Geodesic Dome Greenhouse

by yes2tech on July 3, 2007

Table of Contents

Intro: Geodesic Dome Greenhouse

Hello! Hello! We are from YES-2-Tech, part of a program called Youth Exploring Science (YES) at the Saint Louis Science Center, funded by the National Science Foundation as part of their ITEST program (Information Technology Experiences for Students and Teachers). The YES Program is dedicated to providing the opportunity for teens who face multiple risk factors to learn job, school and life skills. As YES-2-Tech Teens, we teach math and science skills to community youth, design and build geodesic dome greenhouses, work with technology and other activities. In addition, we give presentations to large companies to explain them the purpose and progress of the YES Program.

For more information about the YES program please visit www.youthexploringscience.com .

Working and building the domes has been exciting, but also very beneficial. We traveled around St. Louis teaching kids and adults about the purpose and functions of the greenhouses. Also, we supervised the building of domes at different community centers. With a geodesic dome greenhouse, you can extend the growing season of your plants and protect them from the harsh weather outside.

Greenhouses and how they work:

Here's what we learned about why our dome (and other greenhouses) help plants live for a longer season:

Plants germinate (sprout) from seeds and grow through their life cycle depending on light and soil temperature. We couldn't do much about how much the sun was shining, but our dome made the air, and the soil in the dome warmer than outside the dome. From what we saw, it seems that growing season depends more on soil temperature than light, because some of our tougher plants like cabbage and lettuce kept growing in our dome most of the winter. They slowed down a lot, though.

But we wanted to know, why is it so hot inside??? We can tell a difference when we step inside right away, even though the plastic is not that thick. It's much warmer and the air feels sticky sometimes. It feels really nasty in there sometimes in the summer. There are 2 main things that our dome does to help the temperature stay warmer than the outside air.

1. The air inside the dome is separated from the air outside of the dome.
2. The clear (or semi-clear) skin lets light energy in, but traps heat energy.

Even though our dome skin is thin, it keeps the air inside the dome from mixing with the outside air when the wind blows, or a bus drives by. When the sun shines on the dome, lots of the high-energy light can come through the skin. Light goes through space in waves, and the light that helps us see can go right through clear objects, like glass or our dome skin. When the light bounces off the ground inside the dome and plants and the tools, it loses some of its energy. That means that the waves that bounce off can't move as fast as the waves that came into the dome, and they get trapped inside the skin. So while the sun shines, the dome gets hotter and hotter as the energy from the sun gets trapped. And this hot air can't mix with all the other air outside, and level out. That's why it feels so different in the dome. We feel it right away. It's nice in the wintertime, but when it gets hot, we start sweating right away when we walk in.

At night, when it is colder, the air in the dome has to cool off before the ground can start getting colder. We buried a digital light and temperature reader in the middle of our dome, and also hung one up in the air on a string using a pipe cleaner to make a hook. We noticed that the air got colder, then the ground got colder. Also, when the air warmed up, the ground got warmer too.

The hotter air in the dome also means that the air is more humid. Humidity means that there is more water in the air, and it can make it seem even hotter than the real temperature. That's why we seal the wood for the dome real carefully. All the water in the air can make the wood get moldy and rot. When we open our vent flaps all the way, it gets cooler fast. The hot air rises out of the vents, and mixes with the outside air. The water in the air also leaves too, and it feels much better in there. We always see little drops of water by the vents when they are closed. That's because the water comes out of the air when it is near the colder air.

Last thing: We want to warn people who think they can grow anything they want all year round. You can try, but you will end up killing a lot of plants (like we did in our first year dome). There are plants that are good for planting in the cold season, like all the plants in the cabbage family. Their family name is Arabidopsis, so if a plant has that in its scientific name, it is probably good for putting in your dome in the fall.

If you decide to use our instructable and make your own dome, we want to know what you planted!!!!! We grow food for people who can't always buy food on their own. We also go to different community groups and build new domes for them. We are getting pretty good at making these, which is why we thought we would share our experience with everybody. How hot does your dome get? What did you add to make our dome even better? Please let us know.

Your Friends,
YES-2-Tech Teens from the Youth Exploring Science Program

step 1: Materials Needed

Materials

For wood:
40 pieces of 1" x 2" x 8' wood
1 gallon waterproof sealant

For connectors:
10 6' flat perforated metal straps
25 coarse thread bolts 1/4" diameter x 3/4" length
25 1/4" hex nuts

For putting everything together:
250 1-1/4" drywall screws
250 #8 washers
box of 10' x 100' 6 mil plastic sheeting
2000 5/16" staples that fit your staple gun

For rebar bender:
4' x 6" x 6" piece of wood
4 spikes or large bolts
4' piece of 3/4" plumbing pipe or conduit

Tools
safety goggles
work gloves
hacksaw
tape measure
protractor
shovels
2"-3" general purpose paint brushes
hand wood saw
bench vise (used to bend metal strap)
scissors
staple gun
ladder
drill hammer (baby sledge)
2 socket wrench sets
drill
Phillips screwdriver drill bit
set of multi-sized drill bits

step 2: Clearing the Ground

In the location in which you intend to place your dome, clear the ground by removing all grass from an area that is 12' in diameter.

step 3: Cutting the Wood

1) Start by measuring and cutting 30 pieces of wood that are 42" in length. These are your "A" pieces. It would be good to mark them with the letter A.

2) Once you have those pieces cut, measure and cut 35 pieces of wood that are 48" in length. These are your "B" pieces. Mark these with the letter B.

Image Notes
1. Be Smart! Wear your safety goggles when using tools!

Image Notes
1. we used a hacksaw, but a handsaw would also work well

step 4: Weatherproofing the Wood

After cutting the wood, use paintbrushes to coat it with the waterproof sealant. Allow it to sit overnight or until dry.

step 5: Making the Connectors

When you are finished, you will have 10 4-way connectors, 6 5-way connectors, and 9 6-way connectors.

4-Way Connectors

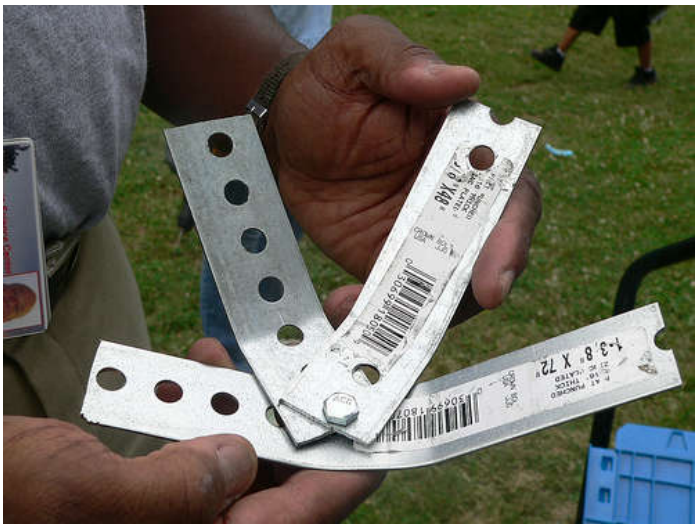
1) Begin by cutting ten strips that have ten holes each.

2) Next cut twenty strips that have seven holes each.

3) Once you have all of your strips cut, you will use a vise to bend the pieces. Each bend should be approximately a 25 degree angle. On the strips that have ten holes, bend them twice, at the fourth hole from each end. Do this for all ten strips. For the seven-hole strips, bend them once, at the second hole from one end.

4) Once you have all of the pieces bent, you will assemble them. Attach two of the seven-hole strips to the middle (fifth hole from either side) of the ten-hole strips. Place the seven-hole strips on top of each other. Then, using a bolt and a nut, connect them together. You do not need to fully tighten the bolts at this time.

5) Repeat step four until you have a total of ten connectors.



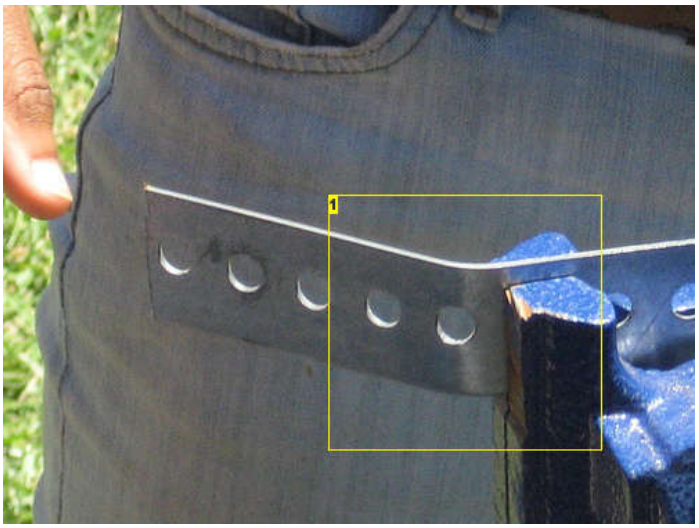


Image Notes
1. this is the angle at which you should bend

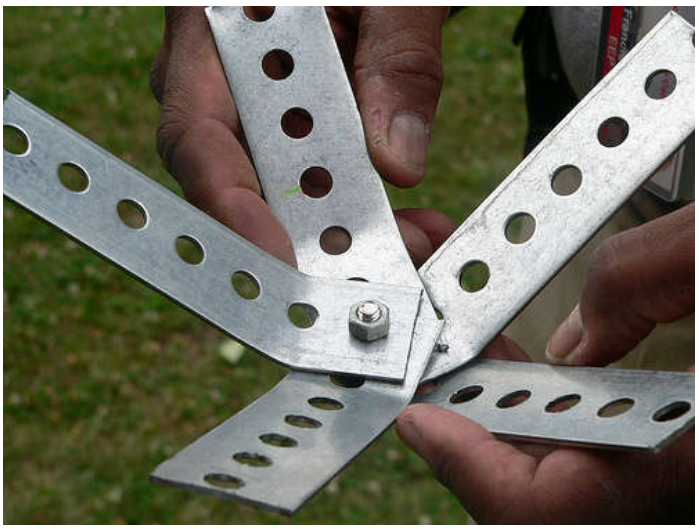
step 6: 5-Way Connectors

1) Begin by cutting thirty strips that have seven holes each.

2) Once you have all of these strips cut, use a vise to bend the pieces after the first hole from one end. Make 25 degree angles on all bends. You must do this for all thirty strips.

3) Once all of your strips have been bent, it is time to assemble them. Line up the first hole for five of the strips and connect them with a bolt and nut. For assistance on how they should be assembled, refer to the picture.

4) Repeat step three until you have a total of six connectors.

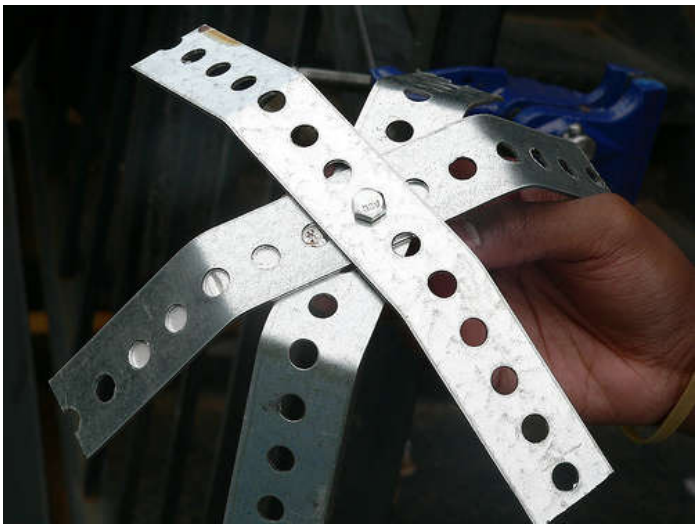


step 7: 6-Way Connectors

1) For the 6-way connectors you will need to cut twenty-seven strips that have thirteen holes each.

2) Once you have all of the strips cut, you need to bend them using a 25 degree angle. Bend at the fourth hole from each end (leaves five holes in center space). You will bend each strip twice. Do this for all of the strips.

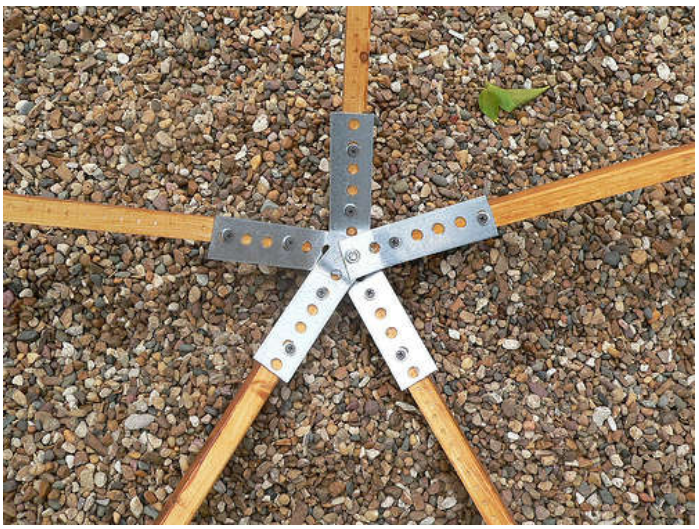
3) Assemble them by connecting them at the center hole (the seventh hole) with a nut and a bolt. Do this for all nine of the connectors. Once you have all of these steps completed, you are finished fabricating the connectors.

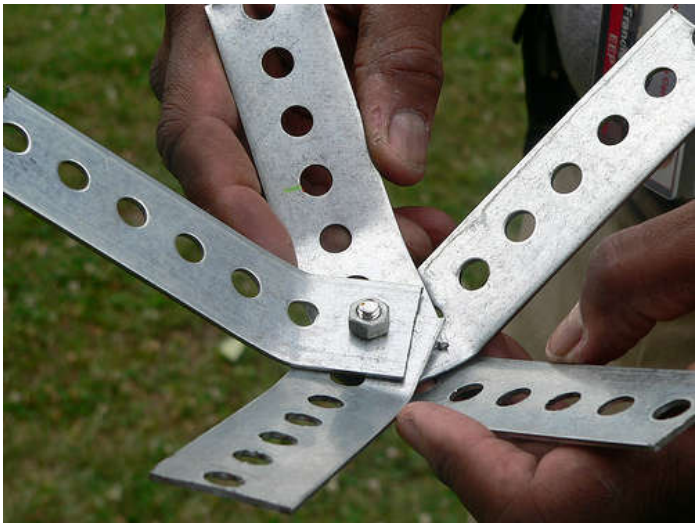


step 8: Make the Pentagons

5-way connector

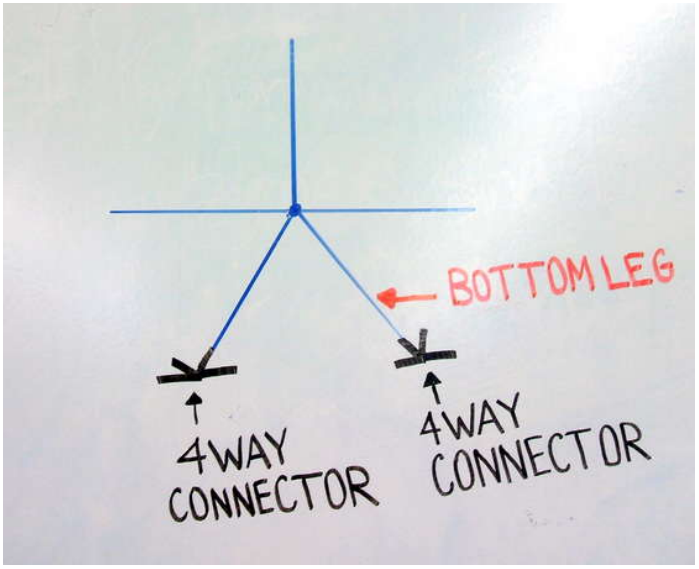
Using your drill with a screwdriver attachment, fasten one arm of a 5-way connector to a 42" (A) piece of wood using two screws (with the washer around each of the screws). Look at the picture below for the placement the screws. Once you have your first "A" piece of wood attached, you will repeat this step for the remaining four arms of the 5-way connector. Repeat for all five 5-way connectors.

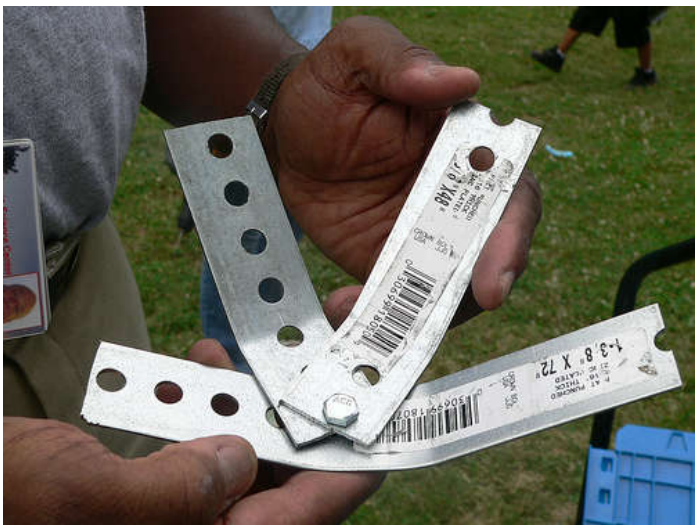




step 9: Adding the 4-way connectors

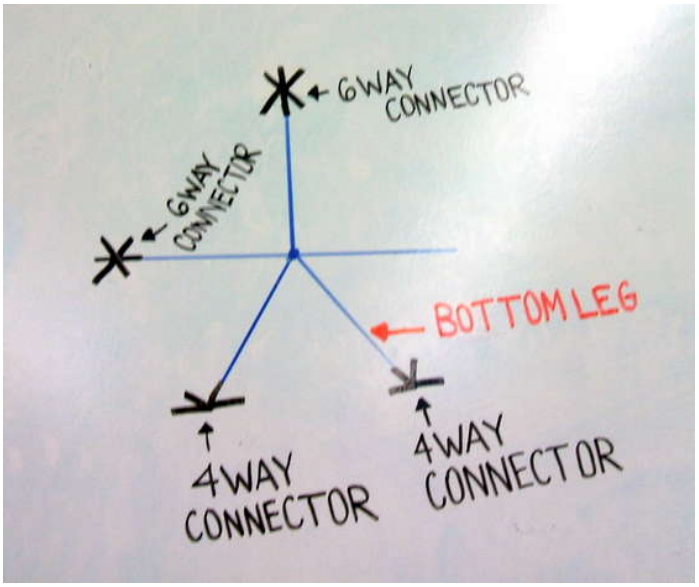
Next you will attach two 4-way connectors to the assembled 5-way connectors and A pieces. Put a washer around the screw (two screws go in each leg), then attach one 4-way connector to one leg at the bottom of the pentagon and attach the other 4-way connector to the other leg at the bottom. For more help, look at the diagram below.

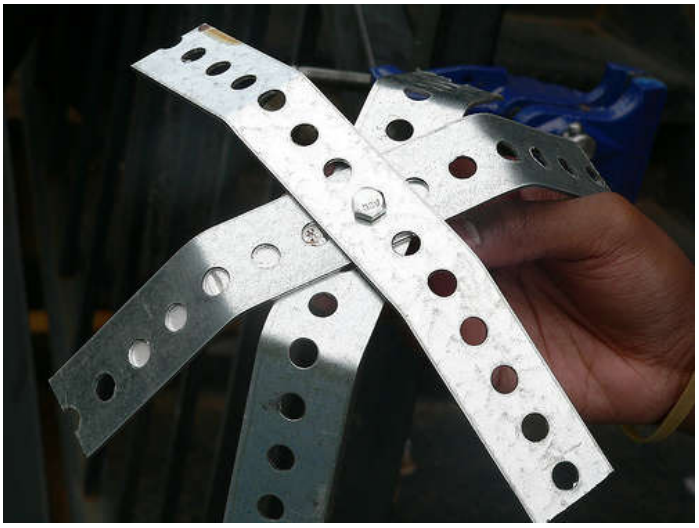




step 10: Adding the 6-way connectors

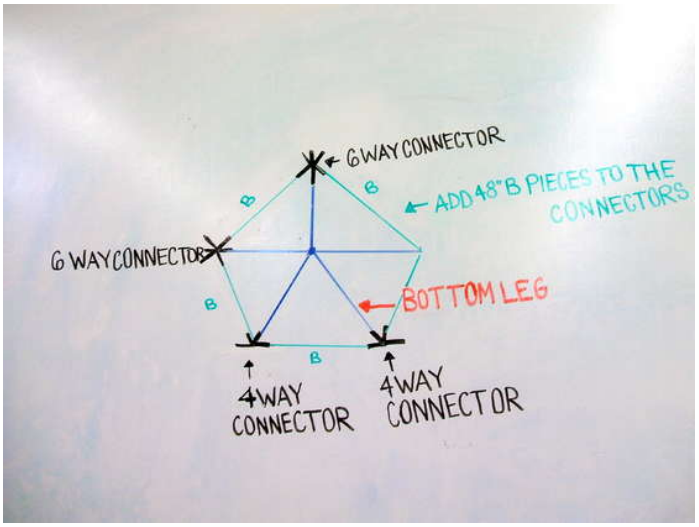
Next you will attach two 6-way connectors. Put a washer around the screw (two screws go on each leg) then attach one arm of one 6-way connector to the top of "A" piece of the pentagon and another 6-way connector to the left "A" piece of the pentagon. There will be one "A" piece that does not have a connector. The diagram shows the placement of the 6-way connectors.

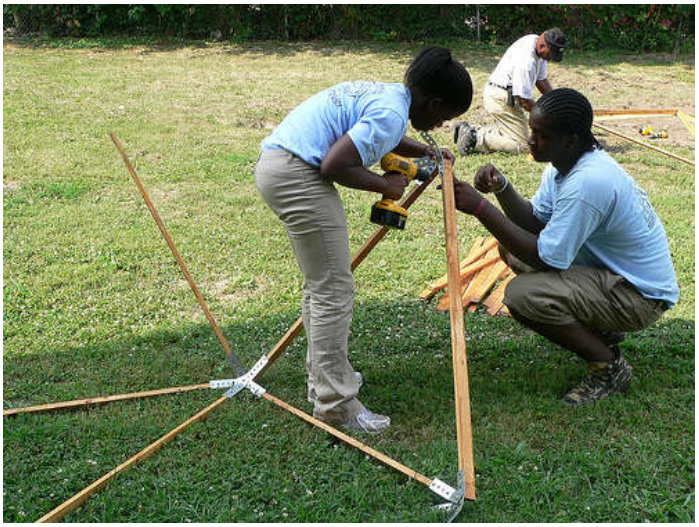




step 11: Attaching the "B" pieces

Attach one 48" "B" piece of wood between each outside connector. Be sure to install two screws and washers for each piece of wood. For more help, see the diagram. There will be no connector on one of the corners of the pentagon.



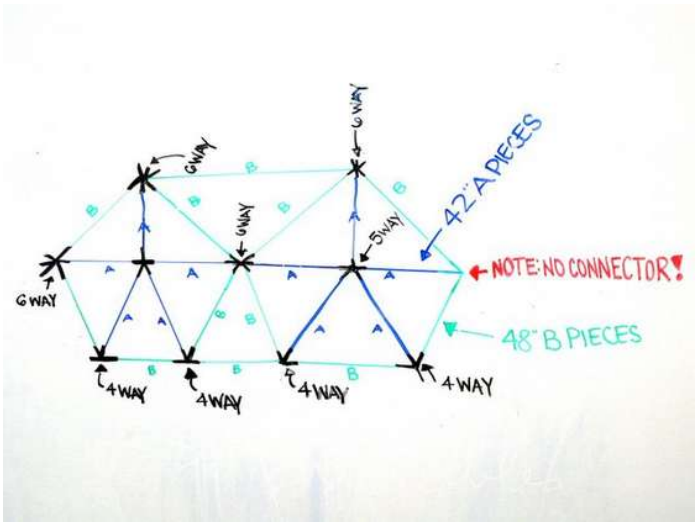


step 12: Finish the pentagons

Repeat the previous few steps to complete the other four pentagons. You will have 5 pentagons when you are done.

step 13: Connect the Pentagons

To connect the pentagons to each other, connect the 6-way connector on the left side of the pentagon to the right side of another pentagon without a 6-way connector. Repeat all the way around until each pentagon is connected. There will be ten "A" pieces connected around the middle of the pentagons.



step 14: Connect The Bottom of the Pentagon

Now attach "B" pieces between each pentagon at the bottom of the dome using the two 4-way connectors. Repeat until there are ten sides on the bottom of the dome.

step 15: Connect The Top of the Pentagon

At the top of the pentagons, attach a "B" piece to the 6-way connectors between each pentagon. Repeat until the five "B" pieces connected at the top of each pentagon form a pentagon.

step 16: Preparing To Make the Roof

First, pick a pentagon most convenient to where you want your door. Then disconnect the 5 internal legs ("A" pieces) with the 5-way connector from the external connectors (4- and 6-way) on each leg. The five legs that are disconnected will remain attached to a 5-way connector and make a star shape. This will be used to make the roof and the open pentagon will be used to make the door.

step 17: Attaching The Roof

Connect the ends of the legs to the last available 6-way connectors at the top of the dome to form the roof.

step 18: Tighten all the Connectors

Put one socket wrench on the nut side and one socket wrench on the bolt and tighten up all of the connectors on the dome.

step 19: Making the Door Frame

Since there are variables that affect the exact dimensions of your completed dome, making the door is a field-engineering task. Measure a piece of wood that will be use to construct the side of the door. Start at the bottom corner of the open pentagon where the 4-way connector is and go straight up until you are touching the top leg of the open pentagon. Mark the wood were it touches the top leg pf the pentagon (see photo below). Repeat this step on the other side.

step 20: Connect the door frame to the dome

After you mark the piece of wood, cut it at an angle so that it fits the pentagon flush against the top piece of wood. Attach the cut piece to the 4-way connector at the bottom of the pentagon. Use a 3" screw to attach the piece of wood from the top of the pentagon where it fits against the wood. This will hold your door frame together. Repeat this step on the other side.

Image Notes
1. screw here

step 21: Adding the top of the door frame

Next, measure another piece of wood to create the top part of the door. To do this, hold a piece of wood at right angles to the tops of your two parallel door pieces. Mark the spots that will allow you to connect it to the "B" pieces of wood at the top of the pentagon. From the outside of the pentagon, use 3" screws to attach this piece where it fits against the top of the pentagon and the other door pieces.

Image Notes
1. Here is where the work is done. make sure you put 2 screws in each side

step 22: Adding the side supports

Next, measure a piece of wood that goes from the 6-way connector at the side of the pentagon to the piece of wood that makes one side of the door (see photo below). Screw the piece of wood into the connector and into the piece of wood that it touches. This step adds support to the door. Repeat this step on the other side of door.

Image Notes
1. 2 screws here

step 23: Adding the top support for the door

The last step of constructing the door is to measure a piece of wood from the top 6-way connector to the top part of the door, cut it and attach the wood to the connector and the door (see photos below).

Image Notes
1. 2 screws to connect this wood

step 24: Make a Rebar Bender

Now it time to anchor your dome to the 12' X 12' area where you have cleared the grass. You will use twenty pieces of bent rebar to anchor your dome into the ground.

To see a visual of how to make a rebar bender (jig) and bend the rebar to hold down the dome, visit this website:

www.monkeyc.org/dome/d-gaskets.html

step 25: Anchor The Dome To The Ground

With your drill hammer (small sledge hammer), hammer two pieces of rebar over each "B" piece into the ground. There are ten sides to the bottom of the dome, so you will use twenty pieces of rebar to hold it down.

step 26: Cover the Dome with Plastic

Cut out a large sheet of plastic, about 6 to 7 feet long. Cover a section of the dome with the plastic. Start from the bottom and work your way up. See photos below.

step 27: Staple Plastic and Cut off Extra Plastic

Pull the plastic tight over one triangular section of the dome. Staple just enough to attach the plastic to the wood on each leg of the triangle. Then go back and staple the plastic to each leg of the triangle, stapling about two inches apart. As you do this, continue to smooth the plastic to get the wrinkles out. It helps to fold the excess plastic on top of itself as you staple it onto the wood. Continue by covering as many triangles as you can until you have used up the plastic sheet. When your first section of plastic is securely attached, cut off any excess that does not completely cover a triangular section of the dome.

step 28: Keep Adding Plastic Until Finished

Repeat the process until the dome is covered. You will need to put a ladder inside the dome to staple the plastic onto some of the top parts (see photo).

step 29: Add the vent

You'll most likely need a ladder inside the dome for this step. Place the ladder on the ground under the top of the dome. Cut along one leg of any triangle at top of the dome (see photo). This will create a vent that will allow air to circulate and help regulate the temperature in your geodesic dome greenhouse.

step 30: Make the Plastic Door

To make the plastic door area for the dome, put a sheet of plastic on the door frame, cut it through the middle into two symmetrical halves, staple the plastic onto the frame, then trim the excess plastic hanging from the frame.

step 31: All done!

The completed dome

Related Instructables

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Tipi Dome by bendertent

Build a cheap and easy Den or Playhouse by the noob

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Home Gardening (guide) by Instructables Guides

Bamboo Geodesic Dome by spotcox

Comments

50 comments **Add Comment** **view all 65 comments**

tnielsenhayden says: Jun 12, 2009. 9:08 AM **REPLY**

The offsite link to the monkeyc.org rebar bender illustrations no longer works, but the rebar bender shown here is intuitively obvious:

Take one hunk of railway tie, four honkin' big bolts with large heads, and a four-foot piece of 3/4" plumbing pipe or conduit. Sink the bolts halfway into the railroad tie as shown. My guess is that they're about an inch and a quarter apart. I don't know why the back two are staggered like that, but doubtless there's a reason for it. To use: thread rebar between the bolts. Slide the pipe onto the rebar. Stand on the railway tie. Have your friend stand on the railway tie too. Use the pipe as a long-handled lever to bend the rebar.

I found instructions for a somewhat more elaborate and full-featured DIY rebar bender here: How to make rebar bender .

bbubbles says: Aug 20, 2009. 7:09 AM **REPLY**

The link for monkeyc.org's bender has changed to
http://www.fetchaphrase.com/dome/d-gaskets.html
haven't checked out your alternate link..... great instructions so far!

Charles-1 says: Jul 20, 2009. 1:22 AM **REPLY**

Thank you for your Connecters I can now build a small green house with two growing beens in side.

Charles-1 says: Jul 20, 2009. 1:19 AM **REPLY**

Great Job you all I want to build a 51" foot Dome for Green House.

tnielsenhayden says: Jun 12, 2009. 9:16 AM **REPLY**

Great project.

Stapling a second layer of plastic to the inside of the frame would improve its ability to trap heat, though you might have problems with moisture trapped between the layers.

Rigging a two-layer door with overlapping flaps would also help keep the greenhouse warm in early spring and late fall.

evan_124 says: Apr 26, 2009. 3:52 AM **REPLY**

what is the benefit of creating a dome rather than a simple rectangle? or any shape for that matter? i do understand that the bucky ball shape or dome is potentially really stable, but are there any other benefits to it for use as a green house i mean?

cheeto4493 says: May 22, 2009. 7:55 AM **REPLY**

Air flow is supposed to be better in a dome, natural convection, so less temp. differences throughout.. There is also some efficiency in the use of materials. If you have a central standing area with the plants around the outside, you could use a smaller building for the same headroom. An "A" frame building would work in the same manner I suppose.

Not necessarily a "better" greenhouse, but I like the idea of teaching the children alternatives to the plain "square" buildings that are so commonly used. Learn to think "outside the box" _pun intended. This also teaches some math and geometrical skills.

For an easier to build greenhouse, 1/2"-3/4" PVC pipes can be bowed, and a plastic material draped over them, but this just has so much more style.

cheeto4493 says: May 22, 2009. 7:40 AM **REPLY**

Another alternative for the connectors, is PVC pipe sections, and plumbing strap. You have to cut the end of the board at an angle, but it makes a fairly strong connection. The pipe is a little big in these pictures, optimally, it should be just big enough for all the pieces of wood to fit around.

presspirate says: Apr 20, 2009. 11:03 AM **REPLY**

Great project! I am going to build one in my back yard.

aaronjehall says: Mar 23, 2009. 1:44 AM **REPLY**

use tin snips instead of a hacksaw for cutting the metal trips. this should save a considerable amount of time.
Great Instructable!

BoDy anD SouL says: Mar 22, 2009. 10:36 PM **REPLY**

I love it!!!!

pleabargain says: Mar 14, 2009. 4:11 AM **REPLY**

Very impressive! I'm so itching to build one of my own... I'm thinking same basic frame, split cans pounded and drilled to act as connectors, then construction fabric and a some shot-crete or paper-crete over the whole thing to seal it from the weather... Thanks for this Instructable!

srhadaham says: Nov 5, 2008. 6:47 PM **REPLY**

we used connectors similar to these for one we built at school. You run a bolt through the board and they pivot around the connector.

(i hope the image attached right its the first time Ive ever attached one)

servant74 says: Nov 21, 2008. 7:46 AM **REPLY**

Do you have a quick pix of the dome you made from these connectors?

srhadaham says: Nov 21, 2008. 9:24 AM **REPLY**

here it is as a frame (not 100% complete)and covered

threecheersfornick says: Aug 24, 2007. 4:27 PM **REPLY**

Hmm... I've been wanting to make something like this for a long time, but I have two problems: (1) wood is expensive (and I'm 13) (2) I'm absolute carp at woodwork. So, is there any other material I could use? PLEASE?

srhadaham says: Nov 5, 2008. 6:40 PM **REPLY**

PVC which really doesn't do much for expense tho

incorrigible packrat says: Sep 13, 2007. 6:39 AM **REPLY**

I can imagine your difficulty, being only equipped with fins, and the tendency of wood to float out of your aquatic environment. "I'm absolute carp at woodwork "...
Sorry about that. I don't usually poke fun at other's typos (I actually almost just typed "fin" instead of "fun" back there, for real and no joke). Myself being at best a four finger hunter and pecker (Man, that sounds rude!) and mine own typographical errors probably being legion. I reiterate, this is not a dig, but merely a giggle.
Seriously, I suggest keep bashing at the wood. Skill will improve with time. Many "professional" homebuilders (I use that term loosely) have committed more sins and atrocities with wood, than you would care to imagine. As to the expense, if you go to the lumberyard and ask for "strapping" rather than "framing" lumber, it is somewhat less dear.

cheeto4493 says: May 22, 2009. 8:07 AM **REPLY**

If you're concerned about the price of wood, you can try pallets. We have a couple of personal-water-craft and motorcycle places around here that have piles of pallets they just give away, or else they have to pay to have them hauled off. The nice thing about free wood, is that mistakes are cheap.

Another advantage to the geodesic domes, is that shorter pieces of wood can be used when building at higher frequencies. I once built a storage building entirely out of scrap wood. It was a 4 freq. 16' dia dome, no strut was longer than 30". (Lot more labor in a higher frequency though)

incorrigible packrat says: Jul 2, 2009. 5:39 PM **REPLY**

Free wood rules! A couple other good sources include:
1) Old box springs from beds. Not all beds have 'em, but those so equipped are a source of eight or so nice one by fourish planks. There's some effort and a mild degree of danger in the dismantling process, but it's fun and rewarding. I just built a rain barrel stand out of such lumber.
2) Roof truss manufacturers offcuts. Most of these places have a bin or pile marked "FREE WOOD" You can get loads of chunks of truss grade wood, many with nice angles already cut in them. Most are pretty short however. If you're lucky, you can score some of the banding support pieces (used to keep the steel strapping from digging into the bundles of lumber during shipping.) They usually look kinda rough and have a 1" or so wide channel routed into one side to hold the strap. They are crazy strong and usually a good three or four feet long.

mcwillie says:
Nov 5, 2008. 5:37 PM **REPLY**
i was thinking of using this design to make a heavy tent for road trips

davetr says:
Jun 19, 2008. 9:25 PM **REPLY**
nicely done waiting for more :)

lexacat says:
Apr 23, 2008. 2:28 PM **REPLY**
I LOVE this!!!

meritsetgo says:
Apr 23, 2008. 11:01 AM **REPLY**
this is what a perfect instructable should be, simple, cheap, useful and clever. Well done

cheeto4493 says:
Apr 23, 2008. 10:50 AM **REPLY**
Cool, here is another method of building hubs. http://www.goodkarmadomes.com/dome_models.php#hubstrut

Meggeler says:
Apr 23, 2008. 10:24 AM **REPLY**
Beautiful, excellent project and learning tool. Congratulations to you all.

jkinrade says:
Apr 23, 2008. 9:56 AM **REPLY**
Great instructable, I think I'll make one, but use pvc instead. I've got a whole bunch extra lying around.

dlg says:
Mar 27, 2008. 12:56 PM **REPLY**
Great design - I want to build one of these domes as a greenhouse but have struggled to find the perforated metal strap you used for connectors anywhere in the UK. Can anyone tell me where I can get hold of this stuff in the UK or suggest an alternative way to make the connectors?

kington99 says:
Apr 23, 2008. 9:17 AM **REPLY**
I would expect any builder's merchant to carry it, your local Jewson's will probably have it and they welcome non-trade business.

servant74 says:
Apr 22, 2008. 7:12 PM **REPLY**
There is a slightly less rigid kind of strapping called 'plumbers tape' in the US.

The normal use of plumbers tape is: hang a pipe that is being run across a ceiling below joists in a basement, one might take a strip of plumbers tape (that has regularly spaced holes and is 1 to 1.5" or 2 to 5cm wide) to attach to the stringers or joists making a sling to hold the pipe. Attach a strip like this every couple of joists or few feet (meter or so) to keep the pipe close to the joists.

fuzvulf says:
Apr 15, 2009. 9:07 PM **REPLY**
could possibly work if you put it on the inside as well as the outside of the wood.

jautley says:
Nov 20, 2008. 5:27 PM **REPLY**
I was thinking of the same thing, but plumbers tape is thin and if bent enough times in the same spot it will brake. So, I suggest double it (triple layers or double rows if you got, or can buy, enough plumbers tape).

Riggertrev says:
Apr 23, 2008. 5:30 AM **REPLY**
Amazing Instructable, in description, execution and documentation. So many things are "Right" about this project. **BRAVO!**
I will be building one of these this summer.
Bucky is smiling.

duck-lemon says:
Apr 22, 2008. 6:24 PM **REPLY**
my da dmakes geodesic domes but he uses plastic or metal pipes for
his bars.
we put ours up at fairs and festivals as "HQs"

nomadtent says: Jan 26, 2008. 11:30 PM **REPLY**

Beautiful dome built by beautiful people, I will be trying to use that plumbers strap you used for hubs I think when I get to build mine. Great job and well communicated, a very good instructable! :)

bobthebilder says: Apr 17, 2008. 12:36 PM **REPLY**

Oops I forgot to mention the four inch by one quarter inch "all thread" that fit perfectly into the quarter inch guide holes that my hole saw left in my perfectly round hubs. With the evenly spaced holes in the plumbers tape, this project could not come together any other way but perfectly even. Good luck with yours. By the way, the correct angles to cut the struts at for these hubs is-- 18 degrees for the long ones and 16 degrees for the short ones, also dont forget to subtract the radius of the hub from each end of each strut.

Jezza Bear says: Aug 14, 2007. 7:56 PM **REPLY**

Nice, the Buckminster Fullerine or Bucky Ball. I hope you throw in the mathematics and not just the mechanics.

The good thing about this shape is you can join numerous tents together without losing strength of the overall structure.

In these days of sustainable construction are there alternatives for the vertices as this structure is very strong and could be made using bamboo can.

Anyway, keep it up and get the kids to talk science:-)

ursus57 says: Apr 3, 2008. 10:52 AM **REPLY**

The joiners are a great hands on for the less experienced builders-Very Excellent-This is the exact design to build homes for year round use. Joiners would need to be much stronger with 2x4 treated lumber. If you add sheathing, plywood or stranded board, the structure becomes very rigid and can stand up to a variety of climates.

bobthebilder says: Apr 3, 2008. 9:18 AM **REPLY**

I made hubs by using a hole saw to make perfect circular plugs from pieces of scrap 2 x 6. I then cut all my "A" and "B" pieces to the appropriate angles and attached the hubs to the legs using plumbers tape.

1234Becka says: Mar 16, 2008. 4:05 PM **REPLY**

I love your greenhouse and believe this 60 yr old woman will try it. I have been researching winter gardening and found a book on sale called: The 12-month Gardener by Jef Ashton. It's on building a Cold Frame. A good project for you and your friends to research "Cold Frame". You can use old boards and two old windows to make a cold frame. Thank you for sharing and helping others. With the price of food rising..we all need to get our garden started.

hassi says: Jan 9, 2008. 2:35 PM **REPLY**

You've done a wonderful job, both in construction and for the kids! Science 'em as much as possible.

Thanks and looking forward to more Instructables from these kids.

incorrigible packrat says: Sep 13, 2007. 7:03 AM **REPLY**

I dig your greenhouse (not very good pun intended)! Some suggestions to make it cooler (or perhaps warmer):

- Build a bottom plate or "mudsill", out of 2" by 4" or something, to put between your dome and the ground. Spike this to the ground and then screw the dome onto it. Then, when the mudsill rots you can move the dome onto another sill, without making fiddly repairs to the bottom chord of the dome structure.
- Make a gravel filled trench and drain for your dome to sit on, to help keep the wood dry. (try googling "rubble trench foundations" for more info)
- A company called Lee Valley Tools, sells an adjustable, temperature activated, lift cylinder specifically for venting greenhouses, that could be attached to a hinged panel in the top of the greenhouse. They also make a peel and stick zipper that could be used for the door. (By the way, this is not a plug, I merely spend a whole lot of time and money at that place, and have inadvertently memorized most of the catalogue.)

Davesp says: Dec 1, 2007. 9:09 AM **REPLY**

Good comments. I would add that over here (in Ireland) we did a trench along 'poly-tunnel' plastic greenhouses and bury the plastic in the ground.

After it has stretched and settled, bank up the soil against the plastic walls to make things really snug and tight.

Also wrapping the plastic around wood (2 x 1) 'battens' and then nailing them through make for a strong anchoring method for around doors etc.

Patrick Pending says: Aug 14, 2007. 8:16 PM **REPLY**

Great instuctable and well presented. I couldn't help thinking that the 6-way connectors could do with a more elegant solution though.

Wishing you all the best with YES-2-Tech.

IdahoDavid says: Aug 15, 2007. 12:15 PM **REPLY**

I believe I've seen connectors fabricated from pieces of sheet metal, but if you are working with kids the bolt-together method is probably preferable to something you have to cut and bend.

yes2tech says: Aug 29, 2007. 1:53 PM **REPLY**

We did cut and bend the pieces to assemble for the connectors. However, we used perforated metal straps, not sheet metal.

Kiteman says: Aug 15, 2007. 2:36 PM **REPLY**

How about two discs, with a big bolt through the middle?

Put several "ends" between the discs, then tighten the bolt to clamp the whole lot in.

i.am.mozman says: Aug 15, 2007. 3:01 PM **REPLY**

None of the struts are actually on the same plane. In this particular build they had around a 25 degree angle for the connectors. I guess the disc method could work if you made wedges to hold the struts at the appropriate angle...

gannon says: Aug 14, 2007. 7:31 PM **REPLY**

With all the work involved, wouldn't it be better built with PVC pipe? It would last for several years with the exception of replacing the plastic sheeting when it gets weatherbeaten.

I'd like to see these on school grounds around the country so students could grow their own flowers and veggies.

Ora says: Aug 29, 2007. 2:34 AM **REPLY**

I think PVC might not be very green...

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