

Step 4 - Build

You're finally ready to build your playground! All the hard work you put into planning and fundraising is about to take shape. Playground building is dynamic, challenging but super satisfying work. Unlike a house, playgrounds can come together very quickly and big changes happen everyday. Be prepared to constantly be problem solving. And no matter how much planning you've done, don't expect everything to go according to plan. Arm yourself with patience, a flexible attitude, a good sense of humor, and plenty of food, water, and rest.

In this chapter you'll find:

- + Checklists to help the "Project Leader" keep the build on track and avoid any unforeseen challenges
- + Guidance on building with tires
- + Tips on specific materials

Let's build a playground!

Set-up

As you're getting ready for the build, make sure you've selected a "Project Leader" to manage each step of the build. Learn more about the qualities of a good project leader on pg. 25.

Materials/Tools

Get your materials ready for the build by collecting materials and tools well in advance to ensure everything is ready to go on the first build day. Decide how and where you will securely store your materials and tools at the end of each day so they are not stolen. Even if you have already purchased all your materials, it's a good idea to keep a stash of petty cash on hand for unforeseen expenses. Set up a system for recording purchases and storing receipts so you can make sure you stay within your budget.

People

Specify the number of volunteers you will need. Clearly communicate with them the days and times they will be needed and anything they will need to bring with them (gloves, clothes they don't mind getting dirty, water, etc.) Communicate with any workers you have hired. Let them know what days and times you will need them and any tools or other supplies they will be expected to bring. Make lunch plan. Will builders and volunteers be fed on site or will they be expected to bring or buy their own lunch? Also make sure you have plenty of drinking water on-site. Get a clear idea of how much you will pay any hired workers and when you will pay them. In many low-income communities, workers expect to be paid daily so you'll need to have someone in charge of making sure everyone's payment needs are met in a timely manner and usually in cash. If children will be present at the site, make a "play plan" with the staff (pg. 30.)

Site

Prepare your site by clearing any trash or rubble, cutting down overgrown brush, and removing any existing playground equipment that is broken, dangerous, or will not be used in the new design. Figure out where and how you will get electricity for power tools and water for mixing cement, washing tires, etc.

Design

Print out copies of the design plans for each element so you can hand these out to build teams. Print this handbook as well as the "Playground Safety Handbook" for reference. Review all the design plans to ensure you understand the steps. As you review the steps for each of your designs, think through all the tasks and when they will need to be done. Plan out your goals for what your team will accomplish on day 1. Separate tasks that can be done by volunteers and ones that will need to be done by trained craftsmen/women. Keep a running to-do list so that as soon as one job is finished you can direct workers to the next task. Keep lots of paper and pencils on hand during the build for sketching out explanations and making calculations and gather plenty of stakes and string to mark boundaries and elements on the first day.

First steps

On the first day of the build, Get everyone together to run through the design and answer any questions. Referencing your site design and map, use stakes and string to mark out where each element will go. Make sure everything lines up and is the correct distance apart. Get others to help you double and triple check your measurements and remember to measure out and mark appropriate safe fall zones (see "Playground Safety Handbook") and the back of each of the design plans. Relocating elements later is wasted time and energy!

Assign different elements to different teams of people. Using pictures and plans, review the steps and explain thoroughly what they should do, where, and in what order. Be sure to also explain the purpose of the element they are building and how children will play on it - use any photos or videos of the element in use to illustrate this. Understanding the end goal will help them understand the construction of the design better. Encourage people to ask questions and clarify anything they don't understand.

Managing the build

During the build, the "Project Leader" should constantly rotate between teams to make sure they're on track and understand the next steps. Keeping an eye on the design as it's built will be much easier than fixing mistakes later on. Getting bogged down on one element is the main reason mistakes are made on other pieces. Always keep moving with your head up! At the end of each day, re-evaluate your to-do list. Look through the next steps for each of your designs and think through all the tasks and when they will need to be done. Plan out your goals for what your team will accomplish the next day. As elements are constructed, check each element for common hazards described in the "Playground Safety Handbook." Make sure you are following appropriate guidelines for safe fall zones, head entrapments, and spacing of elements. Prevent water collection in tires by drilling or cutting drainage holes in the lowest point of any tires that could collect water. See pg. 55 for further details.

Stick to your design, but also allow a little room for improvisation. Look for small details you can add in along the way. Little things like unexpected peepholes, tiny murals, or buckets on a rope to a platform are details that add magic to a play space. Re-evaluate the number of builders and volunteers needed as you go and make sure you communicate with all your builders and volunteers about when they're needed. Keep a running to-do list of tasks and volunteer jobs so you don't leave people waiting to be told what to do next. When possible, involve children in the build. They'll love helping to build their playground! Work with teachers and volunteers to allocate tasks appropriate for them like painting, planting, shoveling sand, or sorting tires.

The build will no doubt be challenging at times, but focus on keeping a positive attitude! Correct any problems as soon as you can, but stay positive, encouraging, and upbeat. An enthusiastic, motivated team will get more done than a frustrated, demoralized one.

Final checks

Before the children can play, go around and inspect all the welding, bolts, screws, nails, and other connections. Review the “Playground Safety Handbook” and double check the site. Check each tire on every element to make sure drainage holes have been drilled or cut. See pg. 55 for further details. Test any load-bearing parts or structures with sacks of heavy grains or sand and check how much movement and warping happens. Add extra bracing or other strengthening elements if necessary. Keep in mind children will play on the equipment in unexpected ways and will regularly overload the elements (for example, three children on a one-person swing) so make sure you test accordingly.

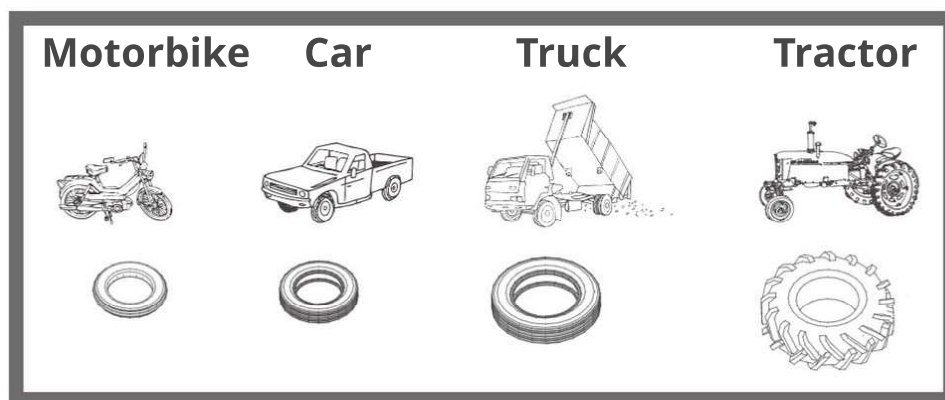
Make sure paint has adequate time to dry before children play on painted elements. Allow minimum 3 days for oil paint to dry. Even though it may look dry before then, it can often still be easily smudged and scuffed and the playground will end up looking dingy if played on too soon. Make sure any concrete footings have adequate time to set before children play on any elements with footings. Allow minimum 5 days for concrete to dry. Even though it may look set before then, it will get stronger the longer it sits.

Building with tires

Used tire playground elements are our specialty so over the years we’ve developed some specific strategies for building with tires. Here are a few of our tips and tricks.

Types of tires

Playground Ideas design plans call for four different types of tires:



Motorbike and tractor tires are easy to spot, but it can be a little harder to tell the difference between car and truck tires. A standard car tire has an inner rim (the hard rubber ring that seals onto the metal rim) that is between 14 to 17 inches across (35.5 cm to 43.2 cm). A truck tire has an inner rim of around 20 to 24 inches (50.8 cm - 61 cm) across. These dimensions are usually written on the tire with the letter "R" in front of it.

When you go out looking for tires, collect anything you can get your hands on. You'll probably end up with different numbers of car and truck tires and will then have to figure out how to fit them into your design. Knowing the differences between car and truck will help you discern when you can substitute one for the other in a design.

Both car and truck tires are useful in designs for their different properties. Try sitting on the top of a car tire and then try sitting on a truck tire and observe the differences. You'll notice that the car tire will likely slowly start to buckle and sink down under your weight - especially if it is a small or old car tire. The truck tire, however, will stay firm and support the weight of an adult (even several adults!) Due to their pliable nature, car tire treads makes great seats, swings, bridges, etc. They can also be used whole as planters, sandpit barriers, and stacked up as steps. Truck tires are much tougher than car tires. They work great in climbing structures and other load bearing elements. Due to these differences, you could substitute a truck tire for a car tire in building a sandpit barrier, but you cannot use a car tire to build a climbing pyramid. Got it?

There are also different kinds of truck tires: some have steel belts, and others have nylon belts. This will also be written on the sidewall of the tire. Steel belted tires are much more common. Most truck tire designs can be built with either steel or nylon belted tires, with one exception: the "Truck Tire Hammock." This element must be built with nylon belted truck tires only. It's one of our very favorite designs, so if you get your hands on 100% nylon radial truck tires, build a few hammocks! They're incredibly cheap and easy to build and little kids love rocking and swaying in them.

**See where it says
"R16"? That means
this one is a car
tire!**





Tire quality

Prior to using any tires, carefully examine the entire surface of the tire to ensure there are no steel wires sticking out. If there is a small patch of exposed wires, you can still use this tire if it is half buried in the ground with the exposed section in the ground. However, if the rubber has worn thin and there are exposed wires on half or more of the tire you cannot use it. Do not try to clip down or grind down these exposed wires - it just won't work and can pose a serious hazard to children.

How to cut car tire tread

Many tire design plans will require cutting car tire tread. Over the years, we've found this method to work the best:

1. Use a utility knife / box cutter to remove both the sidewalls. be careful not to cut too close to the tread because you can expose the steel belt which is very sharp and must stay well encased in the rubber.



2. Clean up the edges so they are nice and smooth. Be sure to make sure your hands are safely positioned so you do not slip and cut yourself.



3. Flatten the tire tread loop. You can put it in a vice or clamp at this stage if you have one.



4. Mark the angle you want to cut the tire on. Some designs need an angled cut and it's best to cut only once.



5. Cut the through the tread with a very sharp knife all the way until you feel the steel wires. You will need to sharpen the tip of your blade after this. (There are usually a couple of layers of nylon tread over the steel wires that you will need to get through.)



6. Using the thinnest metal grinder blade, gently and neatly cut the 2-3 layers of steel wires in the tire and stop once you have gotten through the steel because you can cut through the remaining rubber with a knife much neater and with less smoke. This is best done with the tire in a vice. Add water to the tire as you go and it will not smoke. Don't breath in the fumes from a smoking tire.



7. Finish the cut with the utility knife / box cutter instead of the grinder as you will get a smoother finish.



8. The edge will have some sharp edges and is not yet suitable for play equipment.

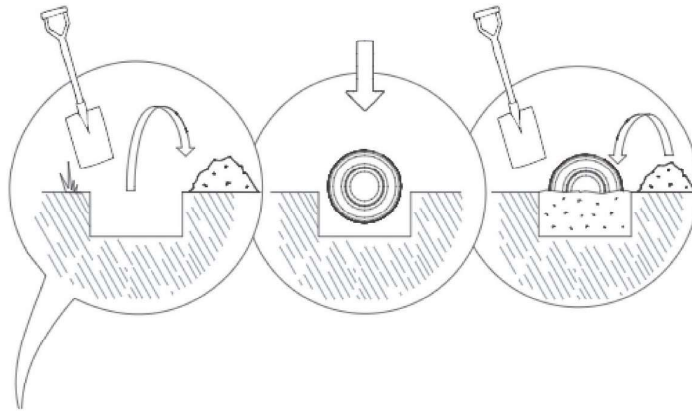


9. Using the side of a thicker metal grinding blade smooth the metal wires into the tire until you can run your fingers over the edge and feel NO sharpness or steel at all.



10. You will be left with a neat smooth edge ready for use.





Burying tires

Many design plans will require you to half bury the bottom tires into the ground to fix them in the site. It is critical to do this step well so that your element stays in place over time and is safe for children to play on. Be sure that the bottom tire is at least half way in the ground. Any less and it will likely move and shift over time.

When you fill the hole back in with soil, take time and lots of force to pack the soil into the bottom of the tire. Use a short log or the back end of a hoe to ram the earth down. Adding water will help pack the soil down. Once it is set, try tugging at the tire to make sure it is securely fixed in the ground. If it moves at all, pack the soil in harder.

Drainage

One of the potential safety hazards in building tire playgrounds is that if you do not take precautions, tires can collect water which can be a breeding ground for mosquitoes. In areas of malaria prevalence, this can be a dangerous problem.

Luckily, it's also an easy problem to avoid! Here's how: on each element, cut or drill a hole at the lowest point of each tire. This will allow any rainwater to freely drain. After you complete the playground, double check each element to ensure that there is a drainage hole for every tire that could collect water.

Painting

To ensure that paint sticks to tires well, use high quality oil based paint. See page 59 for more info on selecting paint. Used tires generally have a lot of oil and dirt on them which can prevent paint from sticking. You also don't want kids getting leftover motor oil on their hands, so scrub down any tires you'll use on the playground with soap and water and allow them to dry before painting and before children play on them. Generally it is easiest to do this all at once at the beginning of the build instead of trying to wash elements that have already been built. Prior to painting, you may need to do another quick wipe down to remove any dirt from constructed elements.



Tips on specific materials

These tips on using specific materials are designed to assist you as you select and work with materials on your playground build. However, they cannot replace expert local advice and local knowledge. In all cases it is best to consult local building experts about the appropriate materials to use.

Timber

There are literally thousands of different varieties of timber used throughout the world, and all timbers have different properties such as flexibility, rigidity, warping, potential to cause splinters, and so on. However they generally fall into two types: hardwood and softwood. Both timber types have their uses, but generally hardwood will last longer and be less susceptible to rot and termites. Hardwood is particularly important for use in areas of high stress, such as the top pole of a swing set, seesaw poles, bridges, and any other places where there are long spans and high loads.

One important factor to consider in building with timber is termites. In some areas of the world where termites are prevalent, they can absolutely decimate a playground. Get a clear understanding of whether termites are a problem in your area before you build with timber. Many communities have developed strategies of treating timber to prevent termite infestation. Be careful to ensure that any treated timber is safe for children to be exposed to. Remember that children are highly tactile - they're constantly touching, feeling, and putting things in their mouths. So just because something is generally safe for adults to be around does not mean it is safe for children to play with.

Bamboo

Again, there are thousands of varieties of bamboo, with all sorts of different structures, densities, diameters, and rot and insect resistance. In some areas of the world, particular giant bamboo species are used to build huge span bridges and multi-level buildings.

It's often assumed that bamboo can be used in the same way as timber, but this is not the case. It's highly susceptible to powder beetles and rot, and certain thin-walled varieties can lose a good deal of their strength if the tubes are cracked or split. The varieties of bamboo near you may look perfect for your needs, but local knowledge is always the best judge.

Steel (chain, bolts, screws, nails, cable)

Most steel looks the same but it is important to know what you are using. There is an enormous difference in the strength, durability, and flexibility of steel depending on whether it is plain, hardened, spring, galvanized, or stainless steel. In hollow steel, wall thickness can be an important factor. One steel 2" pipe may look much like another, but the wall thickness will be the difference between a great set of monkey bars and one that bends and breaks in a matter of months. For any load bearing elements, Playground Ideas recommends a minimum wall thickness of 3mm. Hardened and coated (galvanized, powder-coated or painted) steel parts are important for elements with high loads such as swing chains, swing hangers and fittings, hanging bridges, and merry-go-rounds and other spinners. (See Paint/Coatings for more details about this.)

Beware of substandard items such as:

- + Hand-bent and welded chain
- + Chain, bolts, or screws made from unhardened steel and cable
- + Steel cables with a non-steel core

The best approach when selecting steel is to work with a local welder whose work you trust. They will be able to easily differentiate between quality and substandard steel.

Cement/Concrete

It's important to always follow the directions given on the packaging when using cement or concrete. Cement takes up to a month to fully set, and should not be overstressed during this time especially the first few days. We recommend allowing a minimum of 5 days for concrete to set before children play on it. Concrete becomes hardest if it is kept moist during its setting time so make sure your elements and footings are kept moist as long as possible as this will dramatically increase their longevity.

Generally speaking the footings of elements need to be around 40cm deep or more, particularly for elements with high loads such as swings, cubbies, elements connected to bridges, and seesaw frames. In certain soils and conditions you may need other footing types or ways to fix your elements to the ground. As always, local builders will be able to support you here but again, the loads on some play elements are much higher than those of a house for instance so this need to be taken into account.

Sand

Sandpits are wonderful playground elements but all sand is not created equal. Finding the right sand for your sandpit or safe fall zone can be tricky in some areas of the world. We've put together a few tips to assist you in selecting "good" sandpit sand.

A good sandpit:

- + Feels delightful to run through your hands and sink your feet into.
- + Can be mixed with water and be moulded into all sorts of shapes and forms.
- + Remains soft and malleable over time.
- + Does not produce any dust when kicked up or moved and doesn't make your hands dirty when it's wet.

A bad sandpit:

- + Will pack down and clump over time or after rain and become a hard mass that is unuseable.
- + Is sharp and abrasive to touch or sticks to your skin.
- + Produces dust when kicked or moved. The dust produced by some types of sand can be dangerous for children to inhale.
- + Has either very coarse, gritty particles or highly sifted uniform particles and therefore is not moldable. (Note: This kind of highly sifted sand can be great to use as soft fall material, it's just not as fun to mold and play with in a sandpit. For more details on soft fall materials, please refer to our "Playground Safety Handbook")



How to find “good” sandpit sand:

Generally speaking the best sand is found next to the ocean. Clean beach sand has naturally washed silt and dirt away and the waves have tumbled the sand into soft, round particles. Ask for “beach sand” or even “river sand,” (although this can be very silty sometimes) as opposed to sand made from crushed rock. Crushed rock sand can be sharp, abrasive, and can contain dust that is dangerous to inhale. If you cannot find beach or river sand, try asking for “washed sand.” This is sand that has been surface mined, sifted and washed to remove silt and clay, then allowed to dry. This kind of sand is often used to make quality concrete. Look for sand that is low in clay and soil as this will cause the sand to set hard after the rain. Touch, feel, and mould different types of sand you find to make sure it fits the qualities of “good” sandpit sand listed above.

Research the sand in your area well before purchasing. If you’re having trouble, look for any high quality construction projects happening in your community, try asking where these contractors get their quality sand. If you are building in a community that is near to large rivers or the ocean, finding good sand may be easy. If not, you may need to transport your sand from another part of the country. Typically, we recommend trying to source materials as locally as possible, but as quality of sand is very important to its safety and play-ability, this is a material that is worth spending a bit more money to transport if it means the quality will be higher.

Rope

Generally rope is not a great material for playgrounds especially in high wear areas. Rope rubbing on elements such as wood or steel can cause it to weaken rapidly. If not UV treated, plastic ropes can breakdown in the sun, and hemp/ natural ropes can rot in the rain. Heavy-duty plastic/ nylon rope, has in some cases, shown to be a practical material given its low cost and ability to be easily replaced regularly, as needed. For swings, try using two lengths of rope per connection so that if one breaks no one is hurt and the broken length can simply be replaced. UV treated, high quality rope, like the kind used in the marine industry is typically much harder to find but can last a long time.

Paint/Coating

Paint can make a simple playground look amazing, but it can also serve a very important function by preventing moisture (rain), sun, and insects from degrading the material they are covering. Choosing high quality, UV-protected paints or coated or galvanized steel will significantly reduce maintenance and prolong the life of your playground. Poor quality paint will quickly fade and peel which can end up making your playground look pretty shabby, so don’t skimp on this purchase! Stick with well recognized, brand name companies and choose oil based paint as it is more durable than other options. Most paint companies will sell different qualities of paint, with the higher qualities being more expensive. Try to purchase the highest quality you can find. Paint elements with primer first to help the paint last longer. If you are painting tires, be sure to wash them with soap and water and allow them to dry before painting.

If you cannot find or afford high quality paint, stick to just painting the details that matter:

- + Paint any timber or ungalvanized steel to protect it from degradation
- + Don't paint any high traffic areas like the runway surface of a slide, the very tops of tires that will be jumped on, or swing seats.
- + Add color to the playground that will last longer by painting details on lower impact areas like structure of a swing set and the sidewalls of tires.

A playground with simple, sparsely painted details in a couple colors that will last for years is much better than a playground drenched in a palette of colors that will fade and peel away in a few months.

Paint or other coatings with insecticides in them may be harmful to children and should be carefully considered when using in a playground. Read the label to ensure that you use paints that are suitable for use around humans.



IMPORTANT NOTE: It is essential to ensure the paint you use is lead-free. Lead is a common additive in cheap paints and can cause severe health issues for children. Try contacting the supplier if you are unsure if your paint contains lead. For more info on the dangers of lead see: www.mayoclinic.org/diseases-conditions/lead-poisoning/symptoms-causes/dxc-20275054

Paint can take a deceptively long time to dry. We recommend allowing a minimum of 3 days for paint to dry before children play on any painted elements. Even though it may look dry and feel dry to the touch before then, it can often still be easily smudged and scuffed and the playground will end up looking dingy if played on too soon.

Grease/Lubrication

Grease and other lubricants will significantly prolong the life of swing hangers, seesaw brackets, merry-go-rounds, and similar playground elements where materials rub against each other. Grease and lubricants can be messy and should not be placed excessively in places where a child could touch or consume them.

Congratulations! You've finished your playground build! It's time to get everyone together to celebrate. You can even organize an official "ribbon cutting" ceremony to mark the occasion. Now sit back and watch how much FUN the kids have on their new playground all because of the hard work of your team.