

# How to Build a Fence

## Tool List:

Post Hole Diggers

Piece of Rebar (to stir the concrete with - a 4 ft, 5/8 in piece)

Post levels (the ones with a rubber band for the wood post)

Water bucket (5 gallon paint buckets work great)

Tape measure (100 ft.)

Loppers to trim back bushes

Spike/maddock to break up hard ground, rock, etc.

Large and medium channel locks

Double ended offset ratchet

5-lb sledgehammer

2 t-posts drivers

4 needle nose pliers

Hammer

4 pair of hog ring pliers

Flat shovel

Pointed shovel

Rake

Ax

T-post puller

Chain for pulling

Roll of mason string

2 wire snips

Small and large bolt cutters

Utility knife

Tub/box for holding tools

Turnbuckle

Eye-bolt for lag screws

½-in. drill bit

Come-along

Fence tension bar

## **Materials List for a basic 600 square foot fence**

### **For setting the posts:**

- 4 - 4x8 wood posts
- 1 - 8ft. metal gate post
- 4 - 5 60 pound bags of sakrete

### **For the fence build:**

- 2 - 5x100 ft welded wire (one to be used for groundwire - you won't need two for every fence)
- 25 – 6 1/2 ft. green t-posts
- staples (See figures 7b, 18 and 19)
- soft-ties
- chain-link gate
- gate accessories
- 4 - 5ft tension bars
- 4 small tension bands for bottom of the gate for reinforcement as needed
- 2 lag screws (male hinge) for gate
- hog rings
- nuts and bolts for attaching gate hardware and tension bands
- tent stakes as needed for groundwire

# How to Build a Fence

## **Before the Day of Fence Construction:**

### **Step 1: Choosing an area for the construction of the fence**

When determining where the fence will be located, look for an area of the yard that is relatively flat and has natural shade if possible. When natural shade is not an option, we secure a tarp over one corner of the fenced-in area to provide shade (**See Step 9b**). Try to avoid areas where water accumulates in the yard.

Determine the length and width of the area to be fenced. Since welded wire is available in rolls of 50 and 100 feet, it is ideal to keep the perimeter around 100 feet if possible. We try to utilize the back of the house as one side of the perimeter. This allows for a larger fenced in area utilizing the same amount of wire and also makes it easier for the owners to have access to the dog's area. If it is not possible to utilize the back of the house for one side of the fence, then for a single dog we usually construct a four-sided fence that is 25x25 or 20x30 (600 square feet).

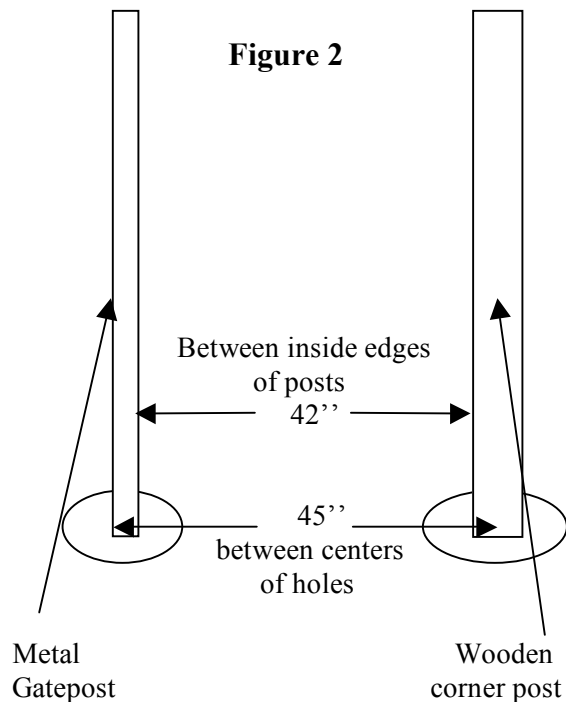
### **Step 2: Setting the Corner Posts and Gate Posts**

Set the corner posts and the gate post of the fence in concrete at least 48 hours ahead of the fence construction. This will allow the concrete holding posts to set thoroughly.

We use a 4x4x8 wooden post for the corner and gate posts. Most five-foot gates for fences are standard in size and require 42 inches of space between the two posts. We measure this space with a "spacer" board that is cut exactly 42" long for this purpose.



Figures 1a & 1b. Placement of the gateposts



With posthole diggers or an auger, dig holes for the posts that are exactly 24 inches deep and 8 to 9 inches in diameter. Ideally, the bottom of the hole should have a slightly larger diameter than the top. The hole for the gatepost should be dug such that there will be exactly 42 inches of space between the posts when measuring from the inside of one post to the inside of the other. The center of the two holes should be a little further apart than that (approximately 45" apart) so that when the posts are set 42" apart, they will be centered in their respective holes. (See **Figure 2**) Be certain that the distance between the posts is 42" at the top as well as at the bottom. The dirt from the holes should be dumped outside the fence perimeter, so that it won't be on the fence line or within the finished fence.

To set each of the corner posts and the gatepost we use a 60-pound bag of concrete and water. Place a corner post in one of the 24-inch deep holes and turn it so that it will be square with the other corner post. Attach a post level to the post. One person levels the post and keeps it square while another person pours small amounts of concrete and water, mixing them together with a three-foot long rod of rebar, and continuing until the hole is filled. Do not fill the hole completely with dry concrete and then add water. This will make it too difficult to mix the concrete and water thoroughly. We usually pour about  $\frac{1}{4}$  of the hole with concrete and water and mix thoroughly using the rebar then repeat until the hole is full. Do not overfill the hole. The concrete will be in the way of the fencing wire if it comes above the top of the hole. Follow this procedure for setting each of the corner post and the gatepost.

## **The Day of the Fence Construction:**

### **Step 3: Setting T-posts and Support Posts**

In order to ensure that the t-posts are in alignment with each other and with the corner posts, stretch string around the perimeter of the fence as a guideline. Tie the string to the gatepost a few inches from the ground. Moving in the direction away from the gate opening, stretch the string around the entire perimeter. Wrap it completely around each corner post, keeping it on the outside edge of the post at you arrive at the post and as you leave it. Keep the string within just a few inches of the ground, without allowing it to touch any obstacles on the ground. (See **Figures 4a and 4b**)

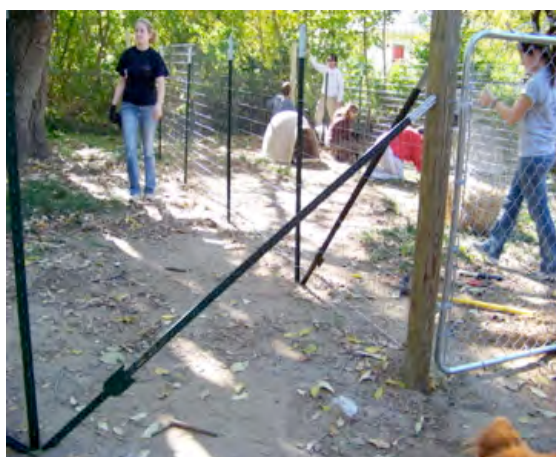


**Figures 4a and 4b. String for aligning t-posts and String wrapped around a corner post**

Place metal t-posts diagonally against the corner posts with the top of the t-post at about a 45% angle to corner post and the base of the t-post resting on the ground just inside the string on each side of the corner post following the perimeter of the fence. The nubs on the posts should be facing outward (**See Figure 5**) These diagonally placed t-posts will serve as support for the corner posts when the welded wire is attached to them and pulled tight. (**See Figures 6a & 6b**) The base of each of these diagonal posts will rest against one of the vertical t-posts, which is driven into the ground.



Figure 5. Placement of diagonal support



Figures 6a and 6b. Placement of the diagonal supports against vertical t-posts

Vertical t-posts will be driven into the ground to attach the welded wire fence to. To determine where the t-posts should be placed on each side of the fence, place one t-post at the base of each of the support posts for that side (**See Figure 9**) and then place t-posts evenly (no more than five feet apart) between the two t-posts at the base of the support posts (**See Figure 13**).

When placing the two beginning t-posts at the base of the support posts, make a mark on the ground in the exact spot where the base of the support post rests, move the support post out of the way momentarily and drive the first t-post directly into the spot marked by the base of the support post. Once it is driven in, place the diagonal support post back into place so that its base is resting securely against the base of the t-post (**See Figure 9**). Then hammer the top of the diagonal t-post until it is securely indented into the corner posts, with the nubs facing outward (**See Figure 7a**). Add a staple to ensure that the support post will not slip (**See Figure 7b**).





Figure 7a. Hammer the diagonal support into the corner post.



Figure 7b. Staple helping to secure corner support post.



Figure 8. T-post Driver

Once the first two t-posts are driven in at the base of the two support t-posts on a side, drive in the remaining t-posts for that side using a t-post driver (See **Figure 8**) The vertical t-posts are placed no more than five-feet apart around the perimeter, just inside the string with the nubs facing outward. Drive the t-post just until the metal plate near the bottom is completely underground. Continue in this way for each side of the perimeter of the fence.



**Figure 9. Diagonal support against vertical t-post**

### **Placement of vertical t-posts**

Once the t-posts have been driven around the entire perimeter of the fence, remove the string.

**Note:** T-posts should be driven in using two people: one to watch and make sure that the t-post is level (plumb) from every direction and one to drive the t-posts in using a t-post driver (See Figures 14 & 15). When driving a t-post into the ground stop driving when the two prongs on the t-post are just beneath the surface. If a t-post is driven in a way so that it is leaning or not in alignment with the perimeter of the fence, use a t-post puller to pull the t-post out of the ground so it can be re-driven.







Figures 14 & 15. Driving the t-posts

#### Step 4: Attaching the welded wire to the corner posts and t-posts

Roll the welded wire out to the length of one side of the fence (See **Figure 16**). If we have the space it is easiest to unroll it on the ground next to the perimeter so we can just lift it up into place. Using wire cutters (See **Figure 17**) we cut the wire from the roll once we've determined the length needed for the side. We add a few inches of extra wire to each side to attach the puller to when pulling the wire tight. Once we've cut the welded wire we use a three to four volunteers to hold the wire up along the side.



Figure 16. Welded wire



Figure 17. Wire cutters

The first step in attaching the fence to the posts is to have a couple of volunteers at each of the corner posts pull the top and bottom of the welded wire tightly by hand. This allows us to place the welded wire as close the ground as possible for the entire length of the side. If the ground is not level and we are not able to keep the welded wire touching the ground for the length of the fence, we move the welded wire out of its place and use a ground breaker like a maddock to trench high spots along the fence line, so the fence will touch the ground across the entire side.

Once we feel we have the fence as close to the ground as possible throughout the length of the side and pulled tightly by hand, we use large, metal staples and a hammer to attach the welded wire to one of the corner posts (**See Figure 18 & 19**).



**Figures 18 & 19. Staple welded wire to corner post**

While we are stapling the welded wire onto one of the corner posts, a different volunteer is working at the opposite end, inserting a tension bar by weaving it through the welded wire (**See Figure 20**). We will attach a puller to this tension bar allowing us to pull the fence as tight as possible before attaching it to the other corner post and the t-post.



**Figure 20. Weaving the tension bar through the welded wire**

Once we've stapled the welded wire to one corner post and inserted a tension bar through the welded wire at the opposite end, we attach a puller to the tension bar. We designed a puller (**See Figure 21**) that works well with welded wire. However, you may also use the pullers designed for chain link fencing and found at most big box home improvement stores. Attach the puller to the tension bar to tighten the welded wire (**See Figure 22**). For pulling toward wooden posts, a single tension bar is used. Regarding the front of the fence, it is easier to keep the fence tight if we pull away from the metal gatepost, attaching the fence to the metal post first and pulling toward a wooden corner post (**See Step 5**).





Figure 21. Fence puller (a.k.a “the CUD”)



Figure 22. Attach fence-puller to tension bar

Once we have attached the hooks of the puller to the tension bar that is woven through the fence, one end of a come-along device is attached to the chain on the puller (**See Figures 23 and 24**). We have invented a device we call the “yellow V” which we attach the other end of the come-along to when pulling the fence tight. (**See Figure 25**) It is made out of two t-posts (painted yellow) clamped together at one end with a U-bolt. The “V” is used “sideways,” with top of the “V” placed against the wooden post, securely set against the top and the bottom of the post. One end of the come-along is attached to the “bottom” tip of the “V” while the other end is attached to chain on the fence puller. If you do not have a “V”, the come-along may also be attached around a tree, the bumper of a truck or car or any other stable object that is in alignment with the side of the fence being pulled. If there is nothing else to attach the come-along to, drive a t-post into the ground and support it with a support post to keep it from being pulled out of the ground when you crank the come-along.

We crank the come-along until the welded wire is as tight as possible without buckling (**See Figure 25**). While cranking the come-along we have a volunteer at each t-post to keep the welded wire from getting caught on the nubs of the t-posts while it is being pulled.



Figure 23. Come-along



Figure 24. Attach the come-along to the fence puller



Figure 25. Crank the come-along to tighten the welded wire



Once the welded wire is pulled as tightly as possible, we attach it to the remaining corner post and to the t-posts. We use 1 1/4" metal staples to attach to the corner post and aluminum soft ties (**See Figure 26a**) to attach to the t-posts. The aluminum soft ties are attached from inside the fence, holding the welded wire to the t-posts as tightly as possible. We wind the ends of the aluminum soft ties around the horizontal wires of the welded wire fence, as close to the t-posts as possible. The tips of the soft ties should face outside the fence for the safety of the dogs (**See Figures 26b and 26c**). Start at each t-post by attaching soft ties at the very bottom of the welded wire. From there we attach one more on the 2<sup>nd</sup> horizontal metal row from the bottom of the welded wire, then we count 5 up to the 7th horizontal row, then 5 more up from there to the 12<sup>th</sup> horizontal row, then to the top two horizontal metal rows of the wire.

Once the welded wire has been attached to each of the t-posts and the corner posts, we use wire cutters to trim any excess welded wire from the ends and repeat the process for each side of the fence.



Figure 26a: Soft ties



Figure 26b: Soft tying the welded wire to t-post



Figure 26c: Soft tie holding welded wire to t-post



Note: Many dogs push and/or pull on the bottom of the gate. As a result we reinforce the bottom of our gates by threading a tension bar through the chain link and attaching it to the bottom of the frame using four small tension bands (See Figure 33).

Figure 33. Tension bar and small tension bands to reinforce bottom of the gate.



Once the gate is assembled, take the gate and place it in position between the wooden gatepost and the metal gatepost. If you have set these posts correctly, 42 inches apart, the gate should fit between them with a few inches to spare on either side. If not, there are adjustments that can be made later to make it fit. With the gate in place, mark two spots on the wooden gatepost corresponding with the positions of the hinges. Remove the gate and, using the large drill bit, bore out the two holes for the lag screws. Drill all the way through the 4x4 wooden post. Next, screw the lag screws in. The first few turns should be easy, and once the bolt is started, use a wrench or turn buckle for leverage to finish screwing the lag screws in. Leave the end of the lag screw sticking out about 1 1/2 inches, with the bottom lag screw pointing up, and the top one pointing down (See Figure 34, 35 & 36).



Figure 34. Screw in the lag screws



Figure 35. Top lag screw with hinge



Figure 36. Bottom lag screw with hinge

Position the gate in place, sliding the hinges up or down so as to fit over the lag screws. To position the gate between the posts, you may have to screw the lag screws in further (if the handle is too close to the metal post) or unscrew them (if the handle is not close enough to the metal post. Make the necessary



adjustments, remembering to keep the bottom of the gate close to the ground. Tighten all the bolts on the gate hardware, leaving the gate handle just loose enough to open and close easily (**See Figure 31**).

To make sure that the dogs cannot push out of the bottom of the gate, we cut a length of chain long enough to wrap around the metal gatepost and the frame of the gate and use a double snap hook to hold the chain in place. We also leave a lock with the dog's owner for the gate handle to prevent the theft of the dog.



**Figure 37: Finished Fence**

### **Step 7: Laying Ground Wire**

Laying ground wire prevents dogs from digging around the perimeter of the fence. First, measure the length of a side and cut that length from a roll of welded wire. Second, cut the welded wire into two halves, cutting it down the width (a roll of welded wire is 5 feet in width, using wire cutters, cut it into two, 2 ½ feet pieces). Lay the 2 ½ feet width of welded wire along the inside of one side of the fence.

Fold the welded wire onto the side of the fence so that about a third of the ground wire is folded up onto the bottom of the fence (See **Figure 38**).



**Figure 38. Fold the welded wire along the fence.**

Using hog ring pliers (See **Figure 39**) and hog rings attach the ground wire to the bottom of the fence (See **Figures 40 & 41**). Use wire cutters to snip along the bottom edge of the ground wire, creating a row of unattached wire ends. Bend these ends at 90-degree angles and push them straight down into the ground to secure the wire at the bottom and prevent dogs from tunneling under it.



**Figure 39. Hog ring pliers**



**Figure 40. Attaching the ground wire to the fence**





**Figure 41. Ground wire secured to fence and ground**

### **Step 8: Placing the doghouse and water bucket**

**Step 8a:** It is usually a good idea to move the doghouse into the fenced area, if it is not already there, before the fence is complete -- in case the house is too large or too heavy to carry through the gate. Make sure that the house is not close enough to the fence for the dog to jump out of the fence from its roof.

**Step 8b:** Provide a water bucket inside the fence. We almost always use a five-gallon bucket, but occasionally use a three-gallon bucket for small dogs. Place the bucket in a spot convenient for filling. If the bucket is against the fence, attach the bucket handle to the fence with a soft tie to prevent it from being knocked over by an excited dog jumping up on the fence.

### **Step 9: Adding seasonal comforts**

**Step 9a:** In the winter, we add a thick bed of wheat straw to the inside of the doghouse for the dog to nestle down in. It will need to be thicker than you may imagine because it will pack down considerably once the dog sleeps on it a few times. We also spread straw on the ground wherever there is bare dirt or mud.

**Step 9b:** Adding a tarp in warm weather over the house if there is no natural shade. We install the tarp at one corner of the fence, attaching two sides of the tarp to the fence using soft ties. The final corner of the

tarp is attached to a t-post driven into the ground inside the fence. We make sure that the tarp is pitched such that water can run off of it. See **Figure 42**.



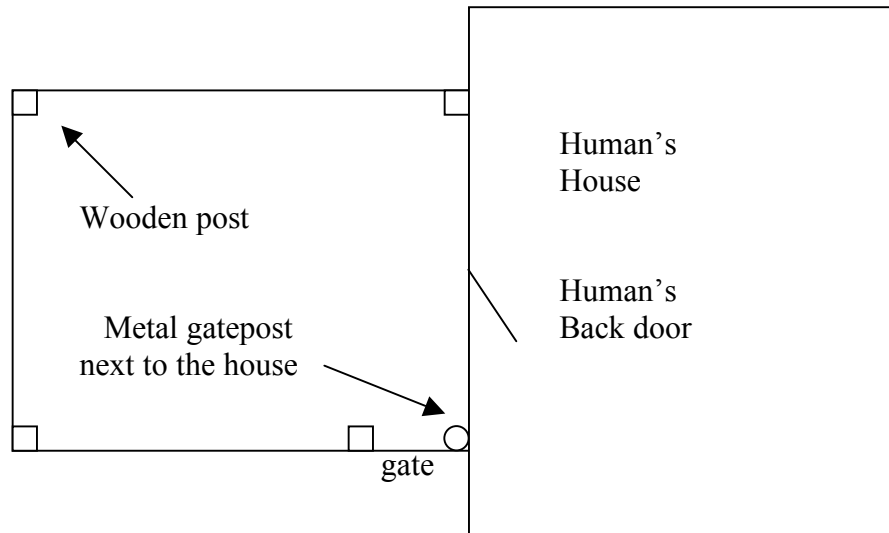
**Figure 42:** Installed tarp, providing shade.



## Various “Floor Plans” for Various Situations

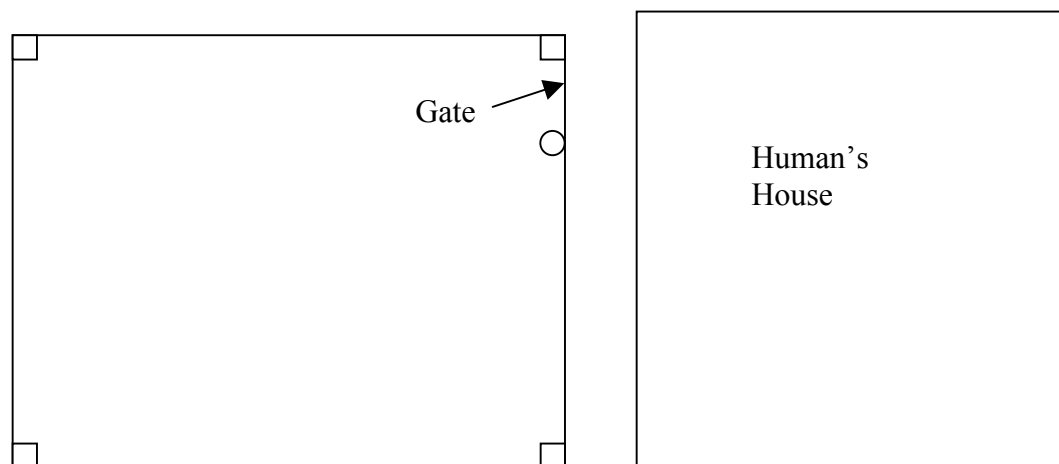
Plan A:

A single dog or multiple dogs who get along, using the house as one side of the fence.



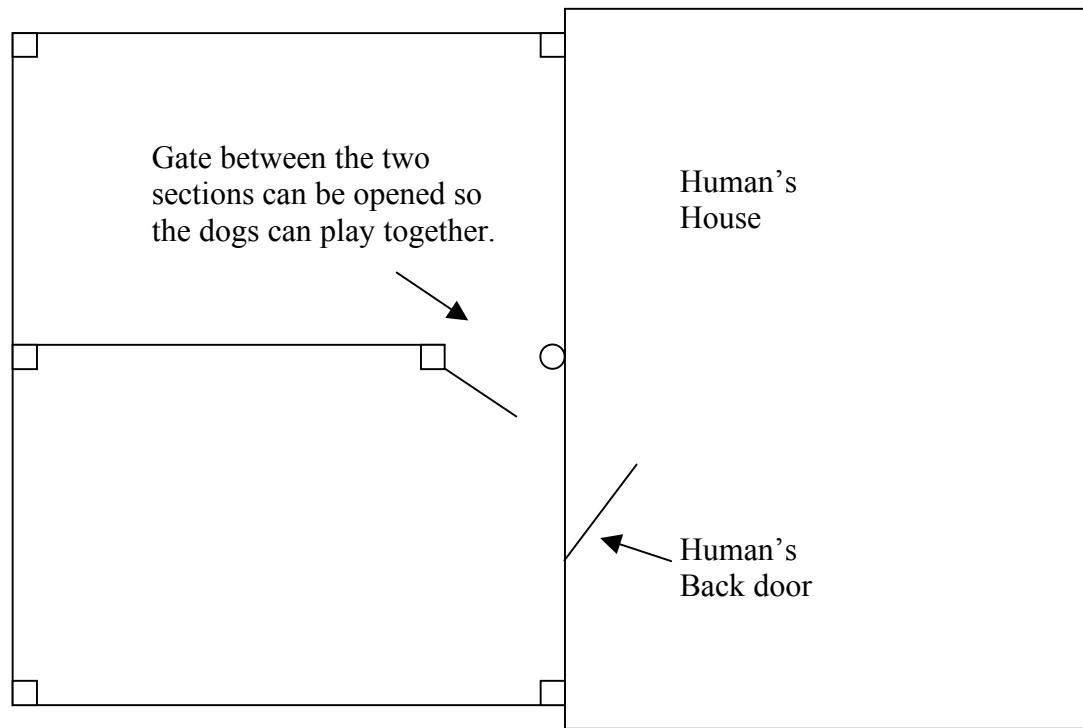
Plan B:

Free standing fence for one dog or multiple dogs that get along:



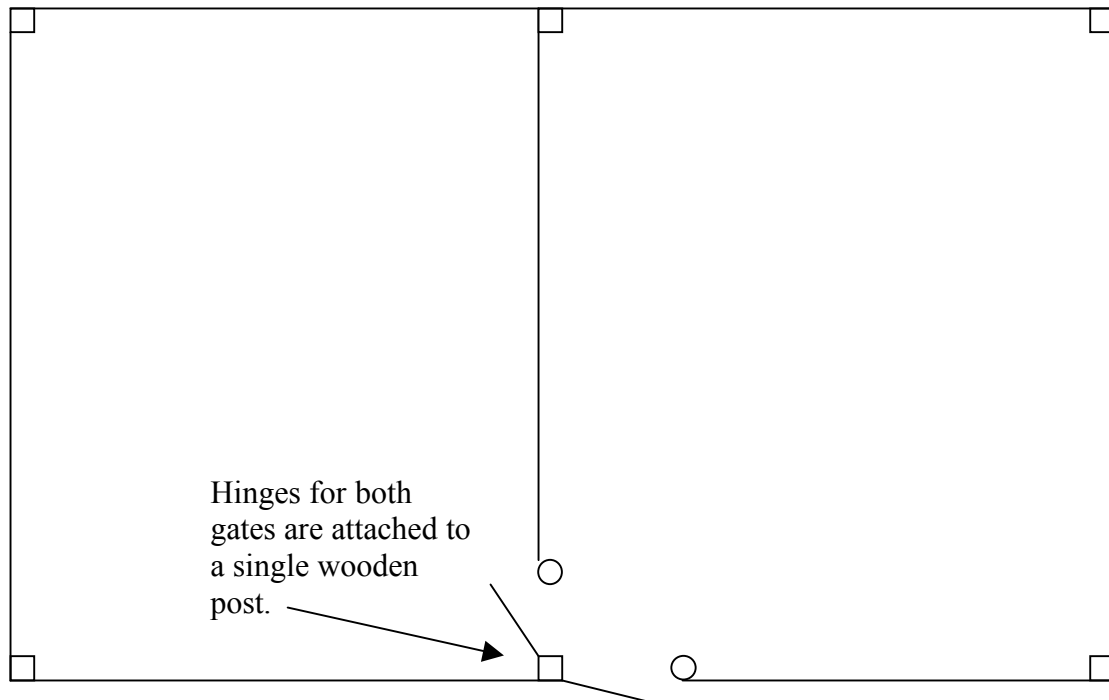
Plan C:

Multiple dog household where the dogs sometimes need to be separated (food aggression issues, usually). Using human's house as one side:



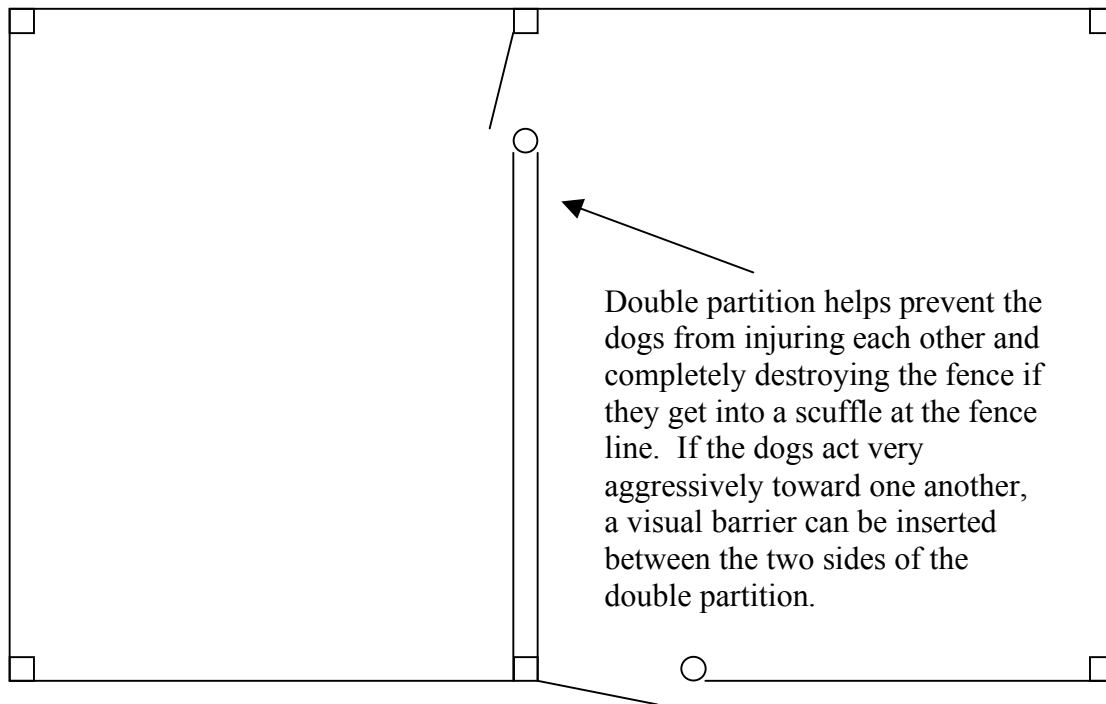
Plan D:

Free standing fence where multiple dogs may need to be separated sometimes:



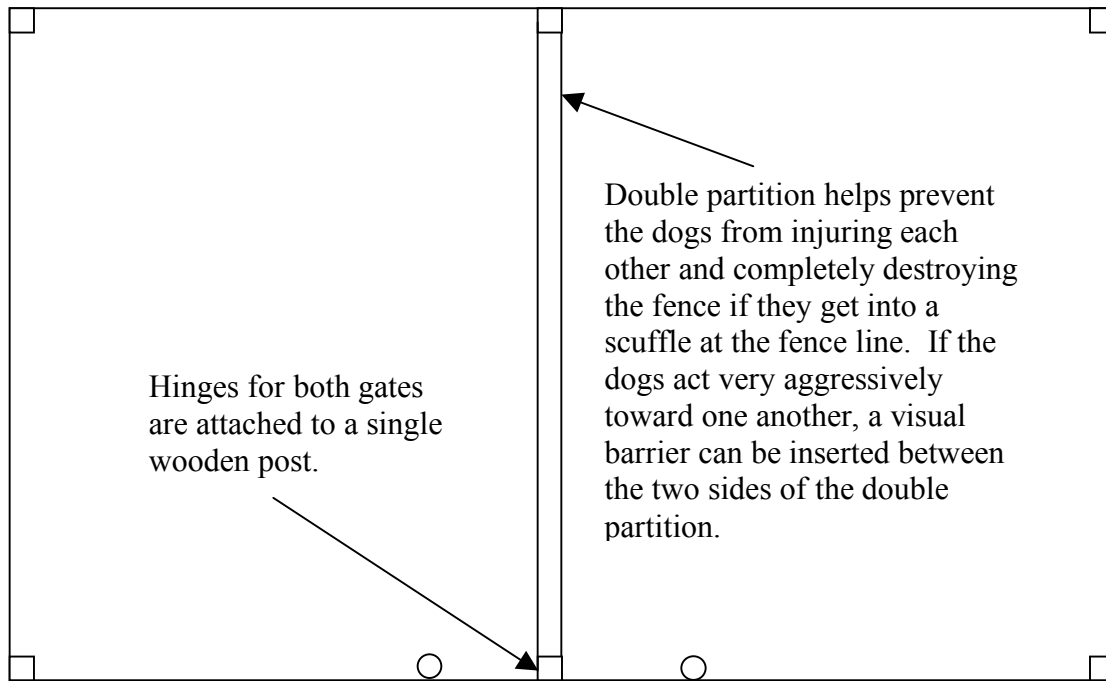
#### Plan E:

Free standing fence for dogs that will probably get along, but could harm the fence and each other if they don't.



#### Plan F:

Free standing fence for multiple dogs who are unlikely to ever get along in the same fence.



Plan G:

If dogs in a multiple dog household are very strong dogs with a known history of aggression toward one another, then you should build separate enclosures without any side in common.

