storage container next to your initial stage composter for easy access.

6. Line buckets / caddies with newspaper to soak up liquids and make cleaning them easier. Cardboard and paper should not be added to the initial stage composter in large quantities as they tend to absorb too much moisture, accumulate into balls and fail to offer the structure which allows vital air flow.

7. Always make sure you have the right mix of wet / green and dry / brown materials – fresh raw and cooked food to dry woodchip / wood pellets and mix well together

8. Wherever possible chop up whole fruit and vegetables or large items before putting them into the initial stage composter.

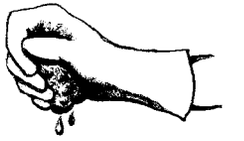
9. Avoid adding lots of wet, sloppy materials like soup, gravy or custard etc

10. Fill your initial stage composter up to three quarters full, before empting it. Avoid overfilling as you need to leave space for air flow and for tumbling.

11. Observe what is going on and take steps to rectify any problems as soon as possible. If things have gone wrong it's best to empty the initial stage composter into the maturation bin and start again. However, if things have gone 'drastically' wrong, then, you could, instead, empty the initial stage composter into your landfill bin and get some advice (see contacts section) and then start again.

12. It's rare for the compost to be too dry in the initial stage composters but if it does seem dry, it's better to add fresh greens such as grass cuttings, fruit or vegetable peelings than water.

13. Check the moisture levels in your HotBox regularly. When adding new materials they should be moist, a squeeze



test should yield a few drops of water, you may well want to wear gloves to do this. When opening the lid, stand back and observe – watch out for any rising mould spores which are a sign that it is too dry. If this happens, soak the contents in water and leave undisturbed for several days.

# Making it happen within the school

**Support -** make sure you have the support of the whole school community, especially the Head Teacher / Governors / kitchen staff / Meal Time Assistants and Caretaker. Without this support, you will struggle to compost effectively.

**Food Waste Audit** - Schools should collect and weigh all their food waste for 5 days, this should be separated out into raw food (fruit and kitchen peelings) and cooked food (plate scrapings and left over servings). This not only gives you a baseline on which to compare when food waste reduction systems have been put in place, but also will inform you what type of composting system will be most appropriate for your school. Email recycle@devon.gov.uk to request an easy to complete spreadsheet for this, they will also be able to advise you on composting equipment after the weighing has been done.

**Communications** - talk to everyone involved at the school before you get the composting equipment to iron out any concerns before you start.

**Composter location** - the initial stage composter should be located reasonably near the kitchen and area where the food is eaten for ease of daily empting. The maturation system (e.g. HotBox) can either be next to this if you have room, or in the garden where the compost is to be used. Try to keep it away from windows, so that if it does start to smell then it won't affect anyone.

**Caddy location** - put caddies in all the areas where fruit and snacks are eaten. A large caddy, or two depending on the size of the school, should go into the kitchen for food preparations. A large open bucket or caddy should go into the area where food is eaten for plate scrapings (when you are ready to start composting this). You may also need collection caddies in the playgrounds. All buckets and caddies should be monitored to avoid contamination.

**Combat contamination** – clearly label all the food waste collection caddies so adults and pupils know what to put in them, using pictures and text to help younger children. You could consider involving pupils in designing the labels to increase their sense of ownership. Make sure all school adults know too so that they can guide the children.

**Team effort** – use pupils from your gardening / eco / green team, or perhaps start a special 'Little Rotters' group. They can collect the caddies and put them next to the composter for when you empty the food waste into it and turn it. The caddies then need to be cleaned and replaced in their locations ready for the next day. If the work is popular enough with the children, make a rota of responsible children involving all the year groups to increase the feeling of ownership of the composter throughout the school.

**Collecting and using data** – weigh the different types of food waste and wood pellets that you are inputting into the composter and take the temperatures inside and outside. These will enable you to learn what the composter needs to keep it running well. The records can also be used as part of the curriculum (see curriculum links section) and used as best practice for other schools. Please send these back to recycle@devon.gov.uk .

**Spread the word** - encourage your composting group to hold an assembly to tell the rest of the school about the great work you are doing. Let parents know by inviting them to the assembly, putting an article in the school newsletter and on the website.

Connect with a local gardening group / allotment users / keen gardener to talk to and work with the children.

Use the compost you have made to grow flowers, fruit and vegetables in the school grounds – thus completing the nutrient cycle. Even better for the children's learning would be to harvest, cook and eat the vegetables within the school day.

# Using your compost

After your compost has matured for 9 - 12 months it will be ready to use. Large chunks of woodchip can take years to break down and so it's best to use your finished compost on the surface and not dig it in. The worms in the soil will soon incorporate the finished compost and the harder bits will remain on the surface slowly breaking down.

## Using your compost to create new beds

Digging disrupts the delicate soil ecology and spades slice up and kill earth dwelling worms. With around 300 earthworms in the top layer of healthy soil, digging can do more harm than good. Of course if you have pernicious perennial weeds such as bindweed, couch grass, ground elder etc then you will probably have to do some digging, but if your ground has been neglected and is covered with grasses and weeds then the easiest way to prepare it is by 'lasagne mulching'. You can do this at any time of year but ideally not when the ground is really dry. Firstly scythe or mow off all the top growth vegetation. Remove any packing tape and plastic from cardboard sheets and lay the sheets over the area. Cover the sheets with newspapers especially

where they overlap and use a watering can to mould the newspaper to the cardboard. If you had a lot of top growth you could spread this on top of the newspaper layer. You can add all kinds of bulky organic material in layers, for example, compost (it doesn't have to be fully mature for this job), leaf mould or manure. Try and put the most mature layers down first and the least on top. You can finish off with raw or partially rotted woodchip, straw, hay etc. This method will clear most weeds but not all. Some weeds are incredibly tenacious, however any that push through such as docks can often be pulled out of the loosened soil, whole and clearing away most of the weeds makes the remaining ones much easier to remove. Potatoes are a great crop to plant into this mulch in the spring because it's easy to harvest them and clear up any remaining weeds at the same time. If you make the beds later in the season you could plant pot grown squashes, or, if preparing in the autumn then you could sow broad beans in November. If the lasagne mulch has been down for some time then you can make holes through the layers (sorry worms) and plant directly into the soil beneath, e.g. fruit bushes and other perennial plants.

## Using your compost on already prepared beds

If you already have lovely well tended beds, then use your matured compost on the soil surface, or during the growing season apply around growing crops. After harvesting, clean up the beds, rake and apply a top dressing after sowing or planting out the next crop. Think of your compost as adding a dose of life giving beneficial micro-organisms, a little goes a long way so even if you only have enough for a thin covering, it is all nectar for the soil and will help boost the life in your soil. Always plan the next crop to go in and try not to leave the soil bare, a bare soil will lose its fertility and life.

## Using your compost as a potting medium

Your fully matured compost will form a great basis for a growing medium for plants in pots or tubs etc. Firstly you will need to sieve it (see p23) then you need to add sharp sand, available from garden centres, pearlite or vermiculite etc to introduce air gaps and improve drainage. Pure compost tends to be too sticky and holds water, so just as you had to add wood pellets or chippings to allow air and water through the active compost, now you need to add a mineral amendment to allow the same process in the finished compost. How much depends on the plants you are growing and how long they are going to be in the container. Sowing seeds in your own compost is trickier, however leafmould is good for this, you can mix leafmould with sharp sand and get a very nice seed mix. For more information see resource section.



# Case Studies...

Congratulations to all of these schools who can proudly say that they are 'zero food waste to landfill' as a result of composting all their food waste

School **Landscore Primary**

Learning Community..... **Crediton**

District..... **Mid Devon**

Number of pupils..... **308**

Equipment..... **Standard Ridan and three HotBoxes**

Amount composting..... **64kg/week**

Wood Source..... **Wood pellets**

Bin reduction costs..... **Through composting all their food waste, Landscore Primary has reduced their waste to landfill by one 1100 litre bin per fortnight, therefore saving the school £486 each year.**

Landscore started composting back in 2006 using the Rolypig. They then moved on to using 2 Jora 270s but as these did not have enough capacity, the Standard Ridan was purchased in May 2010.

This school has a very active 'Little Rotter' group who do the gardening, recycling and composting work. They recorded the weights of the cooked and raw food waste and the amount of pellets they use. This information has inspired them to try to reduce the amount of cooked food waste they produce. The children are going to investigate what food is commonly left in the plate scrapings and whether portions are too big for some pupils, and will communicate their findings back to the kitchen staff. The children will also look at the food waste from packed lunches and the amount, and type, of packaging used. Another idea is to look at the whole food procurement issue and link up with local growers and farmers.

"If schools realised they can get all their composting and recycling managed really effectively by re-deploying a committed mealtime assistant, I'm sure a lot more of them would be doing it, especially because schools need to take an active role in reducing the schools costs." Gary Read, Head Teacher.

Landscore Primary is a beacon school for composting cooked food waste and is willing to show interested teachers around its facilities.

# South Molton College

School

Learning Community.....**South Molton**

District.....**North Devon**

Number of pupils.....**600**

Equipment.....**Standard Ridan and three Hotboxes**

Amount composting.....**56kg/week**

Wood Source.....**Wood shavings and sawdust from DT department**

Bin reduction costs.....**South Molton Community College is a fantastic example of food waste reduction initiatives, resulting in less then half the amount of food waste expected for a secondary school of this size. All plate scrapings and kitchen waste goes into 1 x 23 litre caddy each day. As much food is consumed in the canteen at break time (when students can have beans on toast, bacon rolls etc) as is eaten at lunch time. All this work has resulted in them reducing their bins from 9 x 1100 litre bins collected weekly to 8 x 1100 litre bins, saving £410 per year.**

This reduction in food waste is mainly due to the Catering Manager:

- organising a 'canteen committee' consisting of students from each year group from the school council. They meet twice a year to feedback students comments about the food and canteen experience
- offering tasters of new meals before making a large amount
- being given at least 3 weeks notice of large absences (e.g. school trips) so she can reduce the amount of meals accordingly
- cooking very tasty, healthy meals

**Also**

- 15-20% of the students have packed lunches which they can eat in the canteen with their friends, making it a social experience
- in summer, meals can be taken to an outdoor eating area which has been designed and made by the students

Another initiative here is that the composter is fed with wood shavings and saw dust from the Design Technology department making it self sufficient in a wood source. This not only saves money from not needing to buy in a wood source, but also stops the college paying for it to be taken away. Win, win!



# Holsworthy Primary

School

Learning Community.....**Holsworthy**

District.....**Torridge**

Number of pupils.....**280**

Equipment.....**Large Ridan and two HotBoxes**

Amount composting.....**80kg/week**

Wood Source.....**A teacher's husband is a carpenter, and supplies the school with sacks of his 'waste' sawdust. This is supplemented with wood pellets**

Bin reduction costs.....**Before composting and waste reduction initiatives 2 x 1100 litre bins were collected weekly. Now, only 1 x 1100litre bin is collected weekly, saving £960 per year in collection costs. By using their own compost to develop their nature area, they also saved money from not needing to buy in compost.**

Holsworthy started composting by using plastic Daleks and an open bay wooden New Zealand box composter, but struggled with the amount of fruit waste they were producing. After a visit to Okehampton Primary by the pupil Eco Council (the 'Eco Friendlies') they successfully applied to the Schools Cutting your wasteline Grant to buy a Ridan.

The school's caretaker overseas the composting process, with support from the Eco Friendlies and pupils throughout the school. Y5/6 pupils are responsible for emptying and cleaning the food waste caddies from the staff room, cookery room and tuck shop; KS1 pupils go with a TA to empty their fruit waste into the composter; Y3 children take it in turns to clean out the guinea pigs' hutch and compost all the waste. The caretaker collects the larger bins from the playground and school kitchen.

Holsworthy used composting to help them achieve the prestigious Eco-Schools Green Flag award.

To find out more about the Eco-Schools work at Holsworthy Primary, and hear their amazing ECO song, www.holsworthy-primary.devon.sch.uk/eco/ecopage.htm

School

# Whipton Barton Junior

Learning Community.....**Exeter - Beacon**

District.....**Exeter**

Number of pupils.....**250**

Equipment.....**Big Hanna and three HotBoxes**

Amount composting.....**212kg/week – they cater for 4 other schools**

Wood Source.....**Wood pellets**

Bin reduction costs..... **As a result of composting food waste and other waste reduction measures they have reduced the number of 1100 litre landfill bins from three to two collected per week, saving £320 per year.**

*Big Hanna*

Two compost operators were appointed by the school; the premises manager – to oversee the day to day running of the equipment and a TA / leader of the Green Team – to involve the rest of the school in composting.

The operation of the Big Hanna has been a great success. The Premises Manager inputs the food waste daily. He quickly learnt to trust his own judgements to make adjustments to the wood pellet amounts inputted according to his own observations and the temperature of the food waste.

The Big Hanna has been fully integrated into the schools life and this has been publicised to the wider community. This includes:

- A Big Hanna opening ceremony with the Deputy Mayor and press present
- Further press coverage from the Express and Echo
- Overseeing the collection of food waste caddies by the pupil Green Team
- Creating a compost notice board for pupils, staff and parents
- Supporting the Green Team to deliver an assembly about composting to the rest of the school
- Ensuring that the school's gardening club has been actively involved in composting



- Train MTAs to help them understand the use of the composter and ensure the children do not put contaminants in the caddies
- Working with the science coordinator to plan composting sessions in the summer term which link in with the curriculum

School

# West and East Putford Primary

Learning Community.....**Holsworthy**

District.....**Torridge**

Number of pupils.....**10** (yes!)

Equipment.....**Jora 270 and a HotBox**

Amount composting.....**9kg/week**

Wood Source.....**Free Wood shavings given by member of local community**

Bin reduction costs.....**As the school is so small, any waste reduction measures implemented are not large enough to reduce the waste sufficiently to decrease the number of bin collections.**

Our advice is generally to have the same amounts of raw food waste to cooked food. East and West Putford has its meals bussed in and so does not have any raw kitchen preparations and so relies on fruit waste for its raw food, but with only 10 children this does not equal the amount of cooked food waste. However, West and East Putford is successfully inputting 3kg of fruit waste and 6kg of cooked food waste per week and their Jora composter is consistently reaching very healthy temperatures of 55°C. They occasionally add small amounts of freshly cut grass to their mix to boost the composting process, and always ensure that they tumble their Jora well to keep the mix well aerated.

An advantage of the school being so small is that all the children are involved with the composter and it is used within the curriculum as much as possible.

# Frequently Asked Questions

## Can I sell / give away the compost we make?

**No** - due to the Animal By Product Regulations you must use the compost you made in the schools composter, on the school grounds. However, you can sell any excess seedlings that you grow and these can be grown in the compost you have made. Sieve some of the compost, add some sharp sand, vermiculite or pearlite for drainage to make it suitable to germinate seedlings in and pop it in a yogurt pot!

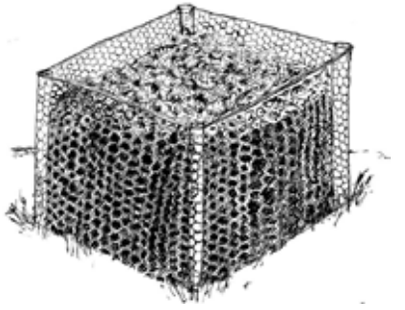
## Paper towels - can they be composted?

It is best to leave paper towels out altogether as they do not add structure or air to a heap, they merely absorb some of the moisture. They will compost, but the volumes generated by schools mean that realistically you will not be able to compost more than a handful at a time.

## Cardboard and shredded paper – can this be composted?

Same as paper towels. However you could use cardboard or newspaper to line food waste collection caddies and add this, but don't add any more to your initial stage composter.

## Can I put leaves in the HotBox?



It is best to keep leaves out of the HotBox as they take a long time to break down and take up a lot of space that could be composting your food waste. You could make your own leaf mould container instead – see **www.gardenorganic.org.uk/pdfs/Make_leafmould.pdf**

## Do I need to add worms to the HotBox?

Worms should find their own way into your HotBox, but there is no harm in adding some yourself from a compost heap nearby.



## Will the composter smell? Will it attract flies?

A healthy composter that has reached a high temperature and has a good balance of materials should only have a very mild smell and should not attract files. If your composter is smelling or attracting flies, you need to increase the temperature by adding more fresh material, raw 'greens' (grass cuttings are excellent or fruit and vegetable peelings), and tumble it more – see the trouble shooting guide on pages 20 & 21 and the start up information on page 24. You can contact DCCN for advice – see contacts section

## Where can I get more wood chip / wood pellets?

Wood chip can be sourced locally through tree surgeons or saw mills – look in the yellow pages. You could also ask your pupils' parents if they know of a source. Wood pellets have to be paid for but are easier to use and store, email Recycle@devon.gov.uk for sources.

## Where can I get a container in which to store the wood chip / wood pellets?

You can buy old dustbins with a lid / plastic dalek composters in which to store wood chip and wood pellets cheaply from your local recycling centre. See contacts section for a map of their locations.

## How long will the food waste be inside the tumbling composter?

It is estimated that food waste is inside the Ridans for approximately two weeks before coming out the other end. The Jora's and Scotspins need to be emptied before they get overfull, whatever the contents look like. Depending on the volumes you are putting through the system (and this will change from school to school and even week to week) the material coming out will vary in its degree of decomposition, but as long as most of the material has started to break down it's fine to transfer to the maturation bin.

## Can we put any sorts of plastic into our composter?

Avoid putting any plastic into any composting system as it will not compost,

even if it says 'degradable' on it. Degradable just means that it breaks down into lots and lots of tiny pieces of plastic which you would then spread onto the school gardens. There are some fully BIOdegradable, compostable plastics which are commonly made from potato and/ or maize starch, however they seem to take an awfully long time to break down. Generally our advice would be to avoid putting these in your composting systems.

## What should we do about our composter over the school holidays?

Ideally, it is best to empty your initial stage composter for the longer school holidays, if you cannot do this then it's not the end of the world. Your composter will be fine, however if anyone is around it will appreciate an occasional turn. Without turning, the composters temperature will cool down, however as soon as you start inputting and turning the system, the micro-organisms will get to work and the temperature will increase very quickly.

# The Compost Curriculum!

By using your composters as a learning resource you will bring the curriculum to life for pupils AND ensure that the composter

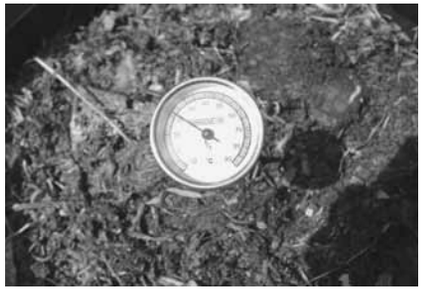
becomes an integral part of the school. Involving pupils in the practical side of composting can make the curriculum accessible to those pupils who prefer learning outside, in less formal situations and by doing practical tasks. Below are a few ideas of how the composting process can be used to address primary curriculum requirements. The obvious links are with the science curriculum, but there are also plentiful opportunities to use data from the composting process in maths and IT work. Of course with a little bit of imagination you could incorporate composting into every subject! With time you should be able to ensure that every year group uses the composters as a resource for at least one classroom topic a year.



## Maths

### (Ma3, Understanding measure; Ma4, Handling data)

- Weigh the mass of food waste and wood chip / pellets being composted each day. (Don't forget to subtract the weight of the caddy!)
- Record the temperature of your composter daily.
- Use your weighing and temperature data to develop pupil's understanding of averages / percentages / decimal places / fractions.
- Represent your composting data in pie charts, bar charts, line charts as appropriate. (These can be generated by ready formatted Excel spreadsheet provided by DCC at www.recycledevon.org/kidszone/teachers/why-compost-composting-project.php or made by pupils themselves)



## Science

### (Sc1, Scientific enquiry; Sc2, Life processes and living things)

- KS1: investigate the wide range of mini beasts living in your

HotBox and sort them into groups according to different features; encourage pupils to respect these mini 'recyclers'.
- KS1: use the routine of hand-washing after handling compost / composting equipment to remind pupils of the presence of micro-organisms.
- KS1/2: use compost from your HotBox to grow vegetables, illustrating the nutrient cycle.
- KS2: consider the HotBox as

a habitat; investigate how the organisms living there are adapted to its conditions; learn about their life cycles and food chains; make a key to help others identify the mini beasts.

- KS2: use your composters to learn about the beneficial effects of micro-organisms and the conditions in which they thrive.
- KS2: take your composter's temperature daily and plot the results. Repeat at a different time of year and compare the two sets of data.
- KS2: weigh your food waste each day before putting it into your composter; analyse your data and look for patterns; discuss ideas to reduce the amount of food waste generated at school; share your results with relevant adults and pupils in the school and beyond.

## ICT

- Use Excel to input weighing and temperature data; produce different types of charts and interpret your results. (Pupils may design their own spreadsheet, or use one provided and ready formatted by DCC.)
- Create a survey for pupils, teachers and parents to see how many of them compost at home.

## English (En3, Writing)

- Persuasive: why compost at home or school?
- Information: design leaflets about composting, presenting your information for different audiences (younger children, teachers in other schools, parents)
- Information; write newspaper or website articles about your school's composting activities, and ask your local paper to publish your work to spread the composting message and promote your school in the local community.
- Imaginative: write stories from the perspective of a worm / centipede / woodlouse living in a HotBox.

## Geography

- Explore food miles. Where our food comes from? What impact does its production, transportation and, if we don't eat it, its disposal have on the environment?
- Hold a class debate about the relative advantages of composting food waste at school / the Council collecting food waste for large-scale composting / sending food waste to landfill.



# Useful websites / resources

**www.recycledevon.org/kidszone** everything you want to know about recycling and composting in Devon

**www.recyclenow.com/schools/compost/index.html** has KS1 and KS2 teachers activity packs www.recyclenow.com/schools/reduce/index.html - how to reduce your school's food waste

**www.gardenorganic.org.uk/pdfs/Make_leafmould.pdf** make your own leaf mould

**www.foodforlife.org.uk** transform food culture within your school.

**www.jamieshomecookingskills.com** easy-to-teach cooking courses developed by Jamie Oliver

**www.schoolfoodtrust.org.uk**

**www.recycledevon.org/map** Devon map showing locations of recycling centres

**www.sustainabilitydevon.ning.com** - Devon Education for Sustainability Website where teachers can exchange ideas and best practice. Look at the website and join up!

**http://edibleschoolyard.org**

### Books

'How to make and use compost, the ultimate guide' (lots of info including schools and food waste) by Nicky Scott

'Organic Gardening – the natural no dig way' by Charles Dowding

Both published by Green Books

**see www.greenbooks.co.uk**

### Contacts in Devon

Devon Community Compost Network (DCCN) www.dccn.org.uk - composting information for schools and community groups

Nicky Scott (Co-ordinator of DCCN) nicky.scott@devon.gov.uk 07919 467589

Melissa Harvey (DCCN Education Assistant) melissaharvey.dccn@gmail.com 07732 396012

Devon schools can book free Waste Audits, Assemblies and Recycling and Composting workshops, contact:
Heidi Diepold, Waste Education Officer, Devon County Council, 01392 382920 recycle@devon.gov.uk

**Local Authorities: For advice on how to set up / improve a recycling collection in your school contact your local council:**

**East Devon: 01395 517528**
**Exeter: 01392 665027**
**Mid Devon: 01884 233102**
**North Devon: 01271 318517**
**Plymouth: 01752 304689**
**South Hams: 01803 861199**
**Teignbridge: 01626 215824**
**Torbay: 01803 207744**
**Torridge: 01237 428734**
**West Devon: 01822 813570**
**Devon County Council: 01392 382920**

[ *I am amazed at how well the Ridan works, how easy it is to use and how quickly it composts, as a result we now only have one bin collected every week instead of two and we have plenty of rich compost for the garden* ]

**Wayne Hack, the Site Manager**
**Stowford Primary School**