Mulches for Home Grounds

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Quick Facts

- A mulch is any material that provides protection and improves the soil when applied to the soil surface.
- There are two types of mulches: organic and inorganic.
- Depending on the type, mulches:
  - Reduce surface evaporation and conserve soil moisture.
  - Improve water penetration and air movement.
  - Control soil temperature fluctuations and possibly reduce soil temperature.
  - Protect shallow-rooted plants from freeze damage and frost-heave.
  - Improve soil structure and nutrient availability.
  - Help inhibit weed germination.

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Overview

A mulch is any material used to reduce evaporation and water runoff, inhibit weed growth, and/or create an attractive appearance in landscapes. Mulch is left on the soil surface while a soil amendment is incorporated into the soil.

There are two types of mulches, organic and inorganic. Organic mulches include wood chips, bark, straw, grass clippings, seed hulls, etc. Inorganic mulches include gravel and rock.

The ideal mulch does not compact readily. It does not hinder water and air movement into the soil, it is not a fire hazard, and it breaks down slowly. In addition, the ideal mulch is weed-free, attractive, and does not blow away. A common practice is to apply mulch over landscape fabric to reduce weed growth. Correctly applied mulch does not require landscape fabric to be effective. Landscape fabric is not needed beneath other mulches and in many cases is detrimental to plant and soil health.

Selection

The selection of a mulch depends on its intended use. Consider your goals and the size of the area in relation to the cost of materials and availability (Table 1). Table 2 lists the advantages and disadvantages of several organic and inorganic mulches.

If the main objective is soil improvement, consider an organic mulch that gradually breaks down. If the area is used primarily for annual flowers, it often is more practical to use a temporary organic mulch, such as composted leaves or grass clippings, that can be turned under each fall. Make sure these materials have not been treated with herbicides or they may damage your landscape plantings. Wood chips and inorganic mulches like pea gravel are a good choice for landscape plants such as trees, shrubs, or perennials.

Any stone used for mulch should be smaller than a half-inch in diameter for the benefits of water conservation and weed suppression. Larger stone sizes do not function well as mulches but may provide landscape interest. Pea gravel has been shown to improve water infiltration into the soil, especially in short, intense events like thunderstorms. Gravel mulch transfers more heat to underlying soil than wood chip mulch. This may serve to keep landscape plants in better overall health in cold-winter temperate climates like ours. Gravel mulch's warming effect can enhance biological activity down to one foot below ground during cold months and result in more vigorous plants. It can also transfer heat to buildings and utilities or cause some tender plants to begin growing too early in the spring. Match your mulch to your situation.

Black plastic (polyethylene) and woven plastic weed barrier fabrics (polypropylene) are not recommended as a mulch in landscape areas. Black plastic is impermeable therefore no oxygen exchange can occur to the soil. Lack of oxygen to the roots and soil microbes significantly reduces plant growth. Black plastic also prevents water penetration. Woven weed barrier fabrics initially allow some minor oxygen and water exchange to the soil, but eventually become clogged and create the same issues as plastic. Weeds easily germinate on top of the fabric and root into or through it. Both plastic and woven plastic fabrics disrupt the life cycles of many pollinators and other soil invertebrates. Fabrics and plastic can be good choices for large-scale vegetable production where regular maintenance and replacement is easily performed. In most gardens and landscapes, the correct application of other mulches is a better option.

When to Apply Mulches

Mulches used to enhance appearance and control weeds may be applied at any time. Reapply organic mulches after they have begun to break down in order to maintain appropriate depth. If the mulch will be used to protect fall transplants by keeping soil temperatures above freezing longer (permitting better root growth), apply immediately after planting. If the mulch is meant to reduce frost heave and delay spring growth, apply after the ground has frozen.

Depth of Mulches

Apply most mulches, including wood chips and pea gravel, to a depth of 3 to 4 inches. More is not better! Mulch that is too deep can weaken trees and shrubs and prevent water and air from reaching the soil. Apply straw, dried leaves, and similar materials to a depth of 4 to 6 inches. Grass clippings should be applied in thin layers and allowed to dry between applications. Add additional layers each week as the lawn is mowed. Deeper applications of fresh clippings (more than an inch) can become moldy.

Table 1: Area covered to a given depth by one cubic yard of mulch.

Area (sq. feet)	Depth of mulch (inches)
81	4
108	3
162	2
324	1

Some mulches, particularly weed fabric, paper, straw, and loose leaves, may harbor rodents so do not place them closer than 6 inches to the base of woody plants. When these types of mulches are placed next to the plant, rodents living in or below the mulch may chew the bark of the plants, girdling and eventually killing them. Mulches in contact with the bark of woody plants may keep it too moist and contribute to the growth of fungi and other decay organisms.

Table 2: Types of mulches and their advantages and disadvantages.

Mulch type	Advantages	Disadvantages	General Comments
Cocoa-bean hulls	Long lasting, dark brown color.	Compact; forms a crusty surface. Expensive. Can cause sickness in dogs if ingested. Avoid if dogs present.	Molds may form on surface. Harmless if stirred to break crust. Difficult to source in Colorado.
Crushed corncobs	Uniform in color.	May retain too much moisture at surface or compact if kept wet.	Cobs dyed various colors. Availability limited in some areas.
Grass clippings	Readily available. Nutrient recycling.	Must be applied loosely, in thin layers to reduce matting. Herbicide residues may harm plants. If herbicide has been used, wait at least three cuttings (use the fourth cutting) before adding the clippings.	Allow grass to dry to prevent matting and disagreeable odor before applying as a mulch.
Spent Hops	Attractive color. Fire resistant.	Disagreeable odor for several weeks until dry. May blow away. Must be kept away from plant crowns and tree trunks due to risk of "burning" during decomposition.	May be available from local breweries. Must be applied 6" deep to be effective. Acidic pH and secondary chemicals may work as chemical weed control.
Composted Leaves (Leaf Mould)	Readily available. Nutrient recycling.	Can prevent weeds, won't prevent soil compaction.	Excellent soil amendment.
Leaves (dry)	Readily available. Nutrient recycling. Can be applied whole or chopped/mown.	May blow away. Can be a fire hazard. Wet leaves can compact.	Beneficial for overwintering pollinators.
Newspaper	Readily available.	Not very attractive. Can provide cover for rodents. Limits oxygen and air-exchange in soil. Don't use color inserts or red ink.	Use 3 to 6 sheets thick and cover with organic mulches. Can prevent water and air infiltration into soil.
Peat (sphagnum)	Usually available in bulk amounts.	May crust on surface. May blow away. When dried, it can cake and become impervious to water. Flammable. Not a renewable resource, harvest can have high environmental costs.	Best used as a soil amendment in limited situations, not as a mulch.
Pine needles	Attractive. Do not compact.	Can be a fire hazard.	Can prevent water infiltration to soil if applied too deeply.

Shredded bark, bark chips, chunk bark	Long-lasting, attractive. Does not blow away easily.	Cost relatively high. Shredded bark may compact. Large bark chunks may impede spreading perennials. Bark is generally water resistant and can increase irrigation costs and prevent rain from reaching the soil. Highly flammable.	Use for informal walkways.
Straw	Readily available.	Blows easily. Highly flammable. Weed seeds often present.	Best used as a temporary mulch around plants needing protection in winter. Anchor with wire mesh.
Wood chips (Arborist mulch)	Long lasting. Readily available. Does not blow away. Popular in perennial gardens. Available in a variety of colors.	Texture and color not always uniform. Can form thick crusts that prevent water infiltration in hot dry conditions. High surface temperatures can be a problem for plants and feet. Does not transfer heat to soil. Can be a fire hazard. .	d Will not compact readily. Excellent mulch in watered gardens. A water-proof layer can form in hot dry conditions (like xeriscapes) unless the mulch is regularly disturbed.
Wood Shavings, Pole Peelings, Sawdust	Low cost.	Compact easily and can create barrier to water. Easily blown away.	Should only be applied to a depth of an inch or two.
Weed-barrier fabrics	Reduces weeds. Allows some air and water penetration to soil. Easy to apply. Though slow to degrade, require regular replacement to remain effective.	Interrupt the life-cycle of many native pollinators. Some may be costly. Most deteriorate in sunlight unless covered with another mulch material such as wood chips. Require regular replacement to remain effective.	Not recommended for landscapes. A good option for agriculture or vegetable production where it can be regularly replaced.
Pea gravel	Increases water infiltration. Can improve growth of perennials, especially in water-saving gardens.	Heat is transferred to the soil from stone mulches. Care should be taken to prevent spill-over into walkways and sidewalks.	Excellent mulch. Larger sizes (greater than ½") do not prevent weeds well and are not as beneficial for water savings as smaller particle sizes.
River Rock, Cobble, Large Stone	Can provide architectural interest to gardens and landscapes.	Stones greater than ½" in diameter do not function well as mulches.	Can be effectively used as garden borders and accents in conjunction with other materials.

Preventing Nitrogen Defciency

As organic mulches decompose, soil nitrogen is used by soil micro-organisms to break down the organic material. Typically this is confined to the narrow interface between soil and mulch and not a problem for plant nutrition. However, if durable organic mulches like bark or wood chips are mixed into the soil, nitrogen may become unavailable to your plants. If this occurs, compensate as needed with nitrogen fertilizer. A soil test can confirm nitrogen deficiency to ensure fertilizers are only used when needed. Never use a “weed-and-feed” type of fertilizer in mulched areas.

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