



## Making The Initial Composting Pile – The Basic Composting Science

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Read: *The Goals of the Compost Education Center (CEC) of Project Grow*

### The Basic Composting Science

*Composting is the process of creating the ideal conditions for the rapid decomposition of organic materials by effective decomposers.* The ideal conditions are: (1) the right mix of organic waste, (2) the particle size of the materials, (3) the amount of moisture, (4) aeration, and (5) dedicated master gardener/composter.

The effective decomposers include micro-organisms (bacteria and fungi) and macro-organisms (worms and insects). They are naturally present in a composting pile. At the microscopic level, bacteria and fungi eat and digest dead organic matter. The carbon (the Browns) and nitrogen (the Greens) in the compost pile provide the decomposer organisms with necessary energy to thrive and multiply. Carbon provides energy and building material for cells; nitrogen is for cell growth and function. As they digest the material, they produce heat, carbon dioxide, and excrement. To heat up the pile, use the optimal mix (the WCMC or the Washtenaw County Master Composter, Mix): 30 parts Carbon 1 part Nitrogen (C:N ratio of 30) by weight. For the gardener, this ratio is estimated by a 2:1 CN ratio by volume, example: 2 pails of Browns per 1 pail of Greens. Then follow the Composting Recipe below.

Temperature Stages	Composting Activity	Effective Bacteria by Active Temperature
Stage 1 – Day 1 to 2	Make Initial pile: layering and wetting; OM (Organic Matter) at ambient temperature.	<i>Psychrophilic</i> : 0°F–55°F; start producing heat in pile.
Stage 2 – Day 3 to 5	pile heats up to 100°F–160°F at the core of pile; also called the <i>thermophilic</i> stage	<i>Thermophilic</i> : 110°F–160°F; the fastest OM breakdown.
Stage 3 – Day 6+	once the microbes have broken down a majority of the pile, the pile cools. Turning the pile at this point will result in a new temperature peak.	<i>Mesophilic</i> : 50°F–120°F; most abundant and do majority of decomposition.
Stage 4 – Day 7+	After most of OM is decomposed, compost temperature drops. Pile volume drops. Weekly turning, mixing & combining piles may cause slight temp increase.	<i>Psychrophilic</i> : 0°F–55°F; re-start producing heat in pile.
Stage 5 – 2-3 mos.	After 2-4 turnings & temperature stabilize, compost is cured. Harvest finished compost.	<i>Actinomycetes</i> : – active at ambient temperature; curing stage; produce the earthy smell.

### Follow The Composting Pile Recipe

The making of the composting pile follows a 5-step recipe:

- 1) *Classify the organic ingredients into Greens and Browns,*
- 2) *Shred, bruise, mash or chop them to small pieces 1" size,*
- 3) *Stack them in layers of 2 parts Browns followed by a layer of 1 part Greens, a sprinkle of native soil, repeat this sequence up to the height of the bin, and moisten each layer,*
- 4) *Monitor and log the daily temperature of the core of the pile between turning cycle,*
- 5) *Turn and moisten thoroughly the pile every week until it cures. Harvest and use.*

**Tools:** composting guide, composting log, cutting tools, compost thermometer, turning tool, sifting tool.

#### Sources:

1. *The Composting Guide of Project Grow Community Gardens.*
2. *The Washtenaw County, Michigan Master Composter Manual.*