

Notes for composting Presentation

(These are the notes written under the slides)

Composting is recycling naturally

When we compost organic materials such as grass clippings, food and kitchen scraps, and leaves and brush, we are using the natural process of decay.

Composting turns these materials into a valuable humus-like product called compost.

Why bother composting??

Compost provides many benefits to soil. Some of those benefits are listed here and on the next slide.

Adding finished compost improves soil health, yields healthier plants and saves you money. You buy less soil amendments, like peat moss, purchase less fertilizer and reduce the need for organic or inorganic pesticides. You also help municipalities save you and them tax dollars by reducing the amount of yard materials set at curbs or taken to drop-off sites.

Compost cannot be considered a fertilizer, but it does contain important plant nutrients such as nitrogen and phosphorus. Compost will slowly release these nutrients to plants. The nutrients in compost are not likely to be leached and lost from the topsoil.

Compost also contains many trace nutrients that are essential to plant growth.

Composting is nothing more than speeding up the natural decay process. A compost pile is used to help us manage the environmental factors that affect the rate of decay.

These factors are :

air (more specifically oxygen)

water

food, and

temperature

The rate of composting (decay) and the quality of the resulting compost depends on how well you control these factors.

There are many different options for compost bins. In fact, if you get serious about recycling your leaves, grass, yard trimmings and food scraps, one bin will not be enough. Shown here are some options for bins you can construct yourself.

Bins generally work better than sprawling heaps. Bins are more attractive, use vertical space better and are easier to turn.

Things to remember when you construct your own backyard composting bin:

- the ideal size is about 3 x 3 x 3 feet (1 cubic yard). This size is easy to keep aerated, easy to turn, but still large enough to maintain warm temperatures.
- Piles that are too big are difficult to maintain and often don't function as well as more appropriately sized piles.
- Here are some examples of manufactured bins that can be purchased.
- Manufactured bins vary in price; the tumbler units being the most expensive. Many of these bins come with covers and often are made with durable, recycled plastic. Most are also UV stabilized to last longer outside. These units are especially good for composting food scraps and small volume materials. Most manufactured bins are not large enough to compost large amounts of leaves, grass and yard trimmings. You may need to have several commercial bins to handle your yard materials. Or you may have a combination of commercial bins and a larger, home-made bin.

Use some common sense when you decide on where to put your compost pile. Some things to think about are:

- A shaded area helps to keep the pile from drying out in the summer, and makes it more pleasant for you to work at the pile. However, a sunny location is fine and will warm up faster in spring and freeze later in fall.
- Be sure the pile won't interfere with your other lawn and gardening activities and fits into the landscape. Place the compost pile in a convenient place so it will be easy to access. Compost areas can be part of an attractive garden design.
- Remember to leave adequate work space around the pile for filling, emptying, and turning.
- You may want to include room for stockpiling browns in fall for use in summer, and to store finished compost until you are ready to use it.
- You will want to have your pile(s) within garden hose reach. Hauling water is heavy work!

14 Choose a spot that is well-drained. You don't want your pile standing in water.

Stay away from wells to be sure any drainage from the pile won't get into the well.

If the compost is made near where it will be used (beside the garden), you won't have to haul it so far.

Keep at least 2 ft of air space between a compost pile and a building for good air circulation.

Finally, be considerate of your neighbors. Not everyone thinks a compost pile is a thing of beauty. Hopefully there will never be foul odors from your pile, but keep the pile where you will smell it before your neighbors do.

15. Composting is a natural process and its easy for you because you have a work crew that does almost all the work for you. Naturally occurring microorganisms (mainly bacteria and fungi) do the hard part of breaking down organic materials into compost.

All you have to do to keep your decomposers happy & working hard is provide them what they need:

- The right kinds of food, and
- The right amount of oxygen, water, and warmth.

16. How do you get this decomposer work crew into your compost pile? Where do the decomposers come from?

If you build it, they will come...

In fact, its impossible to keep them out. Bacteria and fungi are naturally present in soil, on leaves, on food scraps, in manure, and in finished compost. Adding any of these materials will provide enough microbes to start the composting process. If you provide them with the right environment they will rapidly multiply and fill the whole pile.

17. One good source of inoculum is your own good garden soil. Small amounts of soil can be added to your compost pile to provide all the bacteria and fungi it needs to get fired up.

However, you don't need to add soil. In fact, soil can make your compost heavy. Bacteria are all over leaves, grass and other yard materials you add to your pile. Just keep them happy and they will multiply and work for you.

18. Commercial inoculants and accelerators are available. They may in some cases help to get the composting process started a little faster, however they are not necessary. Rapid composting can be achieved, and high quality compost can be produced without using these products.

19. Macro organisms move in after the decomposers break down the organic materials into smaller pieces.

Seeing these critters in a compost pile is a GOOD thing. It shows the compost is continuing to break down.

Look for:

earthworms, sow bugs, mites, springtails, beetles, millipedes, centipedes and even snails and slugs.

20. While any organic material can be composted, you should not try to compost all of them in your backyard compost pile.

"YES" - compost these in your backyard pile include:

Garden trimmings, Kitchen scraps, grass clippings, Leaves

21. These are also “YES” materials to compost that you may have around your house or yard.

Crush up the eggshells when you add them.

If you use horse, cow, or other herbivore manure, it needs to be hot composted to kill off any harmful bacteria.

Shred or tear paper and cardboard before adding.

Cut up the branches or run through a chipper/shredder to make smaller pieces that will decompose faster.

Pine Needles break down slowly, so don't add more than 10% to a compost pile.

23. Some organic wastes are better left out of your backyard compost pile because they can cause problems either during composting or when you use the compost.

These “NO” materials include:

- Meat fish and dairy products because of their tendency to attract pests and vermin (flies, rodents)
- Hard to kill weeds such as bindweed and quackgrass as well as weeds that have produced seed. A hot compost pile can kill these weeds and seeds. Most backyard compost piles do not reach high enough temperatures for long enough periods of time to kill these weeds and seeds.
- Charcoal briquette ash are treated with chemicals that can harm plants
- Thorny branches are a hazard to handle
- Whole branches or logs are slow to break down
- Treated lumber may have copper, chromium, arsenic and/or creosote that is harmful

25. Cat and dog manures also tend to attract pests and could spread disease (especially parasites).

Most backyard compost piles do not get hot enough for long enough to be certain of destroying plant diseases or insects. So to be sure you don't spread or re-infect your garden, do not put diseased or insect ridden plants into the compost pile unless you heat all portions of your pile to 130-140 degrees F for 4-7 days each time you turn it. This heating process can take up to 4 weeks.

26 Lime Many people think it is necessary to add lime to the compost pile. Finished compost is always near neutral in pH even if acidic materials were placed in the pile, such as oak leaves. For most garden uses, high pH compost is not desirable, and adding lime to the pile will often create an ammonia odor.

Adding wood ash will add some potash to the pile which is good. But large amounts of wood ash will tend to increase the salt content of the finished compost. Many wood ashes are alkaline and will increase pile pH and lead to ammonia odor problems.

Be careful when using pesticide treated grass or weeds in your compost. It is best to leave treated clippings on a lawn 3-4 cuttings after treatment. However, most pesticides break down in the composting process and the finished compost is good. But a few chemicals do not break down quickly. The residues, even in very small amounts, can harm plants. One test is to grow pea seedlings in a compost soil mix. If the seedlings look normal with no distortion, twisting or mottling, the compost is likely good. To learn what chemicals to avoid, contact your local Extension or Recycling Office or do an internet search on compost and pesticides.

Also, never use pesticide treated grass clippings as mulch. The chemicals are still active and can kill or damage trees, shrubs or other plants.

27. Is it necessary to shred leaves, twigs, branches and other coarse materials before putting them in the compost pile?

It's not essential, but smaller particles will decompose faster than larger ones because:

- As particles are made smaller, more surface area is exposed to the microbes that do the work of decay.
- Microbes often have a hard time getting at the food trapped inside woody materials. If these are broken apart for them it will speed up the decomposition process.

28. BUT... there is a negative flip-side to shredding.

As particles get smaller airflow into the pile will also be decreased. This could cause the pile to become anaerobic or lacking in oxygen. When this happens, decomposition slows and odors are generated. You can compost with small particle size material, but you will have to turn the pile more often.

29 Just like you, your decomposer work force does best with a balanced diet. They need a mix of high carbon materials known as "browns" and high nitrogen materials known as "greens".

30 Browns Here are some examples of browns. The numbers in parenthesis are the carbon to nitrogen ratios found in these materials. Any material with a carbon to nitrogen ratio higher than 30 to 1 is a brown. Browns tend to be drier than greens and they decompose very slowly.

31 Greens are nitrogen rich materials, those that have carbon to nitrogen ratios that are less than 25 to 1. Greens also tend to be more wet and soft than browns. They decompose very rapidly.

32. Because of their characteristics, browns and greens each have some problems if composted on their own. But they make excellent compost when mixed together. If compost made only from browns is not fully mature when used it could still be high in carbon and tie up nitrogen in the soil. Because greens decompose so rapidly and are high moisture they tend to mat when composted alone. This prevents air from getting into the pile and creates foul odors.

Browns tend to accumulate in the fall, while greens tend to accumulate in the spring. A good system is to stockpile browns, then gradually mix them with greens the following year.

In the background of this slide you see a nice mix of browns and green ready to start composting.

33. Aerobic composting is the most rapid way to produce high quality compost. Aerobic composting simply means composting with plenty of air in the pile. Aerobic composting produces no foul odors and also produces a lot of heat from the multiplying microorganisms.

34. An aerobic compost pile will normally go through several heating cycles. To get the most active and rapid composting the pile should be turned when temperature begins to drop, or if temperature rises above 140°F.

35. High temperatures are not essential for composting, but composting will proceed more slowly at low temperatures. Some of the common reasons for a compost pile not heating include:

- The pile is not getting enough air
- Too much water in the pile (prevents air from getting in)
- Too many browns in the pile mix

The benefits of heat in the compost pile include

- The most rapid composting
- Killing pathogens
- Destroying weeds and weed seeds

36. A hot pile also helps to get fresh air into the pile. Warm, oxygen-depleted air from the pile rises off the top, drawing in cool air from the bottom and sides. The fresh air is also high in oxygen (O₂).

37. In order to move into and out of your compost pile, air needs open pathways to pass through. These pathways or channels are known as pores. Porosity refers to how much of the total pile volume is open pore space that can be filled with air or water. A pile with a lot of porosity, or a lot of open channels, will be easy to keep aerated. Adding browns helps to maintain good porosity.

When a pile becomes matted or compacted it loses porosity. Turning a compacted pile will help to increase porosity and aeration. Other options to increase porosity and aeration include inserting sticks, cornstalks, and even perforated pipe into or under the pile.

38. Turning (mixing) the pile also brings fresh, oxygen rich air into the pile.

Turning the pile is easier and more effective if you take your bin apart and set it up next to the compost pile. Then transfer materials into the empty bin. Having two bins, one that is empty, also works for this transfer..

Turning tools may help mix the pile to some degree.

39. Another essential for rapid aerobic composting is the right amount of water. Bacteria live in water films that surround the materials in the compost pile. If the pile is too dry, the bacteria cannot do their work. If the pile is too wet, the bacteria cannot get the oxygen they need.

It's surprising how much water it takes to get a pile as damp as a wrung out sponge – even a heavy rain may not be enough to penetrate to the center of the pile.

It's easy to tell if your pile has the right moisture content (40-60%), grab a handful of material and squeeze. If water drips out, the pile is too wet. If the handful has about the same moisture as a wrung out sponge, moisture is in the right range. If it seems drier than a wrung out sponge you need to add water.

A dry pile tends to shed water. Turning the pile as water is added helps to mix water into the pile.

If the pile is too wet, add some dry browns and turn the pile. Just turning the pile will allow some water to evaporate and fluff it up to allow fresh air to move into the pile.

41.42. The most rapid composting happens when you mix brown and green materials. 3 parts brown leaves to 1 part green grass or weeds works well. Water the pile as you build it and keep as damp as a wrung out sponge. Turn pile often.

Here you see an example of a three bin system that allows you to start your compost in the bin on the left. Turn the pile to the center for active composting, and turn it to the bin on the right for curing.

43. Here are instructions on how to make high quality compost in the shortest period of time, about 3 months.

Turn the pile frequently to keep decomposition active.

The pile will heat up in a few days and remain hot for a while, but then will stabilize at a lower temperature after a few weeks.

44. When the microorganisms have finished their primary decomposition, the macro organisms move in to finish the process.

The pile has now shrunk noticeably, but wait another month until using the compost to be sure that decomposition is complete.

45. The Laid Back composter will add brown and green materials a little at a time. However, always have the top layer be brown leaves, brown grass, hay or paper to control odors and pests. Take care not to put in any weed seeds or diseased plants as a "Cool" pile will not get hot enough to kill these problems.

Save several bags of leaves or straw so that in summer, when there is only green in the yard, you have browns to add.

Water and turn the pile when convenient. In 6-12 months you will have some finished compost on the bottom and in the center of the pile. It will take up to 2 years to get a full batch of finished compost using the "Cool" Pile method.

46. There are several indicators to tell you when compost is finished.

It looks like rich humus and has a fresh, earthy smell.

You should not be able to recognize the materials you started with – the leaves, straw, grass, or food scraps. Coarse woody materials like twigs and sticks will persist and can be pulled or sifted out.

The pile volume is much smaller than what you started out with, and it won't get hot again after turning.

47. There are some simple tests you can use to check if your compost is ready.

Seal some moist compost in a plastic bag for 3 or 4 of days. Open the bag and take a sniff. A foul odor indicates the compost is not mature, a rich earthy smell indicates the compost is mature.

If you plan to use the compost in a potting mix, you should conduct a germination test. Plant some seeds in the compost and see if they germinate as well as in a standard potting mix. If they don't, the compost is not ready.

49. Before using your compost be sure it is fully mature (use the bag test or germination test). Immature compost could damage or kill plants, and could tie up soil nitrogen. When using compost as a soil amendment or soil conditioner, work no more than a 2 inch layer of compost into the upper 4 to 6 inches of soil. Compost used in this way will improve water and nutrient retention and will loosen heavy clay soils.

50. Compost can be used as a surface mulch. Use a maximum depth of 3 inches for mulch. NEVER pile compost or any mulch around trunks of trees or shrubs. This makes an ideal environment for insects to attack the plant. Keep compost 3-4 inches away from the trunk and extend out to the dripline.

Mulching protects the soil from temperature extremes and helps maintain soil moisture.

51. Fully mature compost can be used as a topdressing on lawns. Use fine (screened) compost and apply about a ¼ inch layer to the lawn. The topdressing will be most effective if the lawn is cored before compost application. Rake the lawn after compost topdressing to move some compost into the core holes.

52. Compost can replace peat in preparing potting mixes. The compost must also be very mature and fine (screened). Use no more than 1/3 compost by volume in your potting mix.

Compost Tea is a way to feed plants with the nutrients of compost. Soak a porous bag filled with compost in water for several hours. Then use the tea to water both indoor and outdoor plants. Put Compost Tea grounds back into the compost pile.

Troubleshooting:

53. Sometimes composting doesn't go just as you would like. If problems arise, here are some possible causes and cures.

At the root of foul odors is poor aeration and lack of carbon material. The cure is to turn the pile and add dry browns. If you are adding kitchen scraps, be sure to mix them into the pile. A small pile of kitchen scraps on the top of your compost pile could start to smell and attract critters.

Ammonia odor usually means you have too many greens in the mix. The extra nitrogen is being converted to ammonia. The solution is to balance the carbon to nitrogen ratio by adding more browns and mixing the pile.

54. A pile may not heat for several reasons.

- Its difficult to get a small pile to heat in the winter when temperatures are cold.
- Causes for not heating in warmer weather could be

--the pile is too small to trap the heat,

--too dry for the bacteria to thrive,

--poor aeration (too wet or compacted), or

--low in nitrogen.

The cures are obvious

- Wait for warmer weather
- Make the pile larger
- Add water
- Turn the pile
- Add greens (adding manure or green grass clippings are a great way to get a pile fired up!)

Too high pile temperature is usually not a problem for backyard composters. If your pile is too hot it will slow the rate of composting and could be caused by too large of a pile and insufficient ventilation to let the heat escape. To reduce pile temperature, make the pile smaller, or turn the pile.

55. You want to be sure your pile does not attract animal pests such as raccoons, opossums, skunks, rats, and insects. Meat scraps, fatty food wastes, and foul odors are usually what attract these pests.

Remove the meat and fatty food scraps from the pile. Be sure to mix and bury all food scraps into the pile 6- 8 inches.

If animals are a consistent problem, use an animal proof bin such as a covered bin, trash can bin, cone or barrel bin.

Bins made of small mesh wire screen also work well to keep animal pests out.

Finally, worm composting is another option for composting food scraps. If you are interested in worm composting check with your local Extension or Recycling Office or do a search on the internet for more information.

56. Grasscycling returns nitrogen rich lawn clippings to the lawn for free. Mulching mowers work best, but a mulching blade can be added to most mowers.

- Cut it high and let it lie! Let the lawn grow to 3 ½ - 4 " and then cut back to 2 ½ - 3 ½ ". Taller grass produces deeper roots, better resists drought and shades out weeds.
- Never cut more than 1/3 of the height at any one time or the grass will be too stressed.
- Leaving clippings on the lawn may mean more frequent mowing but overall will reduce the total mowing time.
- Grasscycling will not cause thatch. Thatch is made up of grass stems and roots, not grass blades. Lawns need up to ½ " of thatch to protect the soil. Leaving clippings to breakdown on the lawn increases soil organic matter, attracts worms and yields a healthier lawn.
- Always use a sharp lawn mower blade. Dull blades shreds grass and make it more susceptible to diseases.