



*David Lynn Photography*

# Ground Surfacing Guide

A detailed resource exploring a wide range of surfacing options for designing safe, engaging, and developmentally appropriate outdoor play and learning environments for young children



**NATIONAL  
WILDLIFE  
FEDERATION**

**NWF ECHO**  
early childhood  
health outdoors

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# How to Use This Guide

**Every site has a unique combination of users, site conditions, and desired design outcomes, all of which will need to be considered when choosing surfacing for your outdoor space. This resource provides a brief summary of the qualities of common outdoor playspace ground surface materials to reference in the design and planning of your own outdoor play and learning space.**

This guide is intended to be used as a tool as a part of the design and material selection process, therefore this guide does not provide instructions or details for surface installation. However, additional information and resources regarding construction and design implementation can be found in the "Additional Resources" section on pages 27.



**When choosing a surface for your space, consider these questions to determine your surfacing needs:**

- Does your space include play features that might require approved safety surfacing or soft, cushioned surfacing that will lessen the impact of a child's fall?
- What age(s) is the playground designed for? Will the surfacing material become a choking hazard for any of these age groups?
- What is the overall look and feel you are trying to achieve? Will the surfacing fit your design theme?
- How much time and resources can you afford to spend initially and for ongoing maintenance and care over time?
- What is the function of the area that needs surfacing? Will the area need to be adapted for a high volume of use?
- Is the surfacing compliant according to ADA (Americans with Disabilities Act) standards?
- What environmental or site conditions exist and need to be addressed throughout the design process (i.e. drainage conditions, area of high sun exposure)?
- Are there any unique traits or conditions within your community that warrant special design considerations (e.g. health concerns, cultural standards)?

# How to Use This Guide

Each surface type is described according to following contexts to help you make informed decisions and meet the needs of your outdoor space:

- **Surface Type:** Unitary (material is bound together to create a single continuous surface), segmented (material exists as multiple units, compounded by a secondary material), or loose fill (material consists of small independent, moveable components)
- **Safety Surfacing:** Whether the surface is or is not considered 'protective surfacing' and what depth the material needs to reach in order to meet safety surfacing requirements
- **Cost:** Material and installation cost for each surface, on a scale from \$ (least expensive) to \$\$\$ (most expensive). Material and labor cost will vary based on location, availability, and the specific product.
- **Build Type:** Identifies expertise recommended for installation: contractor, a construction-savvy volunteer, or inexperienced volunteer
- **Age Range:** Appropriate for infants, toddlers, preschoolers, or school-age children
- **Degree of Maintenance Needs:** Low, medium or high, based on replacement frequency and material durability
- **Maintenance Considerations:** Specific tasks to maintain surface type
- **Accessibility:** As defined by the Americans with Disabilities Act (ADA)
- **Permeability:** How easily water can flow through the surface, into the ground beneath, to aid drainage in a site
- **Appropriate Settings:** Which activity settings or program areas would be most fitting for each surface



Certain surfaces are successful with certain settings, and some are even required by licensing standards.\* This is outlined on each page under **Recommended Settings**.

*\*A note on licensing standards: Every state has different standards and regulations regarding outdoor spaces. Be sure to adhere to local guidelines and collaborate with a licensing specialist or assessor to ensure compliance.*

# How to Use This Guide

Each surface page includes a comprehensive breakdown of the material's **Pros and Cons**, offering a nuanced understanding of how it performs within the broader context of a complete site. These insights take into account long-term behavior, maintenance implications, and how the material responds to environmental factors, use patterns, and adjacent surface types.

Additional **Design Considerations** are included throughout the guide, ranging from practical installation tips to subtle aesthetic or functional qualities that might not be immediately obvious.

These notes support a more holistic and effective design and implementation process, helping providers avoid common pitfalls and maximize the potential of each surface type.

## Before you start your project:

- Soil testing is highly recommended. Understanding your soil will inform decisions around drainage systems, plant selection, and the selection of your surface materials. Local university or extension offices often offer this service for little to no cost.
- Plan and follow a budget. Note that the costs included in this guide are generalizations, and costs will vary depending on local availability and the specific product that is selected. Consider labor and maintenance costs in your budget planning to avoid surprise costs.
- Connect with local plant organizations and construction groups to familiarize yourself with the variety of services available. Reach out to other childcare providers in your area to see if they've had success with a certain surfacing choice or contractor.



Hyperlinks are included throughout the guide to direct childcare providers and designers to more insight from trusted sources.

Research and innovation around playground surfacing and playground safety is ongoing! As regulating bodies flag health and environmental risks associated with certain surface materials, new products (such as [Corkeen®](#)) are being developed to make sure kids are kept safe and healthy while they play. Take the time to consider the tradeoffs associated with each surface and research your options to find the best fit for your space and community.

# Material Comparison Guide

	Type	Safety Surface	Cost*	Age Group	Build Type	Material Lifetime	Accessible	Page
Concrete/Stamped Concrete	Unitary	No	\$\$	All	Contractor	40-50 yrs	Yes	7
Asphalt	Unitary	No	\$\$	All	Contractor	15-20 yrs	Yes	8
Poured-in-Place Rubber	Unitary	Yes	\$\$\$	All	Contractor	8-12 yrs	Yes	9
Artificial Turf	Unitary	Yes*	\$-\$\$\$	All	Contractor	15-20 yrs	Yes	10
Decking (Wood or Composite)	Segmented	No	\$-\$\$\$	All	Construction Savvy	10-30 yrs	Yes*	11
Pavers, Tiles, Bricks	Segmented	No	\$-\$\$	All	Construction Savvy	15-20 yrs	Yes	12
Flagstone, Cut Stone	Segmented	No	\$\$	All	Volunteer	15-25 yrs	No*	13
Tree Cookies, Log Slices	Segmented	No	\$	All	Volunteer	2-5 yrs	No	14
Rubber Mats/Tiles	Segmented	Yes	\$\$	All	Contractor	8-10 yrs	Yes	15
Crusher Fines	Loose Fill	No	\$	4+	Construction Savvy	4-6 yrs	Yes	16
River Rock, Cobble Mix	Loose Fill	No	\$\$	All	Volunteer	15-25 yrs	No	17
Pea Gravel	Loose Fill	Yes	\$	4+	Volunteer	4-6 yrs	No	18
Wood Mulch	Loose Fill	Yes*	\$	4+	Volunteer	1-2 yrs	No	19
Engineered Wood Fiber (EWF)	Loose Fill	Yes	\$\$	2+	Contractor	8 yrs	Yes*	20
Shredded Rubber Mulch	Loose Fill	Yes	\$\$\$	4+	Contractor	10-15 yrs	Yes*	21
Sand/Earth	Loose Fill	Yes (sand)*	\$	2+	Volunteer	1-2 yrs	No	22
Lawn	Unitary	No	\$\$	All	Volunteer	N/A	No	23
Plants/Vegetative Ground Cover	N/A	No	\$\$	All	Volunteer	N/A	No	24

\*Safety surfacing, accessibility status, and cost dependent on context and installation details. See material page for more information.

# Concrete



- Surface Type:** Unitary
- Safety surface:** Not a safety surface
- Cost:** \$\$
- Build type:** Contractor build
- Age Range:** All ages
- Maintenance Needs:** Low, 40-50 year material lifetime
- Maintenance Considerations:** Clean/wash as dirt and grime build up; check for cracks and gaps; avoid using salt as a deicer; remove any snow, leaves, or other debris; occasional re-sealing
- Accessibility:** ADA accessible
- Permeability:** Typically non-permeable



## Recommended Settings:

- Primary pathways
- Wheeled toy play
- Tricycle/bicycle path
- Easily accessible pathways
- Patios or multipurpose and gathering areas

## Pros

- Low maintenance and long lasting
- Opportunities for murals, textures, etc
- Variety of activities and uses
- Cost effective

## Cons

- Cracks develop over time due to weather and use volume
- High initial cost
- Hard surface can lead to more severe injuries from falls

Resource: [The Green Desk "Imprinting Concrete with Natural Objects"](#)



*Can be stamped or painted to add visual interest or texture!*

*Permeable concrete options are more costly and require a higher degree of maintenance, but may improve site drainage conditions*

Banner Image: Natural Learning Initiative

# Asphalt

**Surface Type:** Unitary

**Safety Surface:** Not a safety surface

**Cost:** \$\$

**Build Type:** Contractor build

**Age Range:** All ages

**Maintenance Needs:** Low, 12-20 year material lifetime

**Maintenance Considerations:** Clean/wash as dirt and grime build up; check for cracks and gaps; keep clear of any snow, leaves, or other debris; re-seal every 3-5 years

**Accessibility:** ADA accessible

**Permeability:** Non-permeable



## Recommended Settings:

- Primary pathways
- Wheeled toy play
- Tricycle/bicycle path
- Easily accessible pathways
- Shaded gathering areas
- Multi-purpose play spaces

## Pros

- Melts snow quickly
- Quick installation and dry time (~24 hrs)
- Opportunities for painting, murals, art, etc on the ground
- Small cracks can be filled for approx. \$1-\$3 per linear foot

## Cons

- Cracks develop over time due to weather and use volume
- Hard surface can lead to more severe injuries from falls
- Surface gets hot in direct sun
- Limitations to possible size of surface area



*Asphalt will absorb and retain heat from sunlight, can become very hot in the summer*

*Can crack and wear more easily in colder climates*

Banner Image: Pentagon Play

# Poured-in-Place Rubber

**Surface Type:** Unitary

**Safety Surface:** Safety surface

**Cost:** \$\$\$

**Build Type:** Contractor

**Age Range:** All ages

**Maintenance Needs:** Low to medium, 8-12 year material lifetime

**Maintenance Considerations:** Keep clear of debris; sanitize as needed; needs occasional re-sealing and treatment

**Accessibility:** ADA accessible

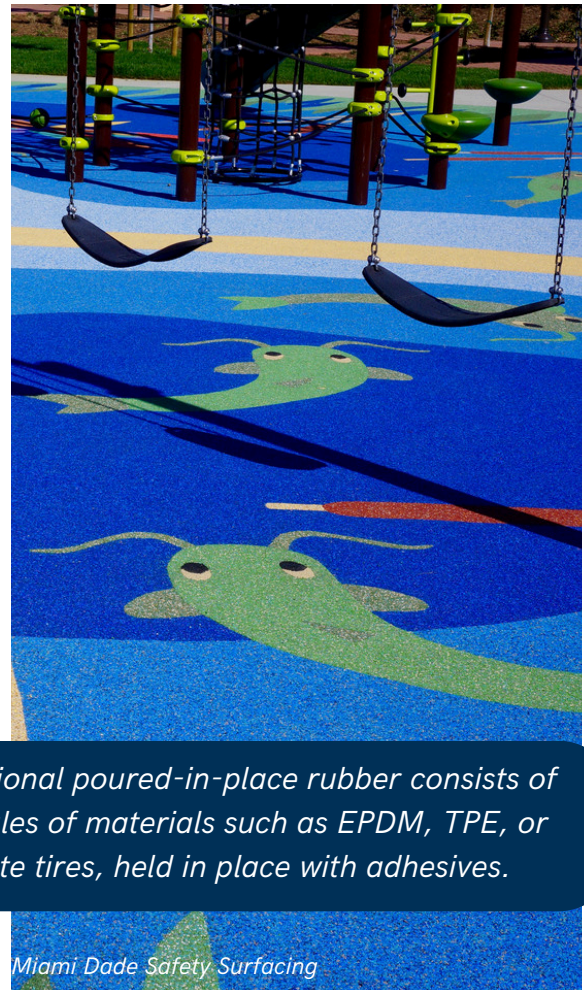
**Permeability:** Permeable or impermeable, depending on installation method (discuss with contractor)

## Pros

- Easy to clean
- More durable and longer lasting than loose fill materials
- Different color, shape, and design options

## Cons

- Can get hot in the sun
- High upfront cost
- Can harden over time in cold, dry climates
- *Some concern around chemical leaching from PIP rubber, natural alternatives (cork) are more expensive*



*Traditional poured-in-place rubber consists of granules of materials such as EPDM, TPE, or waste tires, held in place with adhesives.*

*Miami Dade Safety Surfacing*



*Integrity Safety Surfacing*

*Banner Image: Eclectic Landscape*

## **Recommended Settings:**

- Play equipment areas
- Fall zones: areas with climbing or play structures where a safety surface is needed
- Primary pathways
- Wheeled toy play
- Tricycle/bicycle path
- Open space play areas

*Poured-in-place (PIP) is a strong surfacing choice for areas where children are learning to walk because of the evenness of the surface and it's classification as a fall surface*

# Artificial Turf

**Surface Type:** Unitary or segmented

**Safety Surface:** Safety surface if installed with shock-absorbing sub-layer

**Cost:** \$ (basic turf) - \$\$\$ (turf with shock padding)

**Build Type:** Construction-savvy volunteer to contractor

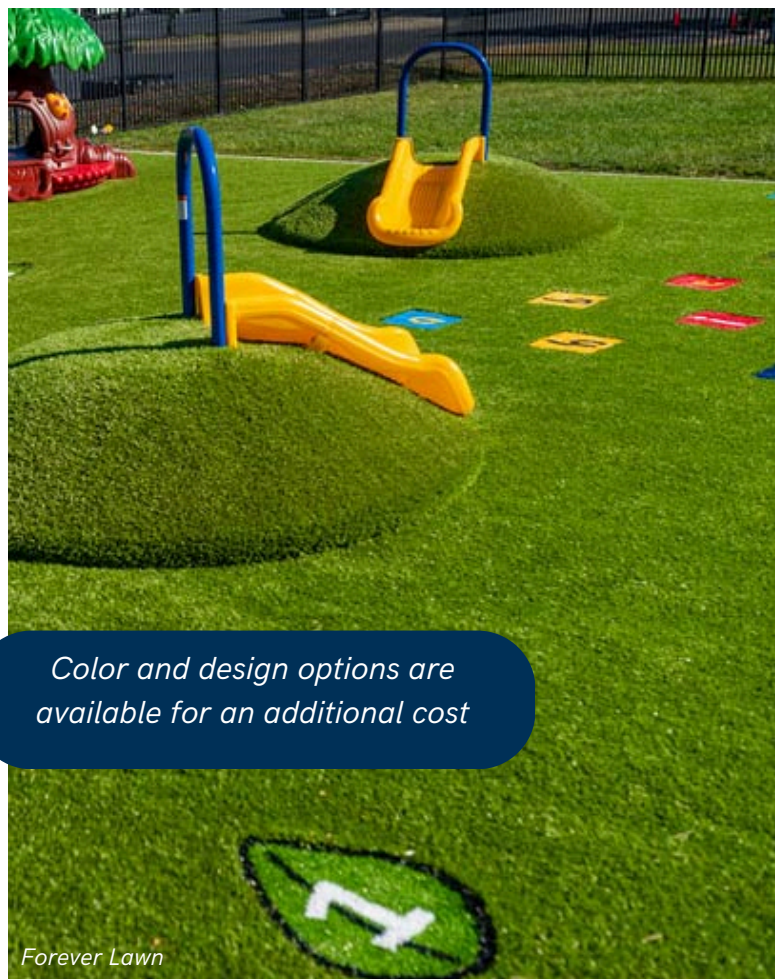
**Age Range:** All ages

**Maintenance Needs:** Low to medium, 15-20 year material lifetime

**Maintenance Considerations:** Wash out dirt and grime; high-use areas may need patching and repairs; keep free of debris; ensure no peeling at corners or joints

**Accessibility:** ADA-accessible

**Permeability:** Semi-permeable (permeability and drainage conditions contingent on proper subbase preparation, installation techniques, and drainage system)



*Color and design options are available for an additional cost*

Forever Lawn



ProGreen

## **Recommended Settings:**

- Fall zones: areas with climbing or play structures where a safety surface is needed
- Multi-purposes areas
- Low balance play
- Ball play and sports
- Play/climbing structures
- Mounds and embankment slides

## **Pros**

- Better drainage and slip resistance than traditional lawn
- More cushioning than traditional lawn

## **Cons**

- Absorbs heat from the sun more than grass
- High installation cost
- *Ongoing research around health and environmental concerns linked to artificial turf, and in particular, artificial turf infill (rubber crumb)*

Banner Image: Blue Ocean Turf

# Decking (Wood or Composite)

**Surface Type:** Segmented

**Safety Surface:** Not a safety surface

**Cost (wood):** \$

**Cost (composite):** \$\$

**Build Type:** Construction-savvy volunteer or contractor

**Age Range:** Appropriate for all ages

**Maintenance Needs:** Low, 10-30 year material lifetime

**Maintenance Considerations:** May need treating/sealing to avoid rot and sun damage; keep clear of debris and unwanted material

**Accessibility:** ADA accessible (if space includes ramp for access onto raised deck)

**Permeability:** Semi-permeable (consider permeability and drainage conditions of ground underneath decking)



## **Pros**

- Multipurpose
- Relatively long material lifetime (10-30 years for wood, 30-50 years for composite decking, depending on climate and use volume)
- Resistant to mold and bacteria growth

## **Cons**

- Composite materials may get hot in the sun
- Wood decking may crack/splinter and have more maintenance needs than composite

*Decks can be rectangular, hexagonal, or a custom shape. Exact dimensions and shape of your deck will vary based on budget and site conditions to complement existing play and learning settings.*

## **Recommended Settings:**

- Gathering and assembly spaces
- Performance stage
- Dramatic play space
- Outdoor classroom
- Loose parts play
- Boardwalk

*Resource: [ECHO "How-To Guide Play Decks"](#)*

Banner Image: OutBack Deck



# Pavers, Tiles, Bricks

**Surface Type:** Segmented

**Safety Surface:** Not a safety surface

**Cost:** \$-\$\$

**Build Type:** Construction-savvy volunteer or contractor

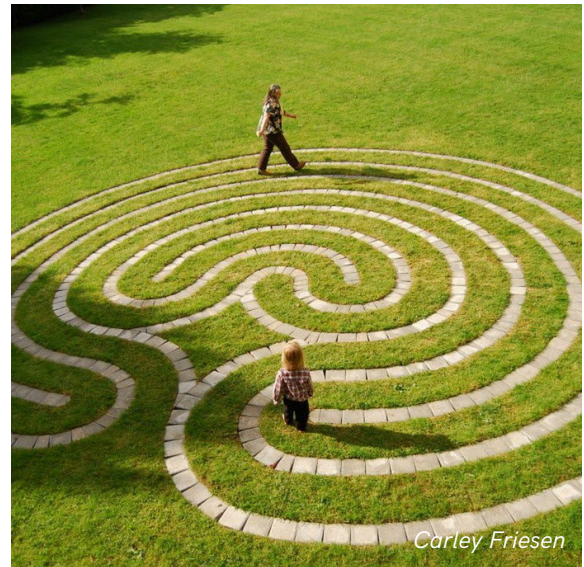
**Age Range:** All ages

**Maintenance Needs:** Low, 15-20 year material lifetime

**Maintenance Considerations:** Clean/wash as dirt and grime build up; keep free of weeds or sprouting plants; remove any snow, leaves, or other debris; re-seal every 3-5 years

**Accessibility:** ADA accessible if surface is smooth, firm, and slip-resistant

**Permeability:** Semi-permeable (permeable pavers may be more expensive and require higher maintenance)



## Recommended Settings:

- Primary pathways
- Wheeled toy play
- Tricycle/bicycle path
- Sensory pathways
- Patios or multipurpose, gathering spaces
- Labyrinth

*Several materials can be used to fill the spaces between pavers. Each joint fill option offers pros and cons related to toxicity, erosion potential, and environmental impact. Work with your contractor to determine which jointing material will be the best option for your space and needs.*

## Pros

- Variety of options for colors and textures
- If desired, greenery between pavers can naturalize a space and increase permeability of surface for drainage
- Resistant to cracking
- Can replace individual pavers if necessary

## Cons

- Longer, more tedious installation process
- Higher upfront labor cost for installation



*Banner Image: reddit via u/grapesarevegetables*

# Flagstone, Cut Stone

**Surface Type:** Segmented

**Safety Surface:** Not a safety surface

**Cost:** \$9/sf (varies)

**Build Type:** Volunteer, construction-savvy volunteer, or contractor (depending on desired application of material)

**Age Range:** All ages

**Maintenance Needs:** Low, 12-20 year material lifetime

**Maintenance Considerations:** Clean/sweep as dirt and grime build up; keep free of weeds or sprouting plants; remove any snow, leaves, or other debris

**Accessibility:** Not ADA accessible, unless stones are embedded in stable and accessible medium

**Permeability:** Semi-permeable

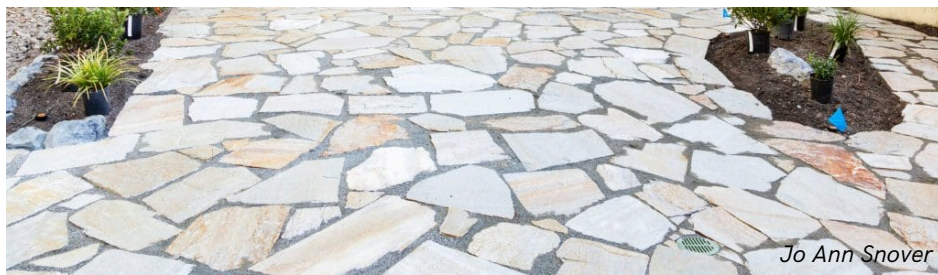
Resource: [Natural Learning Initiative "InfoSheet 06. Stepping Stone Pathways & Small Patios"](#)



David Lynn Photography

## Recommended Settings:

- Secondary pathways
- Garden or sensory paths
- Patios
- Gathering areas
- Messy play/water play



Jo Ann Snover

*Technical expertise needed to create level surface for accessibility and proper drainage across the surface*

## Pros

- Variety of colors and textures, depending on local availability
- Greenery between pavers can add a natural and sensory aesthetic to the space
- Resistant to cracking
- Can replace individual pavers if necessary

## Cons

- Longer, more tedious installation process
- *Some concern around toxicity and environmental impact of joint fill material; work with contractor to determine best joint fill material for your site*
- Range of stone quality when ordering material in bulk



Natural Learning Initiative

Banner Image: Sunland Bark & Topsoil

# Tree Cookies, Log Slices

**Surface Type:** Segmented

**Safety Surface:** Not a safety surface

**Cost:** \$

**Build Type:** Volunteer or construction-savvy volunteer

**Age Range:** All ages

**Maintenance Needs:** Medium, 2-5 year material lifetime

**Maintenance Considerations:** Outer bark may begin to rot (can be treated prior to install or removed entirely); may need wood treatment; individual slices/cookies may need replacing after time

**Accessibility:** Not ADA accessible

**Permeability:** Semi-permeable



*Della Creates*



*The Tree Cutting Company*

## Recommended Settings:

- Sensory path
- Secondary and tertiary paths
- Low balance play
- Loose parts
- Discovery elements (turnover tree cookies)

*Tree cookies can be fixed in place (as steppers or a path) or can be movable (turn-over tree cookies, moveable seating)*

## Pros

- Inexpensive
- Easy to purchase and install
- Easy to transport
- Can replace single tree cookies as needed

## Cons

- Can degrade and rot over time
- Susceptible to pests
- Can have sharp edges if not prepared or installed correctly

# Rubber Mats/Tiles

**Surface Type:** Segmented

**Safety Surface:** Yes, if tile is >2.5" thick

**Cost:** \$\$

**Build type:** Construction-savvy volunteer or contractor

**Age Range:** All ages

**Maintenance Needs:** Low to medium, 8-10 year material lifetime

**Maintenance Considerations:** Keep clear of debris; sanitize as needed; replace individual tiles as needed

**Accessibility:** ADA accessible

**Permeability:** Semi-permeable or impervious (depending on specifications, subgrade material, and installation technique)

## Recommended Settings:

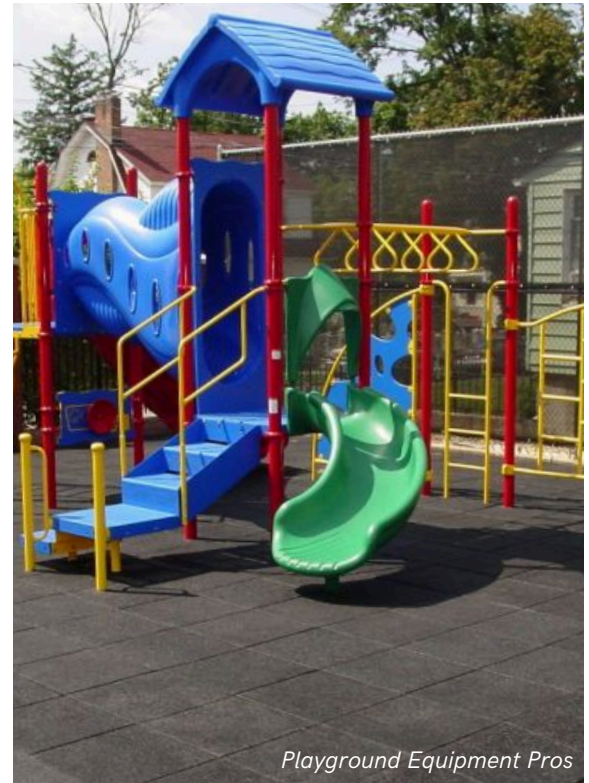
- Play equipment area
- Fall zones: areas with climbing or play structures where a safety surface is needed
- Open space play areas
- High traffic areas through mulch or stone materials
- Movable infant areas

*Not all rubber tiles and mats are the same thickness. 2.5" thick tile is rated for ~6 ft fall height. Thinner tiles can be utilized in low balance or infant areas with equipment less than 18" tall.*



American Mat Rubber

Banner Image: Xiha Montessori



Playground Equipment Pros

## Pros

- Easy to clean
- More durable and longer lasting than loose fill materials
- Easy to replace single mats when needed
- Different color and design options
- Some similar DIY options (foam mats)

## Cons

- High upfront cost
- *Some concerns of chemical leaching and health impacts; effect can be mitigated if mats are used sparingly*
- Tiles may pull apart over time, creating a tripping hazard

# Crusher Fines

(Decomposed Granite, Stone Dust, Breeze, Crushed Shells)

**Surface Type:** Loose fill (generally is bonded)

**Safety Surface:** Not a safety surface

**Cost:** \$

**Build Type:** Construction-savvy volunteer or contractor

**Age Range:** Preschoolers and school-age children  
(choking hazard for infants and toddlers)

**Maintenance Needs:** Medium, 4-6 year material lifetime

**Maintenance Considerations:** Keep free of weeds and sprouts; rake/sweep material back into place after heavy rain or wind; stabilize as needed

**Accessibility:** ADA accessible, but not ideal for comfort or ease of mobility

**Permeability:** Permeable (permeability and drainage conditions contingent on proper subbase preparation, installation techniques, and drainage system)

## Recommended Settings:

- Primary pathways
- Secondary pathways
- Loose parts play
- Messy play/water play areas
- Patio/gathering areas

*Check with local landscape material suppliers to determine best choice of stone or other crushed loose fill material for your site.*

## Pros

- Inexpensive and easy to install
- Good drainage
- Well suited for messy/water play activities

## Cons

- Tends to spread to unwanted areas
- Can be dusty in high-traffic areas; dust can be difficult to get out of protective hair styles
- May wash out in areas with high rainfall or drainage, will need re-stabilizing more frequently



*Install edging material around the perimeter of your crusher fines area to keep the material in place. Shown here are examples of stone edging (above) and plastic landscape edging (below).*



Banner Image: ARS Landscape

# River Rock, Cobble Mix

**Surface Type:** Loose fill

**Safety Surface:** Not a safety surface

**Cost:** \$\$

**Build Type:** Volunteer

**Age Range:** Preschoolers and school-age children (choking hazard for infants and toddlers)\*

**Maintenance Needs:** Low to medium, 15-25 year material lifetime

**Maintenance Considerations:** Return loose stones back to designated areas; keeping stones free of debris

**Accessibility:** Not ADA accessible

**Permeability:** Permeable (permeability and drainage conditions contingent on proper subbase preparation, installation techniques, and drainage system)

*Resource: [Natural Learning Initiative "InfoSheet 36. Dry Stream Beds"](#)*



## Pros

- Deters microbial growth
- Can help manage stormwater on property
- Supports a naturalized playspace aesthetic
- Encourages fine and gross motor skill-building

## Cons

- Can be difficult to move or rearrange
- Debris and/or hazards may become lodged between rocks

*\*Consider size of stones in spaces with infants and toddlers. Avoid small stones that could create a choking hazard.*

*Larger rock materials may call for behavioral modeling and supervision to ensure children are interacting with the rocks safely*

Banner Image: Dubberely Landscape



## **Recommended Settings:**

- Loose parts play
- Dry stream bed or drainage channels
- Discovery play
- Natural construction
- Sensory path or garden
- Earth play



# Pea Gravel

**Surface Type:** Loose fill

**Safety Surface:** Yes (9" material depth protects falls from up to 5')

**Cost:** \$

**Build Type:** Volunteer

**Age Range:** Appropriate for preschoolers and school-age children (choking hazard to infants and toddlers)

**Maintenance Needs:** Medium, 4-6 year material lifetime

**Maintenance Considerations:** Rake into place to keep material level; keep free of weeds or sprouting plants; add fresh gravel every 3-5 years, or as needed, to maintain proper depth

**Accessibility:** Not ADA accessible

**Permeability:** Permeable (permeability and drainage conditions contingent on proper subbase preparation, installation techniques, and drainage system)

*Gravel does not retain heat like rubber or wood materials, making it well suited for hot climates and sunny areas*

## Recommended Settings:

- Loose parts play
- Low balance play
- Planting areas
- Secondary pathways
- Digging areas

*Rock stabilizer can be applied to pea gravel in non-play areas to prevent material from spreading or migrating*



*Eco Sod & Soil*

## Pros

- Low upfront cost and installation effort
- Unattractive to burrowing animals
- Relatively clean (deters microbial growth)
- Cat-resistant alternative to sand as a digging play medium
- Affords opportunities for digging and scooping, offering additional play value

## Cons

- Can compress and redistribute in areas of heavy traffic (calls for consistent maintenance)
- Over time, breaks into smaller pieces and compresses into "hard-pan"
- Low impact absorption (not suited for high-set climbing elements)
- Can be difficult to walk across large areas or distances



*Kristina Buskirk*

*Banner Image: XGrass*

# Wood Mulch

**Surface Type:** Loose fill

**Safety Surface:** Can be a safety surface at proper depth (9" of mulch protects up to a fall height of 7')

**Cost:** \$

**Build Type:** Volunteer, construction-savvy volunteer or contractor (depends on scale)

**Age Range:** Appropriate for preschoolers and school-age children (choking hazard for infants and toddlers)

**Maintenance Needs:** Low to medium, 4-5 year material lifetime

**Maintenance Considerations:** Needs regular turning over to prevent decomposing; rake material back into place occasionally; top off mulch as needed

**Accessibility:** Not ADA accessible

**Permeability:** Semi-permeable (permeability and drainage conditions contingent on proper subbase preparation, installation techniques, and drainage system)



*Ideal mulch depth in planting areas is 2"-4" to maximize moisture retention and mitigate weeds*

## Recommended Settings\*:

- Loose parts play
- Planting areas and garden beds
- Low balance play areas
- Gathering space
- Primary and secondary paths

*\*Different mulch types have different applications. Discuss with contractor or material representative to choose the best mulch for your situation.*



## Pros

- Inexpensive
- Relatively easy to purchase, transport, and install

## Cons

- Susceptible to degradation
- Poor drainage quality
- Risk of splinters
- Needs raking to keep material level and even
- Dyed or treated mulch can contribute to negative environmental impact

*Mulch can be set in place in non-play areas using landscape glue or stabilizers to prevent material from spreading or moving*



*Banner Image: Texas Garden Materials*

# Engineered Wood Fiber (EWF)

**Surface Type:** Loose fill

**Safety Surface:** Yes (9" minimum, 12" preferred for falls up to 10')

**Cost:** \$\$

**Build Type:** Contractor

**Age Range:** Appropriate for preschoolers and school age children

**Maintenance Needs:** Medium, 2-5 year material lifetime (based on volume of use)

**Maintenance Considerations:** Raking out to even grade; topping off to maintain depth

**Accessibility:** ADA accessible, if stabilized and well-maintained

**Permeability:** Permeable (permeability and drainage conditions contingent on proper subbase preparation, installation techniques, and drainage system)



Mr. Mulch

*EWF is made from virgin, untreated hardwood or softwood, with no recycled pallets or chemical treatments*

## Recommended Settings:

- Fall zones: areas with climbing or play structures where a safety surface is needed



## Pros

- Uniformity of size and shape allow interlocking of material to create stable, safety surface
- No sharp edges (smoother edges than standard wood mulch)
- Naturalized aesthetic
- More durable than standard wood mulch

## Cons

- Susceptible to mold and insects
- Loose fill may hide hazards
- Potential to freeze in winter
- Risk of splinters
- May spread out in areas of heavy traffic and become less effective

Banner Image: Mountain West Products

# Shredded Rubber Mulch

**Surface Type:** Loose fill

**Safety Surface:** Yes (6" required for falls from up to 10' high)

**Cost:** \$\$\$

**Build type:** Volunteer, construction-savvy volunteer, or contractor

**Age Range:** Preschoolers to school age

**Maintenance Needs:** Low, 10-15 year material lifetime

**Maintenance Considerations:** Raking to maintain level ground and even distribution; keep free of unwanted debris

**Accessibility:** Not ADA-accessible

**Permeability:** Permeable (permeability and drainage conditions contingent on proper subbase preparation, installation techniques, and drainage system)



## Pros

- No sharp edges
- Doesn't compact, attract insects, or mold like wood mulch
- Good drainage and dries quickly after a rain event

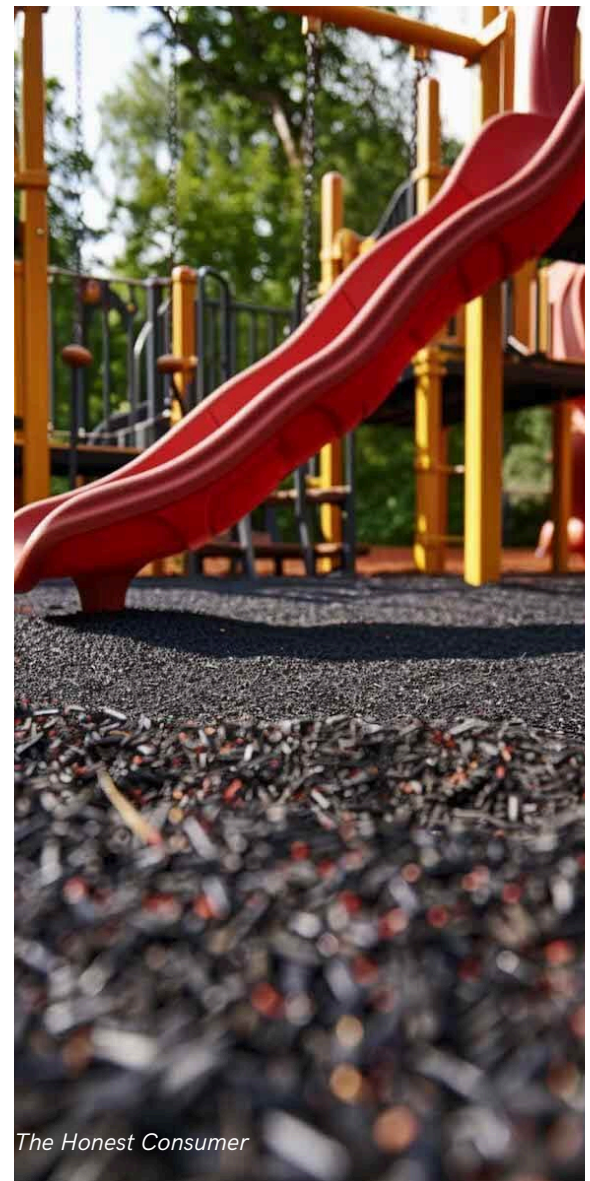
## Cons

- Absorbs and retains heat in the sun
- Needs raking and topping off in high-use areas
- *Concern regarding toxicity of material for human health and environmental contamination*
- Younger children may try to taste or eat rubber mulch
- Can get slippery when wet
- Wet or dyed rubber mulch can stain skin and clothes

## **Recommended Settings:**

- Fall zones: areas with climbing or play structures where a safety surface is needed

*Install material with an edger around the perimeter to keep rubber mulch in place*



*Banner Image: Premier Materials*

# Sand/Earth

**Surface Type:** Loose fill

**Safety Surface (sand):** Yes (9" depth protects falls from 4' high)

**Safety Surface (earth):** Not a safety surface

**Cost (sand):** \$

**Cost (earth):** \$

**Build Type:** Volunteer

**Age Range:** Toddler to school age (may be appropriate for infants with supervision to reduce ingestion)

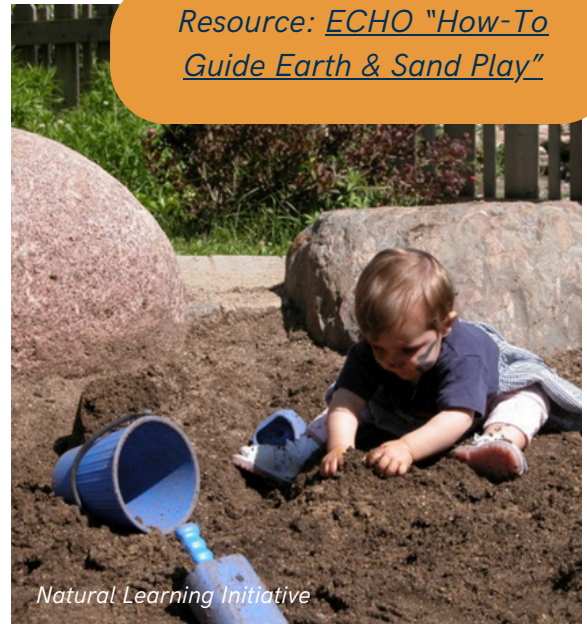
**Maintenance Needs:** Low to medium, 1-2 year material lifetime before needing topping off

**Maintenance Consideration:** Top off annually; check for hazardous or unwanted material regularly; rake to maintain uniform depth

**Accessibility:** Not ADA accessible

**Permeability:** Permeable, if installed with proper subbase and drainage solutions

Resource: [ECHO "How-To Guide Earth & Sand Play"](#)



Natural Learning Initiative

*Soil and natural earth are a dynamic and sensory materials with a host of physical and psychological benefits for children*



Natural Learning Initiative

## Recommended Settings:

- Low balance structures
- Sand play
- Earth play
- Messy play
- Mud kitchen
- Loose parts

*Earth play mix is composed of a combination of natural materials, such as sphagnum moss, organic soil, sustainably harvested peat moss, play sand, mini pine-park nuggets, or coco coir. Ensure your earth play mix is non-toxic.*

## Pros

- Low up-front cost
- Multi-functional surface
- Can enhance hand-eye coordination and help develop fine motor skills as children pour, scoop, sift and shape the material

## Cons

- May attract animals and insects (needs a cover when not in use)
- Loose fill may hide potential hazards
- May need behavioral modeling to discourage throwing or tasting the material
- Earth and sand material can become a slipping hazard on other surfaces; consider allowing buffer space around sand/earth play areas
- Material can be dirty and hard to get out of protective hair styles

# Lawn

**Surface Type:** Unitary

**Safety Surface:** Not a safety surface

**Cost (traditional seeding):** \$

**Cost (roll-out sod):** \$\$

**Build Type:** Volunteer

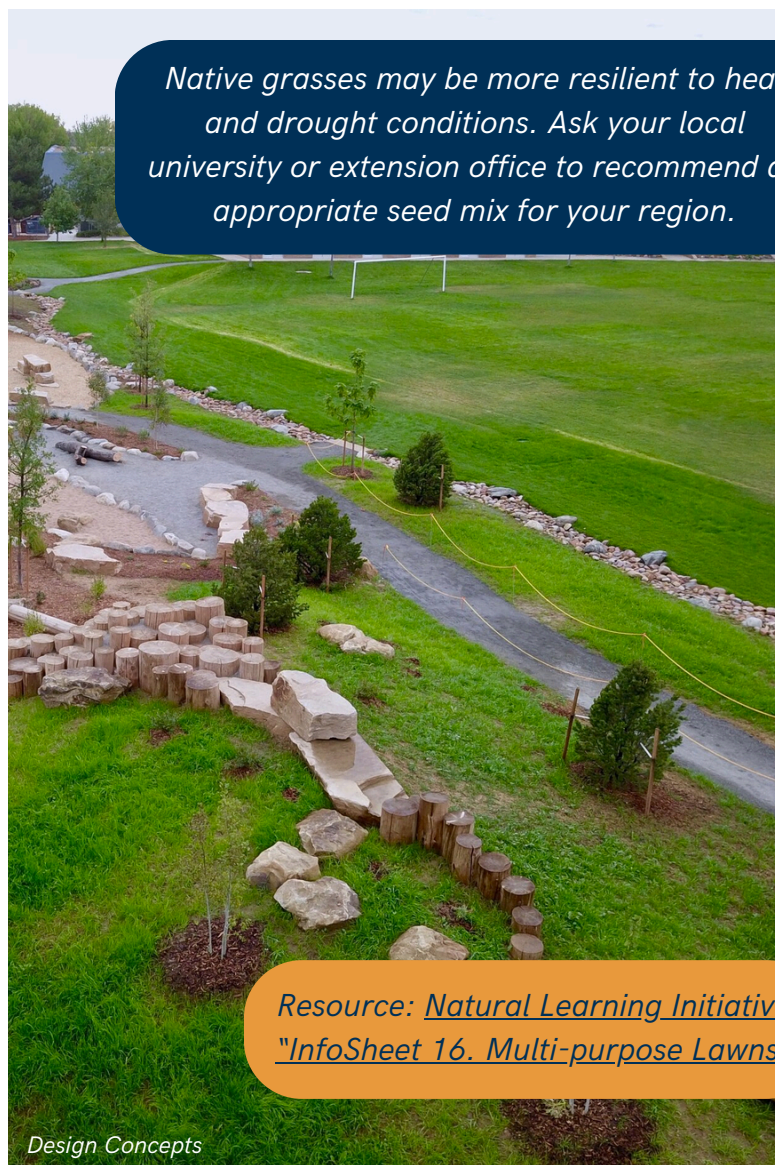
**Age Range:** All ages

**Maintenance Needs:** Medium (high in dry climates)

**Maintenance Considerations:** Seeding, fertilizing, leaf clearing, weeding, watering

**Accessibility:** Not ADA-accessible

**Permeability:** Permeable



*Native grasses may be more resilient to heat and drought conditions. Ask your local university or extension office to recommend an appropriate seed mix for your region.*

*Resource: [Natural Learning Initiative "InfoSheet 16. Multi-purpose Lawns"](#)*



## Pros

- Verdant and vegetated
- Low up-front cost
- Sensory benefits
- Does not retain heat

## Cons

- Needs consistent and high amounts of resources and care
- Some people have an allergic reaction to grass, causing skin irritation
- Prone to weeds
- Monoculture deters pollinators

## **Recommended Settings:**

- Multi-purpose lawn
- Open space
- Gathering areas
- Water and messy play areas
- Loose parts play
- Low balance play areas
- Ball play or sports
- Natural construction

*Banner Image: Jiamiao Lin*

# Plants/Vegetative Groundcover

**Surface Type:** N/A

**Safety Surface:** Not a safety surface

**Cost:** \$\$

**Build Type:** Volunteer or construction-savvy volunteer

**Age Range:** All ages (ensure plants are non-toxic)

**Maintenance Needs:** Medium to high

**Maintenance Considerations:** Weeding, watering, pruning, adding any necessary soil amendments or plant fertilizer

**Accessibility:** Not ADA-accessible

**Permeability:** Permeable



Gardening Know How

*Utilize local resources (university extension offices, local garden centers, botanic gardens) to choose plants well-suited to your site's conditions. Some organizations offer free soil testing as well.*

## Recommended Settings:

- Pollinator garden
- Sensory garden/path
- Discovery play
- STEM activities
- Dramatic play areas
- Secondary path

*Resource: [ECHO "How-To Guide Habitat Gardens"](#)*



High Country Gardens

## Pros

- Very naturalized
- Native plants on site attract pollinators and enrich soil health
- Increased exposure to plants and wildlife
- Open-ended play opportunities
- Aesthetic diversity
- Children can be involved in garden care and maintenance
- Sensory opportunities
- Ground cover can be a low-mow alternative to grass lawn
- Helps to mitigate heat and filter pollutants from the air, water, and soil

## Cons

- Plants need consistent resources and care
- May lack accessibility
- Potential bug bites/bee stings

Banner Image: Kindra Clineff

# Mixed Materials

Some materials are most successful when installed together. A few compatible material combinations are listed here, although be sure to collaborate with your designer or contractor to maximize the success of the surfaces included in your outdoor play and learning space.



Fine Gardening

▲ Dry stream beds are made of a combination of **river rocks** and **larger landscaping rocks** and are often embedded in **concrete**. **Native grasses** and **water-loving plants** grow nicely around a dry stream bed.



Kinder Cloth

▲ An **outdoor carpet or rug** can be laid on top of hard surfaces, such as **concrete** or **decking** to make a comfortable gathering area. An outdoor rug on top of **lawn** can also protect against skin irritation.



Red Monks Play

▲ Sensory paths can be made from a number of surfacing materials, such as **tree cookies**, **groundcover**, **flagstone**, and more. Your imagination is the limit when it comes to what is included in your sensory path!



Great Mat

▲ **Rubber mats or tiles** can be placed in high-traffic areas of **EWF** or **mulch** to protect those spots from wearing out too quickly.

*Edging or border materials will also introduce another material type into each setting. Edging and border materials are available at a variety of price points and aesthetic qualities. Some examples include aluminum, plastic, stone or wood. Edging or borders may be included between two different surface types to differentiate between them, or around the perimeter of a loose fill material to prevent the material from spreading to unwanted areas.*

## **Should I be concerned about toxins in my surfacing choice?**

Some plastic based materials, such as rubber or artificial turf, can leach chemicals when subjected to heat as they degrade overtime. This can lead to health or environmental impacts on children who encounter these materials each day. Make sure to work with reputable surfacing companies and discuss the most healthy surfacing option with them and research the impacts of these effects to be informed in your design choices. Keep in mind that there may be trade-offs between functionality, durability, and risk of toxic exposure.

## **How can I minimize risk of toxic exposure for children and adults?**

Minimize use of known toxic material surfaces in your space. Follow manufacturer guidelines for maintenance and care to keep material in good condition. Encourage handwashing after outdoor play and supervise closely to ensure that children are not ingesting surface material.

## **How can I keep children safe on playground equipment?**

Ensure you have the right safety surfacing covering an appropriate radius of space around the equipment. Check with local licensing bodies and adhere to the most recent ASTM guidelines to make sure you are following fall-zone and safety guidelines.

## **How does ground surfacing contribute to outdoor play and learning?**

Beyond safety, surfacing can encourage sensory exploration, movement, and creativity. Varying textures and materials can support different types of play and developmental learning.

## **How can I keep the outdoor play and learning space cool in the summer?**

Add a variety of shade (e.g. umbrellas, shade sail, pergola) to your space to provide respite from the sun. Choose surfacing options in a lighter color when possible, as lighter hues retain less heat than dark colors.

## **How can my space support local animal and plant populations?**

Choose surface types that have the least known amount of environmental impacts. Avoid dyes in your surface materials and include a range of plant life to provide food and shelter for animals and pollinators.



# Additional Resources

Local and national vendors often offer consultation services and information sheets regarding surfacing choices and maintenance guidelines. Other organizations are entirely dedicated to providing information on accessible or child-safe surfacing materials.

- [National Early Childhood Program Accreditation](#)
- [Children’s Environmental Health Network](#)
- [US Access Board “Chapter 10: Play Areas”](#)
- [PlayCore “Surfacing”](#)
- [PlayCore Plant Database](#)
- [Toxics Use Reduction Institute “Playground Surfacing”](#)
- [Garden for Wildlife](#)
- [ECHO “Stewardship Guidelines for Colorado”](#)
- [Natural Learning Initiative “Preschool Outdoors: Best Practice Toolkit”](#)
- [Harper’s Playground](#)
- [ECHO](#)
- [Natural Learning Initiative](#)
- [Public Playground Safety Handbook](#)