what happens to the urine?

The first question is: do you wee in the compost toilet chamber or not? If it's just a wee you want, then the answer is simple: no. Too much liquid in the chamber will cause the system to become anaerobic, resulting in some pretty nasty smells. Also, urine contains salts that many organisms don't like (worms for example), and if it turns to ammonia they like it even less. You get people to wee somewhere else, and this somewhere else depends on your location, your climate and your outlook on life.

Urine can be a useful thing to collect, as it actually contains more nutrients than faeces. It contains much more nitrogen than faeces (up to 90% of the nitrogen we excrete is in urine), three times the potassium, and up to twice the amount of phosphorus. And no pathogens (not in developed countries anyway, although in developing countries it could contain things like liver flukes) – it is sterile, so there are no health worries, just smells. In fact, it's probably fair to say that if you really want to use human waste as fertilizer, the best thing to concentrate on is urine.

As there is so much nitrogen, bacteria have to give off lots of excess in the form of ammonia, which means that you can't really store it for more than a day – it becomes smelly very quickly.

Urine could replace chemical fertilizers in feeding the world's population (although solid organic matter would have to be added as well to provide structure), instead of being treated as a problem (which it is, if we're trying to stop it ending up in watercourses).

urine separation if you just want a wee

- It could be just outside in the bushes if you live in a very rural location, but unless you live in a warm climate, this is going to be problematic in the winter.

- You could install a separate urinal. This could be waterless, and could even be a unisex version (see 31. Urinals & drains). You can build your own, or you can buy an off-the-shelf waterless urinals too. If looked after properly, waterless urinals actually smell less than flush urinals because on flush urinals, calcium in the water will react with uric acid in the urine to produce more limescale than with water alone. The limescale then absorbs more urine, which encourages bacterial growth and can cause smells. See build section for how to build / install waterless urinals. See below for options as to where the drain from the urinals go.

- Pee on a straw-bale to eventually produce compost – urine doesn't contain pathogens, but lots of nitrogen. Straw contains lots of carbon, and so this is a perfect recipe for producing good compost. You can put the bale in any out-of-the-way place. It won't smell because the

bacteria will have a ‘balanced diet’ of carbon and nitrogen, and so won’t have to give off ammonia (a way of removing excess nitrogen).

- Collect urine in a container with a funnel, and tip it onto your compost heap when it’s full. This will benefit the heap, especially if it has a lot of carbon-rich material like dry leaves, twigs, straw or hay. Alternatively you could tip the container onto a straw-bale (see above). You could even have a urinal above the container. This may be better than having to go outside for a wee, especially in the winter, and especially for women, who have to expose a bit more of themselves to the cold. If you want to irrigate your garden with urine, it’s safe to do so, as urine is sterile, but dilute it with 10 parts water for each part urine, as it’s salt content will be too high for most plants to take, and they will die off (excess salt from our food is excreted via urine).

urine separation when using the compost loo

If it’s just a wee you want of course, it’s easy to separate. Otherwise it’s not so easy. I’ve seen compost loos with notices asking users not to pee in the chamber, but let’s face it – sometimes you just can’t help it. So if you accept that you can’t avoid it, then these are the approaches:

- Ensure that there is a drain. We recommend that there should definitely be a (permanent) drain on the chamber, even if you use one of the separation methods below. It’s vital that no-one comes into contact with the liquids from this drain though. It’s not like ‘worm tea’ – the liquid that drains from a worm bin, even though it’s the same dark brown colour. Worm tea won’t contain pathogens, but liquid from a compost toilet might.

- However, if you don’t have a separate provision for urine, a drain alone may not be enough to stop the heap becoming anaerobic and giving off smells. You could install some sort of stainless steel or plastic funnel or trough inside the seat (at the front) to separate urine from solids. The drain from the funnel / trough will take away the liquids in the same way as for urinals (above). The potential problem with this system is that toilet paper can be accidentally dropped into the funnel / trough, then you can end up with soggy blobs of toilet paper blocking the drain. The chances of this increase if a small child uses the toilet, or you could even end up with faeces in it, which would be a bit of a nightmare.

- A way around the trough / funnel clogging problem is to build yourself a ‘curvy’ trough from stainless steel. In this case, the liquids will hit the stainless sheet, and run down it, around the curve and into the trough, paper or faeces dropped onto it will fall into the chamber and miss the trough. This seems like a lot of trouble to go to, when you could use one of the ‘out-of-toilet’ urine separation methods mentioned above.

where does the liquid go from the urinal / urine separation / drain?

- Into a conventional soil pipe / sewer drain. If you install a compost loo where there was a conventional loo before, then there will be an existing soil pipe that the drain can feed into.

- Into a sewer drain - underground to the inspection chamber of your sewer drain. You will need to do some detective work to find your sewer drain. some houses have sewer drains and also surface water drains to take water from the roof and discharge it untreated into a watercourse. However, some houses only have sewer drains (or combination drainage, as it's called), into which all water drains, including rainwater from the roof (this helps to flush the system through, but could potentially cause problems with overloading of the sewer system during storms). It's up to you to trace your pipes / drains and work out your situation as regards drainage. You have to make sure that you don't connect your urine / chamber waste pipes to a surface water drain. As a last resort, you can just go into a sewer drain gully outside. This may be OK in a rural location, but not so good in suburbia, and even in the countryside, you'll need a cage round it to stop kids playing with it. This drain will then go to a sewage treatment plant, a septic tank with leachfield, a cesspool, a reed bed, or anything else you decide to install.

- To a leachfield. You will need consent to discharge, and a percolation test for your land. Have a look at the Environment Agency's website for more information. NB: most existing leachfields are too deep, and soil microbes can't deal with the nutrients, pathogens or toxins, so the waste water flows beneath the soil and into groundwater effectively untreated. A leachfield must be less than 2ft (60cm) underground for soil treatment to occur. A leachfield consists of a series of gravel-filled trenches containing 50mm pipe with holes in, through which the waste water leaks into the surrounding soil. Micro-organisms in the soil remove nutrients and pathogens - it's the same principle as in a rotating arm sewage bed, where microbes on stones do the work. Soil is an excellent filter for waste water; no better filter has ever been devised. The ideal soil is a loam containing different sized particles – not too fine (could become waterlogged) and not too coarse (drains too quickly, doesn't have time to treat waste water properly). This is the ideal soil for growing things too. Look out for tree roots near a leachfield, especially willow, which will damage the pipes to get at the water. Also watch out for soil compaction – don't park cars or heavy machinery on the leachfield area. If you already have a leachfield, then you will be putting less pressure on it by installing a compost toilet, and so it will be less likely to fail.

- Into a septic tank / cesspool / soakaway (or any other system that exists for waste water.

- To a reed bed / pond system – this is above ground so you can see what's happening, no underground pipes to get crushed, clogged, or damaged by tree roots. It's also prettier.

- How about having a waterless urinal, with a waste pipe that goes through the outside wall and onto a straw-bale?; you can house the straw-bale in a cage or some sort of container to stop kids playing with it. It will compost away nicely, with no pathogen problems. After a year or so, you can shovel out the compost and replace it with a fresh bale.

- Even better – have the drain from the waterless urinal go into a pit, or an oil-drum which is half buried, with a hole in the bottom, and is sitting on about half a metre of small stones, or pea shingle (a soakaway in other words). Fill the pit with straw or sawdust, and empty compost from it each year. This will work well on a domestic scale, but may become overloaded in a public building.