



Outdoor Home Playground Safety Handbook



U.S. Consumer Product Safety Commission
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Playground Equipment Manufacturers, Builders and Installers

The *Standard Consumer Safety Performance Specification for Home Playground Equipment*, ASTM F1148 contains technical provisions for the performance and design of home playground equipment. Protective surfacing requirements can be found in ASTM F1292, *Standard Specification for Impact Attenuation of Surfacing Materials within the Use Zone of Playground Equipment*. These standards can be ordered from ASTM International at www.astm.org or call 610-832-9585.

In July 2009, ASTM International published a revision to the standard for home playground equipment, *Standard Consumer Safety Performance Specification for Home Playground Equipment*, ASTM F1148-09. This revised safety standard prohibits the attachment of components such as swings, gliders and trapeze bars from monkey bars. This change in home playground design will reduce the likelihood of children falling from the monkey bars onto the swinging components and is applicable to all future production of outdoor play/gym sets.

For older equipment, the U.S. Consumer Product Safety Commission (CPSC) reminds parents to remove swings and other suspended components that are attached to monkey bars to lessen the chance that children will be hurt by a fall from the bars.



Outdoor Home Playground Safety

If you have playground equipment in your backyard, you'll want to make it a fun—and safe—place for kids to play.

Unfortunately, injuries on home playgrounds can be more than just scraped knees or minor bruises. Each year, about 50,000 children go to U.S. hospital emergency rooms because of injuries on home playground equipment. About 80% of the injuries occur when children fall from play equipment. Children are also injured when they are hit by swings or other moving equipment or are cut from sharp edges and protruding bolts on play structures.

In addition, each year several children die on home playgrounds. These deaths often result when children get entangled in and strangle from ropes, cords, or leashes attached to play equipment, or when clothing drawstrings and items worn around children's necks catch on the equipment. Others die when their heads or necks are trapped in narrow spaces, they fall from the equipment, or when they are struck by play equipment that moves or tips over.

The good news is that you can help prevent many of these injuries. This handbook, developed by the U.S. Consumer Product Safety Commission (CPSC), highlights the most important safety information you need to know about planning, constructing, and maintaining an outdoor home playground. The most important safety tips for setting up a home playground as well as a simple reminder to supervise children and teach them how to play appropriately on the equipment are in the *Outdoor Home Playground Safety Checklist* inside the back cover. The handbook is not a mandatory standard. The information provided is not intended as the sole method to reduce injuries associated with playground equipment. The Commission believes, however, that the recommendations in this handbook will contribute to greater equipment safety.

This handbook is intended as guidance for homes and residential child care facilities. Schools, parks, multiple family dwellings, public child care facilities, restaurants and recreational developments, and other public use facilities should reference the *Handbook for Public Playground Safety*, CPSC publication number 325. The publication is available on the CPSC website, www.cpsc.gov.

1. Plan Your Play Area

Choosing a Site

When you plan a home playground, a location away from roads and driveways and readily visible from inside the home and patios or porches, is important. So, keep the following points in mind:

- Create a site free of obstacles that could cause injuries—such as low overhanging tree branches, overhead wires, tree stumps and/or roots, large rocks, bricks, and concrete.
- Choose a level location for the equipment. This can reduce the likelihood of the play set tipping over and loose-fill surfacing materials washing away during heavy rains. Some sites may need re-grading to improve drainage or to reduce the slope.
- Locate play equipment at least 6 feet from any structure or obstacle, such as a house, fence, sheds, trees or poles. Swings should be further away from structures to the front and rear of the swings—a distance equal to twice the height of the top bar from which the swing is suspended.
- Locate bare metal platforms and slides out of direct sunlight to reduce the likelihood of serious burns. A slide that faces north will receive the least direct sunlight.

Providing Play Areas

Children can injure themselves when they fall or run between pieces of play equipment. To help prevent this, you can do the following:

- Provide shock-absorbing protective surfacing material underneath and at least 6 feet beyond the perimeter of the play structure.
- Provide enough room so that children can use the equipment safely. For example, for structures with multiple play activities, a slide should not exit in front of a swing.
- Place each piece of play equipment so that it has at least 6 feet of play area around it. The areas in front of and behind swings need even more play space (see figure on page 7).
- Separate active and quiet activities from each other. For example, locate sandboxes away from swings or use a guardrail or barrier to separate the sandbox from the movement of the swings.

2. Pick the Right Construction Materials

Materials

Whether your play equipment is made of metal, wood, or plastic, keep the following in mind:

- Metal should be painted, galvanized, or otherwise treated to prevent rust, corrosion and deterioration—**Do not use paint containing lead!**
- Wood, intended for outdoor use, should be naturally rot-resistant and insect-resistant (e.g., cedar or redwood) or treated to prevent such deterioration. **Creosote-treated wood and coatings that contain pesticides should not be used.**

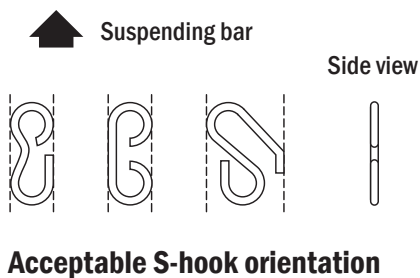
Pressure-treated Wood:

Since December 31, 2003, wood that is pressure-treated with the chemical CCA (chromated copper arsenate) is no longer processed for residential use. The chemical contains arsenic. Alternative chemicals that do not contain arsenic are now being used to pressure treat wood for playground/residential use. When using wood treated with any of these alternatives (ACQ/CBA/CA-B, etc.), be sure the associated hardware (nails, screws, bolts, hangers, etc) is compatible with the wood treatment chemicals. These chemicals are known to corrode certain materials faster than others.

Hardware

Hardware is an important component in assembling a play set. Protruding bolts and open hooks can cause lacerations or clothing entanglement—a possible strangulation hazard. To avoid these potential hazards:

- Use the bolts and screws provided or recommended by the manufacturer. They should be corrosion-resistant.
- Fasten all bolts, screws, washers, and nuts tightly. To prevent bolts from loosening, always use lock washers, self-locking nuts, or other locking means.
- Cover exposed bolt ends with caps supplied by the manufacturer. Bolts should not protrude more than the diameter of the bolt past the nut. A flush cut is preferred.
- Cover exposed, open ends of tubing with caps or plugs that cannot be removed without the use of tools.
- Close “S” hooks and all hooks so that the gaps are less than the thickness of a dime. Open-ended hooks may be used for the uppermost attachment points of swinging elements. (See figure below for acceptable and unacceptable hook configurations). Unacceptable hook configurations create a protrusion and could catch clothing.



3. Anchor, Assemble, and Maintain Your Equipment

Anchoring

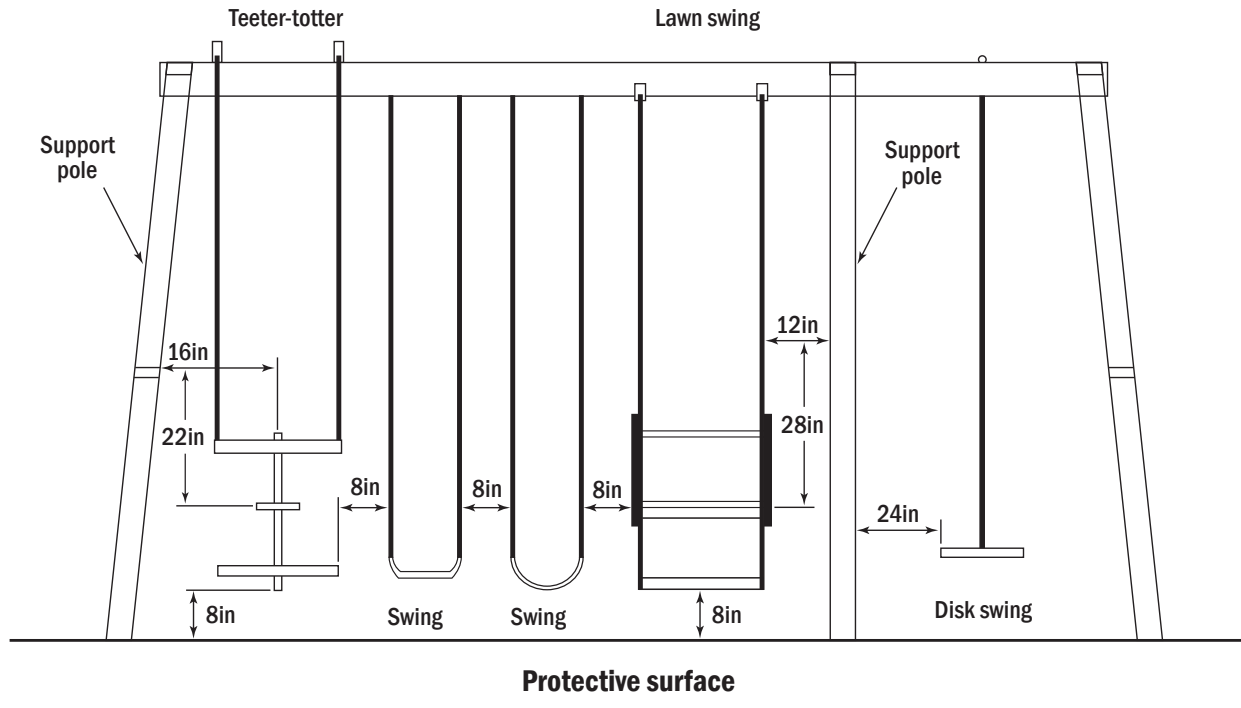
Play equipment may need to be restrained with anchors to keep it from tipping over while in use.

- Follow the manufacturer's instructions for anchoring.
- Be sure anchors are buried or otherwise covered with protective surfacing. Exposed anchors, hooks, bolts, etc. can create tripping hazards or lead to other injuries.

Assembly

Follow the manufacturer's instructions for correct assembly.

- Install your play equipment on level ground with adequate surfacing and anchoring. Use proper hardware, and tighten all connections.
- Use lightweight swings to minimize injuries if a child is struck. Avoid heavy seats of metal or wood.
- Place disk swings* in separate bays, away from other swinging equipment.
- Locate tire swings capable of 360-degree rotation in a separate bay, away from other play equipment and structures.
- Space swings at least as far apart as indicated below and shown in the illustration above.



- ✓ 8 inches minimum for swings with limited sideways motion.
- ✓ 24 inches minimum between swings with unlimited lateral motion (such as disk swings) and support poles when measured from the side of the swing perpendicular to the plane formed by the support poles.
- ✓ 12 inches minimum between lawn swings and equipment support poles measured at 28 inches above the seat.
- ✓ 16 inches minimum between the teeter-totter's seat center and support poles at 22 inches above the seating surface.
- ✓ 8 inches minimum between the protective surfacing and the underside of a suspended unit.

* Disk swings should be suspended from woven rope that cannot be separated to create a strangulation hazard.  **WARNING: Adults should be aware of the strangulation hazards associated with ropes and take precautions through supervision and instruction to ensure children do not become entangled.**

Maintenance

Keeping a play set in good condition is essential to reduce injuries. Save the manufacturer's instructions so you can order parts that break or wear out. The instruction sheet should provide the name and address of the manufacturer/distributor and the model number of the playground equipment.

The following maintenance schedule is recommended:

- Check nuts and bolts twice a month and tighten as needed.
- Oil moving metal parts as directed by the manufacturer.
- Check to make sure protective caps and plugs that cover bolt ends and ends of tubing are in place and tight. Inspect twice a month and replace as needed.
- Check the condition of the equipment, looking for signs of wear and tear such as broken or missing components, bent pipes or tubing, and splintering wooden surfaces. Repair as necessary.
- Check swing seats, ropes, chains, and cables monthly for deterioration and replace as needed.
- Clean, sand, and repaint rusted areas with a non-lead-based paint, as needed.
- Remove plastic swing seats in cold weather, if recommended by the manufacturer.
- Rake surfacing periodically to prevent compaction and maintain appropriate depths.

4. Select Protective Surfacing

One of the most important things you can do to reduce the likelihood of serious head injuries is to install shock-absorbing protective surfacing under and around your play equipment. The protective surfacing should be applied to a depth that is suitable for the equipment height in accordance with ASTM F1292. There are different types of surfacing to choose from; whichever product you select, follow these guidelines:

NOTE: Do not install home playground equipment over concrete, asphalt, or any other hard surface. A fall onto a hard surface can result in serious injury to the equipment user. Grass and dirt are not considered protective surfacing because wear and environmental factors can reduce their shock absorbing effectiveness. Carpeting and thin mats are generally not adequate protective surfacing. Ground level equipment—such as a sandbox, activity wall, playhouse or other equipment that has no elevated play surface—does not need any protective surfacing.

Loose-Fill Materials

- Maintain a minimum depth of 9 inches of loose-fill materials such as wood mulch/chips, engineered wood fiber (EWF), or shredded/recycled rubber mulch for equipment up to 8 feet high; and 9 inches of sand or pea gravel for equipment up to 5 feet high. NOTE: An initial fill level of 12 inches will compress to about a 9-inch depth of surfacing over time. The surfacing will also compact, displace, and settle, and should be periodically refilled to maintain at least a 9-inch depth.
- Use a minimum of 6 inches of protective surfacing for play equipment less than 4 feet in height. If maintained properly, this should be adequate. (At depths less than 6 inches, the protective material is too easily displaced or compacted.)
- Use containment, such as digging out around the perimeter and/or lining the perimeter with landscape edging. Don't forget to account for water drainage.
- Check and maintain the depth of the loose-fill surfacing material. To maintain the right amount of loose-fill materials, mark the correct level on play equipment support posts. That way you can easily see when to replenish and/or redistribute the surfacing.
- **Do not** install loose fill surfacing over hard surfaces such as concrete or asphalt.

Poured-In-Place Surfaces or Pre-Manufactured Rubber Tiles

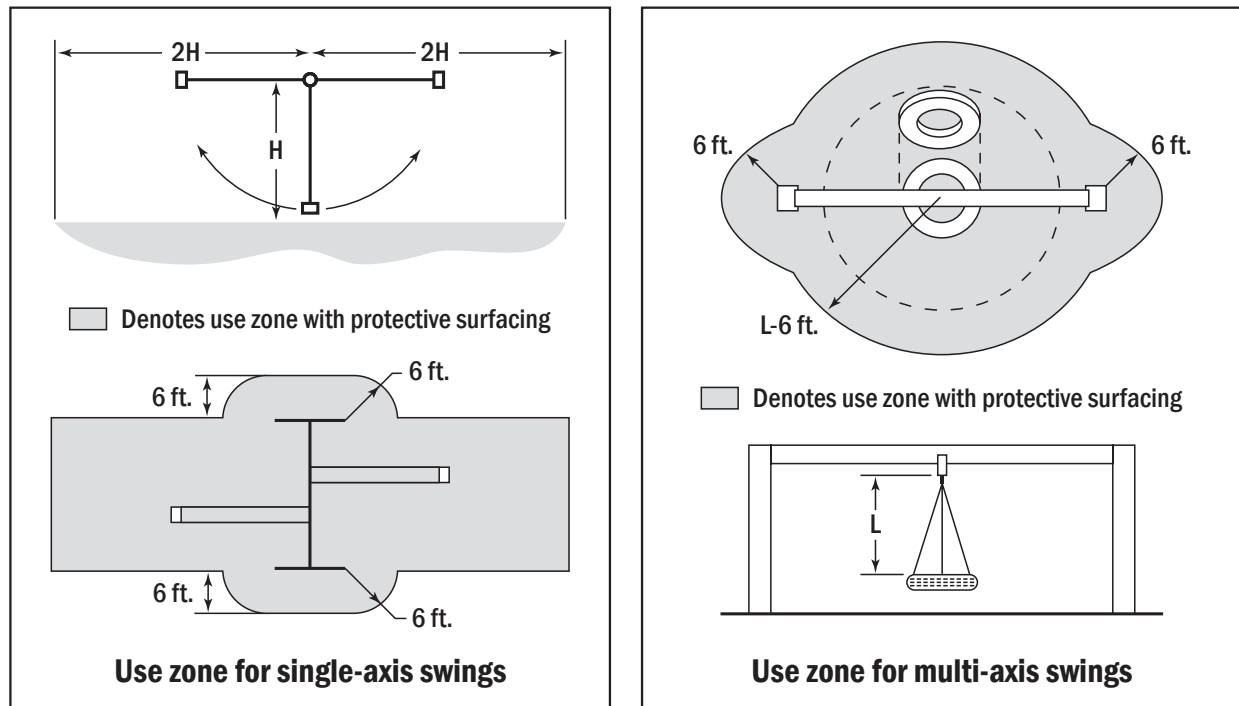
You may be interested in using surfacing other than loose-fill materials—like rubber tiles or poured-in-place surfaces.

- Installations of these surfaces generally require a professional and are not “do-it-yourself” projects.
- Review surface specifications before purchasing this type of surfacing. Ask the installer/manufacturer for a report showing that the product has been tested to the following safety standard: ASTM F1292 *Standard Specification for Impact Attenuation of Surfacing Materials within the Use Zone of Playground Equipment*. This report should show the specific height for which the surface is intended to protect against serious head injury. This height should be equal to or greater than the *fall height*—vertical distance between a designated play surface (*elevated surface for standing, sitting, or climbing*) and the protective surfacing below—of your play equipment.
- Check the protective surfacing frequently for wear.

Placement

Proper placement and maintenance of protective surfacing is essential. Be sure to;

- Extend surfacing at least 6 feet from the equipment in all directions.
- For to-fro swings, extend protective surfacing in front of and behind the swing to a distance equal to twice the height of the top bar from which the swing is suspended.
- For tire swings, extend surfacing in a circle whose radius is equal to the height of the suspending chain or rope, plus 6 feet in all directions.

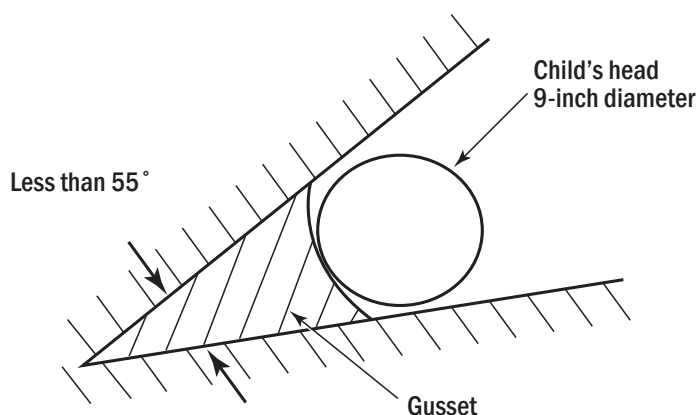


5. Prevent Head and Neck Entrapment

Play equipment should have no openings between components that could trap a child's head or neck.

- Check all openings on the play equipment—such as between ladder rungs, posts, and railings. Be sure spaces are either smaller than $3\frac{1}{2}$ inches wide (so children **can't** put their body through) or larger than 9 inches (so children **can** slide their body and head through). See CPSC Publication Number 325, *Handbook for Public Playground Safety*; Appendix B, for entrapment test probe specifications and test procedures.
- Inspect slide entrance area and bed for gaps and protrusions that could catch or entangle clothing and create a potential strangulation hazard.

- Fill V-shaped angles that open upward and are less than 55-degrees with a solid barrier (gusset) because these angles can trap a child's head or neck (see figure below).
- Do not allow children to wear bike helmets on play sets. Helmets can not pass through some spaces on play equipment, and children have become entrapped and strangled by the chinstrap.



6. Eliminate Hanging Ropes

Hanging cords of any kind on play equipment are a strangulation hazard. ***Adults should be aware of the strangulation hazards associated with ropes and take precautions through supervision and instruction to ensure children do not become entangled.***

- Never attach—or allow children to attach—any kind of loop-forming materials (ropes, twine, jump rope, pet leash, clothesline, belt, etc.) to the play set.
- Secure BOTH ends of climbing ropes according to the manufacturer's instructions so the rope cannot become entangled around a child's neck.
- Remove and replace frayed or loose ropes immediately.
- Do not use ropes that can untwist or separate for swings because they can create an opening in which a child could become entangled.

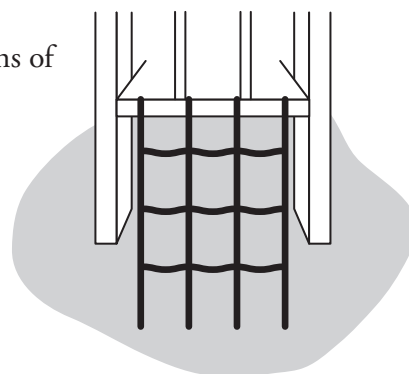
7. Protect Against Falls

There are a number of ways to protect children from falling off play equipment onto the ground—the single largest cause of visits to hospital emergency rooms for playground equipment-related injuries.

Rung Ladders, Stairs and Stepladders

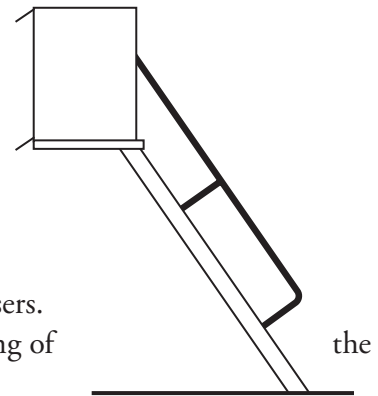
To help protect children from falling off rungs, steps, or other means of platform access:

- Make sure all rungs, steps, and stairs are evenly spaced—including the top one.
- Spacing between climbing elements should not create an entrapment hazard. Spaces should be less than 3½ inches wide (so children ***can't*** put their body through) or larger than 9 inches (so children ***can*** slide their body and head through).



Handrails and Rungs

- Round rungs to be gripped by young hands should be approximately 1 to 1½ inches in diameter. Small or weaker children do best with the smaller diameter handgrip.
- Stairs should have continuous handrails on both sides from a point where the top surface of the step is higher than 30 inches above the protective surfacing.
- Rung ladders and stepladders steeper than 65 degrees should have hand grips. Hand grips are needed on all stepladders with closed risers. The hand gripping components should begin at the first step or rung of equipment. For rung ladders, the rung itself may act as the hand-gripping component.
- Freestanding slides require a handrail on all sides except the entrance and exit of the slide platform.



Railing Protection

Guardrails or barriers are needed around any platform over 30 inches above the protective surfacing. Neither should be considered an area for climbing, unless the guardrail has been specifically designed to double as a climber. Guardrails are intended to prevent inadvertent falls from the elevated surface while barriers should be designed to prevent deliberate attempts to pass through the device. Guardrails for low platforms can have openings larger than 9 inches. Barriers for higher platforms should only have openings less than 3½ inches in width.

- Platforms above 30 inches up to 48 inches high should have a guardrail at least 25 inches high.
- Platforms above 48 inches up to 72 inches high should have a protective barrier (not a guardrail) at least 27 inches high.
- Platforms over 72 inches high should have a protective barrier at least 33 inches high. These high platforms also should have an intermediate standing surface where a child can stop the ascent and choose another route to descend.
- Slide platforms greater than 200 square inches should have a guardrail or barrier on all sides, except the entry and exit side. The choice of guardrail or barrier is dependent on the platform height as described above.
- Protective barriers are not areas of intended play. There should be no crossbars or toeholds that assist children in climbing over the barrier. Openings should be less than 3½ inches in width.
- Guardrails intended to double as climbers should have no openings that would allow a head or neck entrapment to occur (between 3½ and 9 inches).

8. Use Toddler/Tot Swings Safely

Close adult supervision is essential.

- Never leave a child in a toddler swing unattended.
- Always securely fasten the child with the swing's restraint system when provided.
- Make sure the restraints do not allow the child to slide under or through the restraints (an entrapment hazard) or climb out of the swing (a fall hazard).

Finally ...

For important tips and reminders about setting up your home playground, remember to read the *Outdoor Home Playground Safety Checklist*. You'll find it on the inside back cover.

Outdoor Home Playground Safety Checklist

Use this to help make your home playground a safe place to play!

Supervision	Be sure to always supervise children on play equipment.
Surfacing	Install a protective surface under and around play equipment to reduce the likelihood of serious head injuries. • For most play equipment, install protective surfacing 6 feet in all directions beyond the equipment. • For swings, extend protective surfacing in front and back of the swing to a distance that is twice the height of the bar from which the swing is suspended. • For tire swings, install protective surfacing outward from the swing equal to the suspension chain plus 6 feet.
Types of Surfacing	Carpeting and thin mats are not adequate as protective surfacing. Maintain at least 9 inches of loose-fill material (see page 6) or use an ASTM F1292 rated material at the depth required for the equipment height. • Use wood mulch/chips, shredded rubber mulch, or engineered wood fiber for equipment up to 8 feet high; • Use sand, pea gravel, or mulch products listed above for play equipment up to 5 feet high; or • Use surface mats tested to provide impact protection equal to or greater than the height of the play equipment.
Equipment Maintenance	Periodically check nuts, bolts, caps, swing seats, suspension ropes, chains, and cables and replace as necessary. Maintain loose-fill surfacing and surface mats.
Opening	Eliminate openings that can trap a child's head or neck, such as openings in guardrails or ladders. Openings should be smaller than 3½ inches to prevent entry of a small child's body, or larger than 9 inches to allow a child's head and body to slide completely through.
Ropes	Never attach jump ropes, clotheslines, pet leashes, or cords of any kind to play equipment. Anchor any climbing ropes at both ends. Remove drawstrings from children's clothes. Children can strangle on these.
Anchors	Bury or cover anchors with adequate surfacing material to prevent tripping. Play equipment should not tip over.
Guardrails or Barriers	Make sure that platforms and ramps over 30 inches high have guardrails or barriers to prevent falls.
Repair	Repair sharp points or edges on equipment that can cause injuries.
Upkeep of Hardware	Replace missing hardware, eliminate protruding bolts, and close "S" hooks that can cause injuries.



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