Spica chair plans aren’t about construction, they’re about kids. The end product, and the whole point, is to give little people an opportunity to forget about the stuff that’s not so much fun, and just be the angels they really are. These are the plans for Gavin’s Spica. This is Gavin’s story.

There are a lot of really good websites that explain everything you need to know about the process and recovery, so we’re not going there. Please make certain, however, that you understand some really important basics – such as, your child will not be able to sit upright in nearly any kind of traditional children’s furniture while in the cast. And the cast will provide a resting point, but only outside of the diaper area, so the seat dimensions are fairly critical.

When some of us learned about the challenges the little guy was going to be facing, the search began for ways to take some of that challenge away. As we looked for information, there weren’t a lot of places we could find that had actual plans for building a simple, functional chair for a child in a Spica cast. Compounding the problem, Gavin’s care was going to have to be divided between his Mom and his Grandma, and have to be in two locations.
The job, then, was to come up with a Spica chair that was functional, sturdy, safe, relatively lightweight, and portable enough to be taken from one location to another on a regular basis. We looked at a lot of pictures, and finally came up with a design that seems to be filling all the needs. As it turned out, it’s also pretty simple and straightforward to build, so now Gavin actually has two chairs, one at Mom’s and one at Grandma’s.

The chair was designed to allow Gavin to be in an upright position. We felt like that was important. The seat of the cast rests into the seat slot solidly enough that with the additional support of the tray fitting around the front of the cast and the safety harness, he can sit and play at the table, eat, and be positioned to enjoy looking out a window for periods of time. Gavin’s weight is on the cast in this seat, and the cut-out diapering area of the cast is not in direct contact with the surface of the seat - this helps in keeping his bottom comfortable and makes diaper changes easier. By attaching links to the sides of the tray, toys can be clipped on and changed for variety. The surface is large enough to accommodate a lot of infant toys (he especially likes the ones with electronic musical features) that kids in Spica casts can’t otherwise easily be positioned to enjoy. It’s also large enough for you to pull up a chair and visit, easily.

If you don’t have some fairly basic power tools, a place to work, and at least basic woodworking experience, it will probably be best to recruit someone to do the labor for you. But if you have the time, the place and the tools, we hope that the plans that follow will provide all (or at least most) of the technical information you’ll need. And I understand we’re putting up an email link if you have questions. So have fun, be careful, and never lose sight of the story, and the smiles, that will result from your labors.
Getting Started

To make Gavin’s Spica, you’ll need part of one sheet of plywood, and two eight-foot-long pieces of fairly straight pine or fir lumber that’s called 1 x 6 (that’s supposed to mean 1” thick and 6” wide, but it’s really only ¾” thick and about 5 ½” wide). The lumber yard folks will call them 1x6-8 standard or better lumber. Pick out your own, and try to get two pieces that are pretty straight. It’ll make life a lot easier for you.

The plywood we used was 19/32” floor decking, because we had a sheet of it on hand. Don’t use thinner than ½”, because it might not be sturdy enough when it’s done. Either 5/8” or ¾” is a good thickness. The ¾” will be a little sturdier, but the 5/8” will be a little lighter to move around once it’s done. Inexpensive interior plywood that’s only “finished” on one side will work perfectly, since all the parts have an exposed side and a hidden, or covered, side.

You’ll also need about 24 #6 screws 1 ¾” long (#6 – 1 ¾”), 30 or 40 6-penny finish nails, a small bottle of wood glue, sandpaper, and bar soap. Seriously. Bar soap. You’ll see. For the tray surface, sanding and painting will certainly work, although we used a couple of pieces of smooth-finish particle board, again because we had them on hand. For the rails along the edges of the tray, we used 1x2 pine (actual size ¾”x1 ½”), but you’ll have enough material left from the 1x6’s to cut them if necessary. Finally, you’ll need paint, foam padding for the seat and backrest, and some type of fabric to cover the seat. We used flashy candy-apple red on Gavin’s, courtesy of his Grandma’s shopping spree. Stain-resistant and pretty waterproof is a very good idea. The harness is 1” webbing from a craft store, and we’ll discuss it more later.
The only tools you’ll really need are a circular saw or table saw, a small hand saw or a jig saw, a belt sander, a screw gun/power drill, a staple gun, a square, probably a screwdriver at some point, and some clamps. All of the power tools can be replaced with hand tools if you have to, and if you’re having a problem figuring out how to cut out the seat section with only hand tools, send an email and we’ll walk you through it.

**Plywood Layout**

At the right is a layout plan for cutting all the plywood pieces from a full sheet, which is 48” x 96” (4’ x 8’). First, cut a piece the full width of the sheet that’s 38” long. This will be both of the sides. Then cut that piece into two pieces about 24” by 38”. They don’t have to be exact, but both pieces need to be the same size. Your saw blade will remove some amount of the wood, about 1/8” if you’re using a circular saw or table saw. Cut in the middle.

If you’re having trouble reading the sizes, copy the picture into a blank sheet and print it out as a full page.

The tray size does NOT have to be the same as we made it, although we wanted it to be large enough (and made the chair the correct height) that someone could pull a chair up to the end opposite Gavin and play with him. On the second model, the tray is
smaller and makes this a little more difficult. We also made the width to fit the pieces of finished masonite we used for the tray surface. A finished tray somewhat close to 24” x 24” is a very good size.

The tray support can also be sized differently if you use a different tray size. And we learned after it was mostly finished that making the tray support a little shorter would have been a good idea. At some point we’ll probably cut it off about an inch. You’ll see the problem in the pictures. The most important thing about the two 1 ½” x 12” tray support spacers (noted as 1 in the drawing) is that they be at least as thick as the tray support. A little thicker will be fine, or you can use a cardboard spacer to provide clearance. The tray stop (2 in the drawing) can be plywood, or it can be 1 x 2.

Cutting the Sides

These two pieces are the most critical parts of the chair construction. In order for the chair to sit level and be solid, they need to have square corners (except for the single angle that makes the backrest), and they need to be as nearly identical as you can make them.

Again, if you’re having trouble reading the dimensions, copy the jpeg at right onto a separate sheet and print it out as a full page.

Once the two pieces are cut, clamp them together and sand them as a single, thicker piece. This will help keep them as nearly the same size and shape as possible.

The angle made by making the
top of the backrest 3 ½” and the bottom 6” is based totally on dumb luck. It looked about right, and as it turns out seems to fit Gavin pretty well. You know the child that’s going to use your chair, so give some thought to overall child size, probable cast thickness, and how long the chair will be in use. Gavin was just over six months when he tried it out for the first time and we guessed pretty well, but take your child’s age and size into consideration. You may need to make the depth of the actual seat area a little more, or a little less, than 9 ½”. That won’t hurt a thing.

1 x 6 . . . .  whaaa?

Most of the pieces of 1x6 are fillers, they simply hold the two sides apart and give you a solid place to fasten the seat, the back, the legs that make the chair steady
(the only “non-filler” 1 x 6 parts), and the tray support. The pieces on the very front, the very back, and the part that’s up and down directly in front of the seat cutout, will show when the chair’s finished, the rest will be covered up and won’t show. Even though that’s true, it’s still a good idea to sand them before you install them, and sand the assembled piece once the glue is dry.

So first, cut a piece of 1 x 6 that’s 38” long. Measure it, and use the square to mark it so the end is square, or a 90 degree corner. Then cut a piece of 1 x 6 that’s 28 ½” long. Using both glue and #6 - 1 ¾” long screws, fasten the 1 x 6 – 38” piece onto the 38” long side of the plywood side piece. Fasten the 28 ½” piece in the same way onto the 28 ½” side of the same plywood side piece. You may want to use clamps to hold the two pieces together while you install the screws, and it’s a good idea to drill what’s called a “pilot hole” where the screws will go to keep from splitting the wood. This is made with a drill bit that’s slightly smaller than the diameter of the screw (a 3/32” bit is just right. Don’t use a drill bit that’s larger in diameter than your screw threads). Make certain that the wide surface of the 1 x 6 is very close to being exactly lined up with the edge of the plywood side piece. This makes less sanding later.

With both the 38” and 28 ½” boards attached to one plywood side, use the same process to attach the other plywood side. You should end up with a box-like assembly that resembles the picture above.

Now begin measuring and cutting the 1 x 6 fillers for the seat back, the seat bottom, the “baby side” of the seat cutout area, the top of the seat back, and the tray support area (the top of the “column” in front of the seat). There’s no particular order that these should be done, although if you’re a stickler for finish considerations, decide where you want the “end grain” on the 1 x 6’s to show.

Although the picture above doesn’t show the piece that goes under the tray support, you will want to install a piece there. Without it, fastening the tray support to the chair is much more difficult.
**Assembly and legs**

With the main chair body assembled, further work will be easier if you next make and install the “legs”, or the front and rear stabilizer braces, if you prefer. These are 20” long pieces of 1 x 6, with a small angle from the outside in to the center. If you’re using a large enough diameter table saw or circular saw, it’s easiest to cut both pieces at the same time, and it keeps them more even.

First, measure the chair body you’ve just assembled. Depending on the thickness of plywood you’re using, and the actual width of your 1 x 6’s, it should be between 6 ½” and 7”, or close to that. Measure 10” in from one end of the leg, and using a square, mark the centerline of the board. Now measure HALF of the thickness of the assembly in each direction. For example, if the chair body is 6 ½” thick, measure 3 ¼” to each side of the center mark, and make another mark on each. Your two marks will now be 6 ½” apart, and centered in the length of the board.

Now measure down 2” on each end of the 20” 1 x 6 – on the end rather than along the long side, and mark both ends. Using a ruler or straight piece of lumber, draw a line from the 2” mark on one end to the closest outer mark toward the center. Look at the picture. You’re making a piece that slopes on each end, thicker toward the middle and becoming narrower toward the outside. Cut along the two angled lines. If both 20” pieces were clamped together, you now have both legs, or stabilizers. If not, cut a second piece just like the first one.

**SAND, a new four-letter word**

I have one very simple rule that guides ALL my woodworking projects:

**IF KIDS ARE GOING TO BE NEAR IT, SAND IT.**
And I’m not just talking about surfaces. Traditional woodworking is all about exact cuts and perfect, square corners. That’s fine. Square, sharp corners and small heads do not play well together. Sharp corners and your hip won’t make happy companions either. Sand EVERY corner so it’s rounded. Sand EVERY surface so there are no splinters. If you’re using a belt sander, sand until you need a new belt, buy one, and finish sanding. If you’re sanding by hand, just keep sanding. Round off every sharp edge and every corner on the chair. It’s worth the effort.

So, once the legs are sanded smooth and safe, you can attach them to the chair body. One goes in front, one goes in back. Use glue on both surfaces, and then use FIVE screws, four corners and one center, making an X. Place the corner screws about 1 ¼” in from the outside edges of the chair body, so they won’t split out.

It will be best to be able to place the chair body on the actual floor where it will be used. It’s unusual for any two floors to be level and smooth in the same way, and being able to see how the legs need to mount to hold the chair body level and solid is a great help. If that’s not practical, and it wasn’t for us when we built Gavin’s chair, try to find as smooth and level a spot as you can, and take your time attaching the legs. At the worst, you may have to use either a small piece of cardboard to level the chair while it’s in use, or install adjustable leveling legs once it’s finished.

*Making the Tray and Tray Support*

Because Gavin’s chair was made to be portable, having the tray be completely removable was important. Having the tray moveable is also helpful in getting the child in and out, and it will be next to impossible to do that without being able to slide the tray. The cast simply doesn’t “give” or bend to fit through smaller spaces. Note in the picture that with the tray fully in, there’d be no easy way to get the cast up and past the tray cutout. So these plans are for a chair with a removable tray. This allows additional play area around the child as well,
close enough to be easily used.

Fit the tray support onto the front column, the part that goes up right in front of where the child will sit. The tray support should be even with the back of that column, that is, it should not make the space for the child to sit narrower, but it should also not be past that edge. Note that the edges have all been sanded round in the picture.

Use glue and at least four #6 - 1 ¾” screws to attach the tray support. For this piece, make especially certain that the screws go in all the way. Once the tray support is in place, SAND THE SURFACE VERY SMOOTH, AND MAKE IT SLIGHTLY THINNER THAN IT WAS. And brace yourself, you’re about to use the soap we talked about earlier.

But first, you’ll have to make the tray. Take the 24” x 24” piece you cut out of the plywood sheet, sand it smooth enough to accommodate a baby’s hands, and attach very well sanded 1 x 2 pieces on three sides, so you have a tray that looks something like the one in the picture. Again, use glue and #6 - 1 ¾” screws to hold the sides of the tray in place.

The next step is to attach the tray support guides onto the bottom of the tray assembly. The purpose of these is to provide a channel that slips over the tray support and lets the tray slide back and forth. You’ll also install the piece to keep the
tray from sliding too far in. In this instance, a picture is probably worth considerably more than any 1,000 words I can come up with, so study the picture that follows for most of the instruction.

In this picture, the tray is upside down and resting on the tray support. The half-circle is where we were planning to make the cutout to go around Gavin when he was sitting in the chair. Sand both of the guides before you install them, AND read ahead. You’ll want to soap those areas where the tray slides onto the guide before you install them onto the bottom of the tray.

There are two critical parts to this step. The first is that the space between the narrower pieces that hold the wider pieces away from the bottom of the tray HAVE to be installed slightly wider than the tray support. The second is that the thickness of those two pieces HAS to be slightly thicker than the tray support. This assembly has to slide onto the tray support. It won’t if there
isn’t room. It will also “drag”, and be hard to slide into place. This is where the bar soap comes in. Rub a liberal amount of soap onto the entire top surface of the tray support and covering the whole area, and on the bottom of the tray and under the tray guides, and all or most of the drag will be eliminated.

Don’t get too hung up on this – in the picture at left you’ll notice that after everything was painted and nearly done, we had to take it back apart, add some cardboard, and allow enough room for it to be easily removed. That happened because the plywood warped a very small amount after it was painted. The soap will make it slide easier. If it’s still too tight, use a spacer. We were pressed for time at that point, so we used corrugated box cardboard, thicker than we really needed. One of these days we may take it back apart and put something a little thinner in there. Or not …

**A Couple of Somewhat Tricky Spots**

You’re ready to make the cutout in the tray that goes around your child. If your child isn’t already in the cast, the correct size is going to be a guess. If your child IS already in the cast, you needed to have the chair done yesterday. Decide how thick you think your child will be once the cast is on, look ahead to the section called “The Home Stretch” and decide how thick the foam will be, and make your decision.

It will be close, and so long as it’s not too small will be close enough to work well. Mark the center of the tray on the top, NOT on the bottom as in the picture, make two marks
equally distant from the center mark, and use the square to mark them as straight lines. Measure the depth of the cutout along each line, and connect those marks to make the inside line. Now, using a coffee can, dish lid, or anything circular, make the corners rounded. Use a jig saw to cut them out, and sand the cutout so smooth you aren’t worried about it coming into contact with your baby’s tummy.

Determine how wide the seat needs to be, based on your child’s size and your best guess about the probable size of the cast. These two pieces are not on the cutting layout, so don’t fret that you missed them. Cut them from the remainder of the sheet of plywood. Check with your doctor and nurse, show them the pictures, and ask them for advice. Remember, the width of the seat bottom will ideally be at least 2” wider than the diapering cutout on the cast. That way the cast supports your child’s weight. The seat bottom will be about 9” long and the seat back will be about 19” long (measure one, cut and install it, and then measure the other). Cut the seat and seat back, sand them smooth with rounded corners, and glue and screw them into place.

The Home Stretch. Really.

Presto, you’re ready to start painting. Or staining, or whatever kind of finish you want to use. But water-based paint dries quicker and is easier to clean up. You don’t have to paint much, if any, of the seat and seat back since the fabric will cover them, and DON’T PAINT THE TRAY GUIDE OR THE BOTTOM OF THE TRAY. See the picture to the left. If you paint the surfaces where it’s supposed to slide, at some point the paint will almost certainly stick.

Once the paint is dry, we added brass handles (window lifts you can get at most any hardware store) just to make it a little easier to haul around. Handy, not essential.
If you use them, place them where they feel the most right to you, one on the front “tray column” and the other on the back “seat column”.

For the seat foam, we used a combination of 2” thick and 1” thick, again because that’s what we had on hand. We doubled the 2” for the seat bottom, and used 2” with a 1” “egg crate” piece for the back. The foam just rests in place.

If you have access to an upholstery professional, your chair will look better than ours. But in the end, the fabric needs to hold the foam in place and stay put. We used a hand staple gun, fastened one side, stretched the fabric across, stapled the other side, and folded the corners over. I’m pretty sure none of our corners are done exactly the same way as any of the others, but it’s holding up so far. And Gavin hasn’t said a word about the limitations to our craftsmanship. He’s such a good kid.

Another admission of slight “oopsie” – in the picture the tray is pushed all the way in. The cutout is deeper than we intended, because we completely forgot to consider that depth when we made the cutout. Easily solved by cutting the tray guide off in front by the amount it’s exposed in the back. But it’s got all that soap on it, and then there’s the sanding, and so far it hasn’t caused any problems. But yours will be better if you check it before you’re almost entirely done, and shorten the tray guide if needed.

The final steps involve using 1” webbing to create a harness and some toy hooks for the sides of the tray. We were lucky enough to have someone who knew how to run a sewing machine on hand, and Grandma stitched “D” rings onto loops to make the harness. The clasp was purchased at the same store.
The finished harness looks like this, and is basically the same 5-point harness arrangement you’ll find on car seats, etc., except it only requires 4 points, since the child can’t slide out the bottom. The clasp ends slide through the webbing which is connected at the top. The side webbing slides through loops on the top webbing and connect using similar plastic fasteners. Examine a few car seats, high chairs, and similar devices which have harnesses, and it will become fairly clear how they all fasten together.

The toy hooks are also made with 1” webbing and a “D” ring. We used some fancy screw bases to hold them on, but a plain screw with a small washer will do the same thing.

This picture was Gavin’s first solo flight in his new chair, and we had the tray so overloaded with toys it’s a wonder he could even find them all. We did discover that using those plastic snap-rings to fasten toys onto the tray worked really well.

Hopefully, we’ve given you enough information to make your own Spica chair. If you have questions, please send us an email and we’ll do our best to answer them.