# Child Care Facilities **Outdoor Surfacing Guide**

**Environmental** and **children's health considerations** for available surfacing options for child care facilities.

Prepared by the Low Income Investment Fund

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# How to Use

High-quality outdoor child care environments promote children's well-being, health and safety while also offering rich opportunities for learning and exploration. Materials should be used in combination throughout an outdoor child care area to encourage diverse play and rich sensory experiences.

Cost, ease and license compliance are important considerations for a child care provider when designing their spaces. However, it is important to recognize that materials vary widely in how they affect children's health and development, as well as their environmental impact through production and pollution.

**Rating system**
The following pages highlight how each surfacing option impacts children's health and development, and the environment. The rating scale below is used to summarize recommendations.

| | | |
|---|---|---|
| Highly recommended |  | Overall positive impact on both children's health & environment. |
| Sometimes recommended |  | Not compelling evidence for benefits to children but useful for some scenarios. |
| Not recommended |  | Harmful to both children and the environment. |

**Cost estimates**
Materials and labor costs will vary widely depending on geography and availability. Cost and maitenance estimates are national averages and are intended to serve as an approximation rather than exact cost. Please consult local vendors for cost and labor estimates.

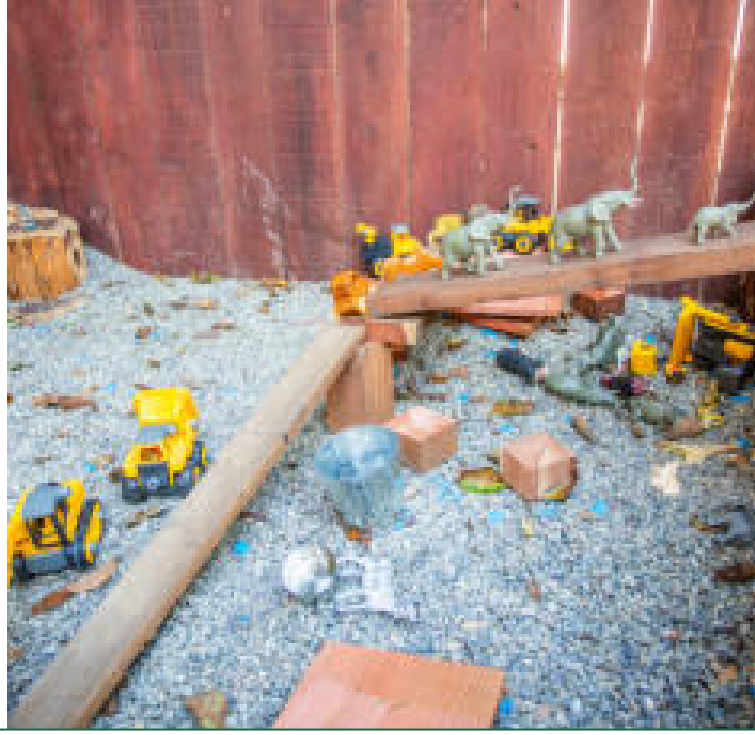
# Table of Contents



# Pea gravel

**Loose fill fall surfacing**

A decorative aggregate composed of small, smooth, rounded stones (typically about 3/8″ to ½″ diameter). It is commonly used in landscape, playground, pathway, and garden settings, providing a loose, permeable, natural-looking surface.



## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • can provide good drainage and reduce puddling, making outdoor play areas safer during and after rain<br>• rounded stones are gentler than sharp gravel edges, which can reduce cuts or abrasions in the fall<br>• a "loose" surface that encourages sensory play—kids can dig, move stones, and interact with natural materials, promoting exploration and motor skills | • stones can shift underfoot and pose a tripping hazard<br>• small stones might get into shoes, clothing, or be a choking risk (for younger children)<br>• over time, the surface may become uneven, creating pockets of deeper material or bare spots that affect stability<br>• not ADA accesible |
| Environmental impact | • a natural, inert material that does not require chemicals or fertilizers<br>• allows rainwater to percolate through to the soil below (i.e. good permeability), which helps reduce runoff and supports groundwater recharge | none! |

| | |
|---|---|
| **Cost estimate** | ~$2-4 per sq foot |
| **Typical lifespan** | ~3-7 years |
| **Maintenance level** | High (raking, redistribution as needed) |

Highly recommended

# Bark, mulch, or wood chips

**Loose fill fall surfacing**

Organic (wood-based) materials broken down into chips, shredded bark, or fiberized wood designed for ground cover or playground surfacing.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • a "loose" surface that encourages sensory play—kids can dig, move bark, and interact with natural materials, promoting exploration and motor skills<br>• in hot weather, does not absorb and retain heat<br>• good fall material | • may pose some accessibility issues for some children (wheelchair, etc.) |
| Environmental impact | • natural material that decomposes overtime<br>• creates an inviting environment for animal and plant life | • important to source untreated wood<br>• can harbor mold if wet |

| | |
|---|---|
| **Cost estimate** | ~$2-$5 per sq foot |
| **Typical lifespan** | ~1-3 years |
| **Maintenance level** | High (requires top-offs every 1-2 years, leveling) |

Highly recommended

# Engineered Wood Fiber (EWF)

**Loose fill fall surfacing**

An engineered wood fiber (EWF) playground is a play area that uses a specialized, manufactured wood-based surfacing material to provide a safe, cushioned, and shock-absorbent surface. It is made from virgin wood, processed to be free of hazardous metals, and manufactured to meet specific safety and accessibility standards set by organizations like ASTM International. This surfacing is distinct from regular wood chips due to its consistent, fine-ground composition that provides a stable and durable surface. Bonded EWF refers to engineered wood fibers that are bound with chemical adhesives.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • natural look and feel promotes connection to nature and sensory play<br>• EWF has a high maximum protected fall of 20ft<br>• Can be manipulated easier for flat surfaces to lay on top, making it more accessible for wheelchair use | • chemical adhesives to bound EWF together may contain chromated copper arsenate (CCA) which can be harmful to children's health<br>• possibility for mold growth |
| Environmental impact | • EWF still decomposes over time, but slower than regular mulch<br>• important to source untreated wood to reduce inclusion of extra chemicals | • Chemicals used in adhesives may be toxic to the environment<br>• can harbor mold if wet |

| | |
|---|---|
| **Cost estimate** | ~$3-7 per sq foot |
| **Typical lifespan** | ~3-5 years |
| **Maintenance level** | High (raking, replenishment) |

Highly recommended

# Sand

**Loose fill fall surfacing**

Playground sand is a specially processed, washed, and screened, fine-grained, non-toxic material designed for safe use in children's play areas, sandboxes, and under equipment to provide impact cushioning. It is distinguished from regular construction or beach sand by its soft, rounded grains and thorough cleaning process, which removes contaminants, sharp particles, and excessive dust.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health | • a "loose" material that encourages sensory play—kids can dig, shape, and interact with natural materials, promoting exploration and motor skills<br>• different play opportunities when wet and dry<br>• soft fall surface | • risk for contamination from animals if not well-maintained<br>• risk of exposure to pathogens and bacteria<br>• not ADA accessible |
| Environmental impact | • sustainable, renewable, long-lasting material<br>• when used in combination with other natural landscaping, can strengthen ecological system<br>• supports drainage | • some sand mining practices can harm coastal areas and marine biodiversity |

| | |
|---|---|
| **Cost estimate** | ~$1-$3 per sq foot |
| **Typical lifespan** | ~1-5 years |
| **Maintenance level** | High (raking, sanitation, refilling) |

Highly recommended

# Recycled rubber or rubber mulch

**Loose fill fall surfacing**

Shredded chips or nuggets of recycled tire rubber used as a top loose-fill layer. Often coated with UV-resistant pigments in various colors.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • high shock absorption<br>• drains well | • risk of ingesting and inhaling rubber particals<br>• fire and chemical safety concerns<br>• not ADA accessible |
| Environmental impact | none | • overtime, decomposes and releases heavy metals and other harmful toxins into nearby environment |

| | |
|---|---|
| **Cost estimate** | ~$0.80-$3 per sq foot |
| **Typical lifespan** | ~10-12 years |
| **Maintenance level** | Low-moderate (occasional raking, minor top-offs) |

Not recommended

# Grass alternative (clover, no mow grass)

**Soft play surface**

A clover or no-mow grass lawn is a sustainable, low-maintenance landscaping alternative to traditional turfgrass that utilizes low-growing plants, such as white clover (Trifolium repens), microclover, or fine fescues, to create a durable, green ground cover.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • natural material promotes connection to nature and sensory play<br>• naturally cool underfoot, supports barefoot play<br>• low allergen risk<br>• soft surface for cushioning minor falls | • potential draw for bees<br>• bare patches may develop with heavy use |
| Environmental impact | • creates an inviting environment for animal and plant life, especially polinators<br>• does not require much water or fertilizer<br>• shade tolerate<br>• improves soil | none! |

| | |
|---|---|
| **Cost estimate** | ~$0-2 per sq foot |
| **Typical lifespan** | ~1-5 years |
| **Maintenance level** | Moderate (irrigation, reseeding, patching as needed) |

Highly recommended

# Alternative turf

**Soft play surface**

Plastic grass with natural or no infill opposed to crumb rubber used for soft play surface. Alterntative infills can include cork, sand, zeolite, coconut hulls, walnut shells, or olive pits.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • creates a consistently soft and durable play surface to cushion falls<br>• lower heat retention and toxin exposure than crumb rubber turf | • while safer than crumb rubber turf, is a synthetic material that can limit children's contact with nature<br>• plastic blades can easily overheat in warm weather<br>• shred infill particles can stick to skin and clothing |
| Environmental impact | • reduces demand for crumb rubber turf | • replaces natural grass and friendly environment for other plant and animal life<br>• plastic turf fibers found in river and sea waters |

| | |
|---|---|
| **Cost estimate** | ~$7-$15 per sq foot |
| **Typical lifespan** | ~5-10 years |
| **Maintenance level** | Moderate (infill replenishment required every 1-2 years) |

Sometimes recommended

# Crumb rubber turf

**Soft play surface**

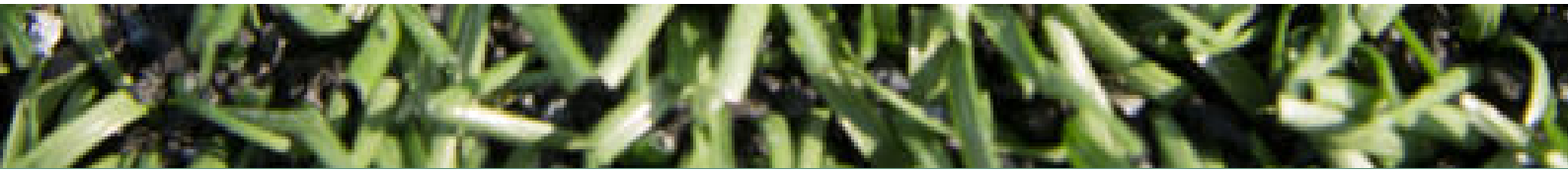
A type of synthetic grass surface that uses small pieces of recycled rubber, often from shredded tires, as infill to provide cushioning and shock absorption for play and sports areas.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • ADA accessible<br>• good fall protection and reduced risk of injury | • when exposed to sun, surface can reach dangerous temperatures putting children and risk of burns<br>• risk of injesting and inhaling rubber particles |
| Environmental impact | • recycles rubber materials, such as old tires | • not biodegradable<br>• may leach chemicals into nearby soil and water<br>• risk of picroplastic pollution |

| | |
|---|---|
| **Cost estimate** | ~$5-$10 per sq foot |
| **Typical lifespan** | ~10-12 years |
| **Maintenance level** | Low-moderate (raking, minor top-offs) |

Not recommended



# Corkeen

**Solid fall surfacing**

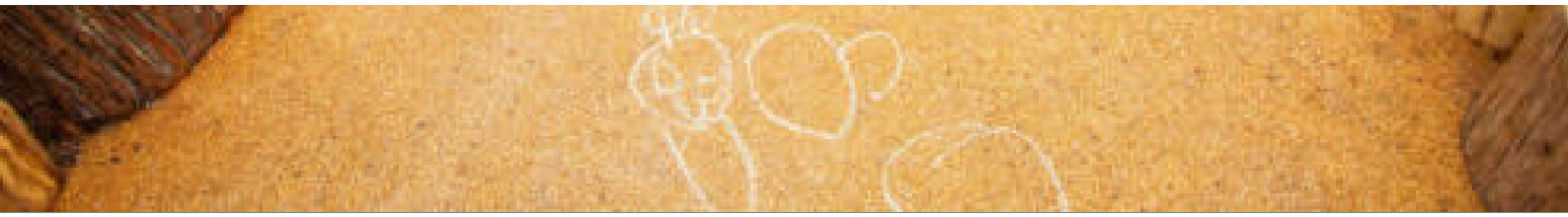
A compacted surface composed of natural, porous granulated cork and a polyurethane binder patented by Amorium.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • good for fall zones<br>• ADA accessible<br>• cooler surface than alternatives in hot weather<br>• non-toxic & allergen free<br>• drains quickly after rain | • over time, can become uneven<br>• can retain some heat during prolonged sun exposure compared to grass |
| Environmental impact | • carbon-negative material<br>• sustainably harvested cork<br>• biodegradable and recyclable<br>• no toxic chemicals or heavy metals<br>• reduces urban heat island effect | none! |

| | |
|---|---|
| **Cost estimate** | ~$6-$14 per sq foot |
| **Typical lifespan** | ~10-15 years |
| **Maintenance level** | Low (requires some cleaning and inspections) |

Highly recommended



# Decomposed granite

**Solid fall surfacing**

A natural material made from weathered granite rock that has broken down into small, gravel-like particles. It is commonly used in play areas, pathways, and landscapes to create a firm yet permeable surface.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • slightly uneven texture promotes gross motor skills<br>• a "loose" material that encourages sensory play<br>• drains well reducing puddles<br>• flat enough for trikes and bikes | • can sometimes create dust that can irritate eyes or lungs<br>• may cause minor scrapes<br>• can get stuck in kids' shoes |
| Environmental impact | • natural, permeable material that allows rainwater to filter into soil, reducing runoff and helping with groundwater recharge<br>• does not require chemical treatments like fertilizers or pesticides | • overtime loose particles could contribute to dust in the air |

| | |
|---|---|
| **Cost estimate** | ~$0.30-$5 per sq foot |
| **Typical lifespan** | ~5-15 years |
| **Maintenance level** | Moderate<br>Top-off required every 2-3 years |

Highly recommended

# Pour in Place (PIP)

**Solid fall surfacing**

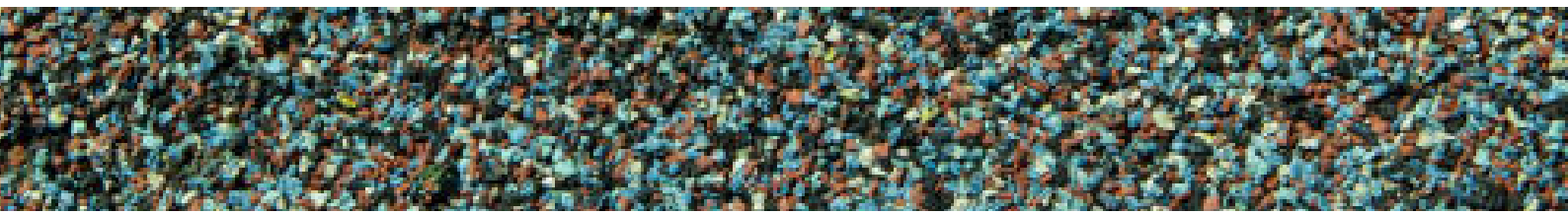
A shredded rubber mixture bound with polyureuthane poured directly into disired area. The materials "cures" and hardens in place creating a seamless soft surface.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • ADA accesible<br>• durable and will not splinter<br>• somewhat permeable | • can become very hot when exposed to sun<br>• can contain lead<br>• overtime can harden and become and unsafe fall surface<br>• dust from crumb rubber can be inhaled or ingested |
| Environmental impact | none | • overtime can breakdown and can pollute microplastics beyond play area |

| | |
|---|---|
| **Cost estimate** | ~$10-$18 per sq foot |
| **Typical lifespan** | ~10-15 years |
| **Maintenance level** | Low (requires cleaning, inspections, patching as needed) |

Not recommended



# Concrete

**Hard play surface**

Concrete is a rigid,durable material made from cement, water, and sand or gravel.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • paved pathways throughout an outdoor space can provide separation of play areas<br>• paved pathways offer use of trikes/bikes | • surfaces can reflect heat and be unsafe for children during high temperatures |
| Environmental impact | • long lifespan, reducing need to replace | • production process can produce enviornmental pollutants<br>• can cause water runoff and flooding issues |

| | |
|---|---|
| **Cost estimate** | ~$2-$6 per sq foot |
| **Typical lifespan** | ~20-30 years |
| **Maintenance level** | Low-moderate (crack repair, sealing as needed) |

Sometimes recommended

# Asphalt

**Hard play surface**

Asphalt is a flexible, highly viscous form of petroleum. In surfacing, asphalt is used as a sticky binding with sand or grave to create a pavement material.

## Considerations:

| | Positive effects | Concerns |
|---|---|---|
| Children's health & development | • paved pathways throughout an outdoor space can provide separation of play areas<br>• paved pathways offer use of trikes/bikes | • black surfaces can reflect heat and be unsafe for children during high temperatures<br>• poor fall absorption, concern for scrapes and cuts |
| Environmental impact | • long lifespan, reducing need to replace | • production process of heating petroleum-based bitumen off gases carbon and other air pollutants<br>• impermeable surface eases water runoff that can carry oils and heavy metals into waterways and increase flood risk |

| | |
|---|---|
| **Cost estimate** | ~$2-$6 per sq foot |
| **Typical lifespan** | ~20-30 years |
| **Maintenance level** | Low-moderate (crack repair, sealing as needed) |

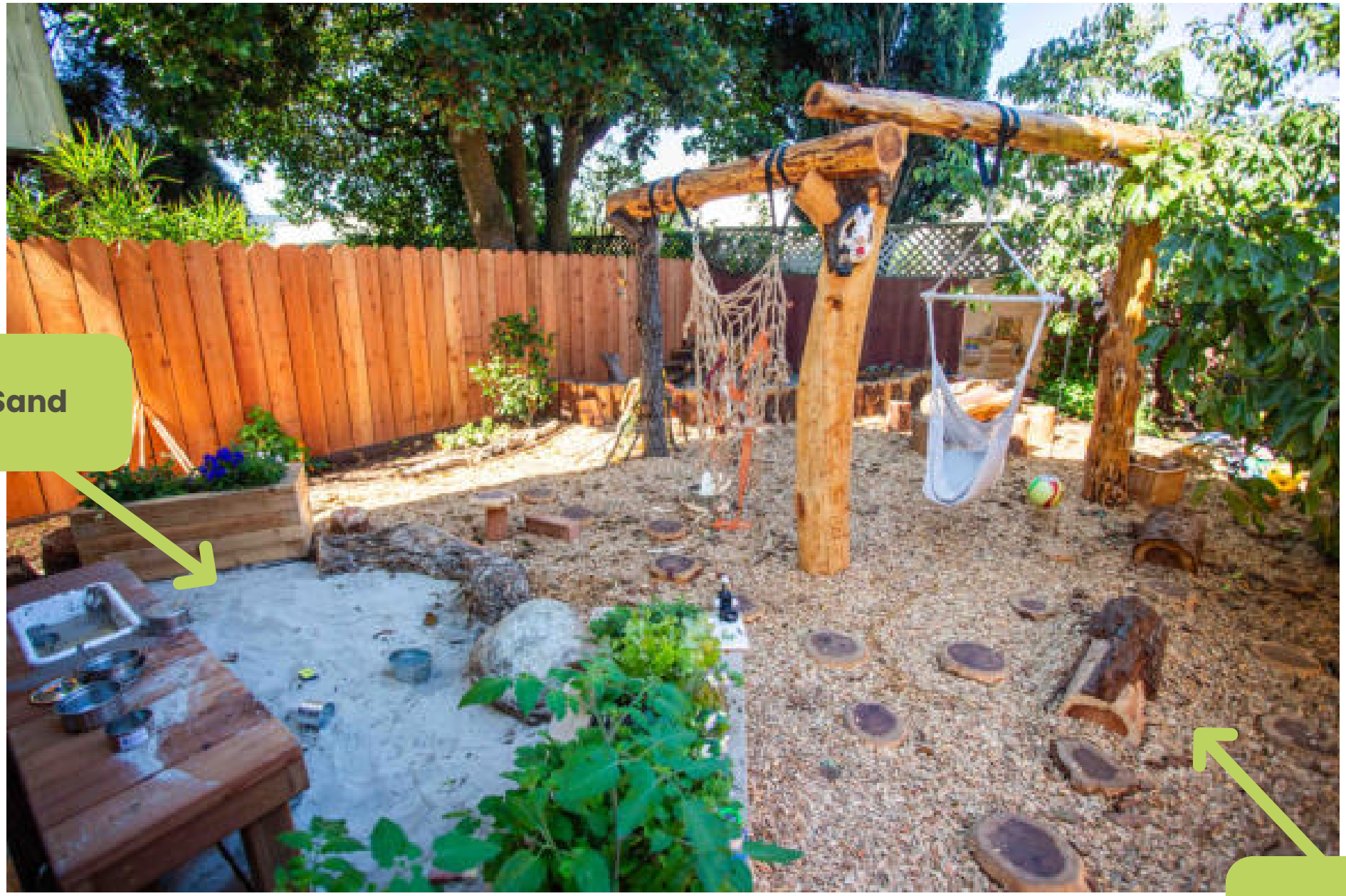
Not recommended

# Cost & Maintenance Estimates Summary

| Material | Cost (per sq ft) | Maintenance Level | Typical Lifespan | Key Maintenance Requirements |
|---|---|---|---|---|
| **Poured-in-place rubber** | ~$10–$18 (up to ~$25 small jobs) | Low | ~10–15 years | Cleaning, inspections, patching |
| **Rubber mulch (loose-fill)** | ~$0.80–$3 | Low–Moderate | ~10–12 years | Raking, minor top-offs |
| **Engineered wood fiber (EWF)** | ~$3–$7 | High | ~3–5 years | Frequent raking, replenishment |
| **Wood mulch (non-engineered)** | ~$2–$5 | High | ~1–3 years | Constant replenishment, leveling |
| **Sand (playground)** | ~$1–$3 | Very High | ~1–5 years | Raking, sanitation, refilling |
| **Pea gravel** | ~$2–$4 | High | ~3–7 years | Raking, redistribution |
| **Artificial turf (with padding)** | ~$4–$10 | Low–Moderate | ~8–15 years | Brushing, infill, cleaning |
| **Rubber tiles (modular)** | ~$5–$20 | Moderate | ~10–15 years | Replace tiles, seam monitoring |
| **Corkeen (cork-based surfacing)** | ~$6–$14 | Low | ~10–15 years | Cleaning, inspections |
| **No-mow grass / clover** | ~$0–$2 | Moderate–High | ~1–5 years | Irrigation, reseeding, patching |
| **Concrete** | ~$6–$12 | Low | ~20–30+ years | Crack repair, sealing |
| **Asphalt** | ~$3–$7 | Moderate | ~15-20 years | Sealcoat every 2-3 years, crack repair |
| **Decomposed granite (DG)** | ~$0.30–$5 *(typical installed range)* | Moderate | ~5–15 years | Compaction, weed control, top-off every 2–3 yrs |

# Additional Resources

1. Playground Surfacing: Choosing Safer Materials for Children's Health and the Environment | Toxic Use Reduction Institute
2. Natural Learning Institute | North Carolina State University
3. Early Childhood Health Outdoors | National Wildlife Federation
4. Green Schoolyards America
5. Climate Change and Children's Health and Well-Being | Environmental Protection Agency
6. Public Playground Safety Handbook | Consumer Product Safety Commission


Sand
Wood chips


Sand
No mow grass
Corkeen


Clover
Wood chips
Decomposed granite