101 REASONS To Live Off Grid

GARDEN HARVEST
Prepping & Preserving Your Garden Goodies For Winter

Affordable Wind & Solar Power
How To Live On 500 watts or Less!

Got Chickens?
How To Raise Poultry
101 Reasons to Live Off Grid

Got Chickens? How to Raise Poultry

Off grid homes and natural building

How to live on 500 watts or less
Affordable Wind & Solar Power

Garden Harvest: Prepping & Preserving Your Garden Goodies for Winter

Bow Making 101: How to Make a Bow and Arrows from Scratch
1. **Self sufficiency**
Living off grid is all about living a self sufficient lifestyle, one not dependent on outside resources because you create your own resources thereby reducing or totally eliminating your dependence on a system that could collapse at any moment.

2. **Sustainable living**
It's about living more sustainably. Without constantly consuming resources, you will actually be producing more than you consume. This has the added benefit of not only providing for your family, but contributing to your local community.

3. **Renewable energy**
The use of renewable energy only makes sense. Using an energy source that is not renewable is absurd. Fossil fuels are not renewable, at least at the rate we are consuming them. So it makes sense to use sources of energy that are completely renewable, and that can be shared. Renewable energy is also more sustainable long term, and that’s just smart living.

4. **Environmentally responsible**
When one realizes their own responsibility is just as valuable as the next person's and that no one person's responsibility is less than another's to make this world a better place, then we come to a crossroads where we must, as responsible human beings, and for the future of our children and their children, be more environmentally responsible, or there may not be an environment left for them.

5. **Practical living**
Living off the grid is more practical because we reuse, recycle, and stretch the use of our resources to their maximum purpose.

6. **Smaller footprint**
Living off grid means you don't use as many resources as most people, and it cuts down on waste.

7. **Less impact on the planet**
When you're off grid, you live your life more in tune with nature, and as such, have less of a negative impact on the planet.

8. **Healthier lifestyle**
It's just plain healthier because you're more active. The benefits of physical activity and exercise on your life, overall, are innumerable.
9. Rewarding
Living off the grid is more rewarding for all the reasons listed on this page. When you factor in all the benefits of the off grid lifestyle, you realize there’s really no other way to live that’s more rewarding.

10. Happiness
It makes you happy. Less stress and more activity creates a feeling of contentment, and this creates happiness.

11. Getting back to our roots
Living off the grid is getting back to our roots, and where we come from. Our ancestors lived this way for tens of thousands of years. The story is the same all over the world. Looking back throughout human history there’s one commonality that is universal. Save the fact we’re all human beings, we all lived off the land as hunter-gatherers. We built things and made stuff, created shelter, grew food, and tapped natural water sources to provide for our families and the village. Our tribe is humanity, and we’ve all done things the same way. Now, in modern times, with the advent of modern technology, things are done much more easily, and we’re in a time of unprecedented advancement. Living off grid with high technology. Solar panels, wind turbines, hydro electricity, geothermal, and renewable biofuels power our world, while at the same time, we can connect back to our roots and enjoy nature.

12. Preserves knowledge
When we live sustainably it preserves the knowledge through the ages for generations to come. If we all lived in a consumer world we’d lose this precious knowledge and it would be lost forever. What would we do if we didn’t preserve that knowledge by sharing it with our kids, and the world? The advent of the internet and high technology allows us to share with the entire world, with the click of a mouse, the knowledge of our ancestors, forever preserving the knowledge for humanity.

13. Teaches future generations
Teaching others brings its own rewards, both for the student and the teacher. The beauty of it is that being off grid allows us to teach a new (old) way of living that everyone should know. The reward of the good feeling of teaching is just a bonus.

14. Shares experience
Sharing the experience we have with others is part of life. It’s deeply fulfilling to share your experience with others, adds to your sense of purpose, and helps them at the same time. They will, in turn, share that experience with others and so on. It’s self perpetuating, and furthers the advancement of knowledge.

15. Advances humanity
The knowledge of course advances humanity - everyone’s knowledge base build atop the last. Like building blocks of sustainable living, it creates a foundation to build a better life, and that we can all benefit from.

16. Uses less resources
Living off grid consumes fewer resources. Simple as that. When we live off the grid we actually create more resources than we use, and this benefits the local community.

17. Avoids consumerism & waste
Consumption of resources is running rampant, and needless waste is at an all time high. To reduce waste and consumerism it’s much better to create and produce resources. When you live a sustainable and renewable lifestyle you become a boon to society and create more than you use. This helps keep consumption to a minimum and sets a great example for others.

18. Leads by example
Because you’re doing it, you’re living the lifestyle, you’re leading by example. When you walk the talk, and live this lifestyle, it shows others there is another way to do things. That it doesn’t have to be all about consuming, that you can give back, and still live a fulfilling and rich life.

19. Better for our kids
It also goes without saying that it’s better for our kids to see us live this way because it will help propagate awareness for the responsibility we have to live smarter lives.

20. Healthier food
When you live off grid, you tend to eat healthier food. Your food is healthier because you grow it without
pesticides and without harmful chemicals.

21. **Fresh air**
The air is fresher in the country. Not much more needs to be said about that.

22. **Digging in the dirt!**
Lets face it, we all love digging in the dirt.

23. **We get to build stuff**
Living off grid allows you to build stuff and make things. Things you wouldn't normally be able to make, and projects you wouldn't normally be able to work on in the city. Like the next spaceship to Mars for example, or a time machine. Or maybe you could build a new kind of greenhouse that grows 100 pounds of food fruits and veggies per square foot. Now there's an idea.

24. **Independence**
When you live the off grid life, you instantly become less dependent on the system, and more independent and self reliant. You are no longer bound by a system which does not have your best interests in mind.

25. **Connect with nature**
This is one of the most fulfilling parts of the lifestyle of off grid living. The connection with nature you have is much deeper and on a level much more profoundly satisfying than suburban life. Waking up each morning to the sounds of nature instead of honking horns, slamming doors and shrill sirens. Being able to walk outside in the morning and feel the crisp cool fresh country air while you sip your hot morning beverage while listening to the sounds of the birds singing, the cool morning breeze blowing, the deer in the field lifting its head to look at you while you sit in your rocking chair, the flock of geese browsing the edge of the lake, is the epitome of contentment and connection with the natural world.

26. **Teach our kids the value of a days work**
When you live off grid your daily life is full of work, and lots of things that need to be done throughout the day. Raising your children with a strong work ethic is important, and will come more naturally on an off grid homestead. It will instill in your children and sense of accomplishment, and what it takes and what it means to complete a days work.

27. **Physical exercise**
Running a farm or ranch takes work. You're constantly on the go. As such your physical activity level will be much higher than the average person. It's great exercise.

28. **Less dependent**
Living off the grid is about self sufficiency. As mentioned above, it's about creating a sustainable lifestyle that allows you to become less reliant on the resources of others, thereby increasing your independence.

29. **Safer lifestyle**
Technically speaking living in the country is probably safer than living in the city. Especially in the event of some kind of social collapse, or even in daily life. Cities are statistically less safe than rural areas.

30. **Security for our family**
As mentioned above, the fact that cities have higher crime rates than their surrounding areas, it makes sense that country living is more secure for raising your family. Even more than suburban neighborhoods.

31. **Financially responsible**
It's financially responsible to cut your expenses. Moving and living off the grid will allow you to save money on groceries, and utilities over the long term. This is just smart money management 101. Initial setup costs might be slightly higher than a suburban home, but overall, the costs are distributed over a longer period of time, and since you're producing more resources than you use, you will have a surplus.

32. **Socially responsible**
It's socially responsible. Speaking of the BIG PICTURE, overall, living off the grid and homesteading, is socially responsible, and arguably more so than living in the city. The reason is simple. People who live in the country are typically farmers and ranchers and those who are retired. In other words, they're hard workers, they contribute much to their local communities, and they are usually...
more in tune with their fellow humans when compared with the impersonal and superficial nature of society living in densely populated areas. This is not to say that people who live in the city do not care or are not being socially responsible. On the contrary, there are probably more socially responsible people per square mile in an urban environment than a rural environment, but many times they are unable or do not have the means to contribute as much as they like because the cost of living, and their annual expenses limit the amount of community work they can do. It’s really a balance between what you’re willing to do, and what you can do. Off grid living allows for a more direct approach and offers more opportunity, in this author’s opinion.

33. Helps the local community
When you own your own homestead and are producing more resources than you use, then this in turn gives back to the community in which you live.

34. Creates a place for change
Your off grid homestead creates a home base for leading by example, and this creates positive change within your community.

35. Inspires others
Leading by example, creating your own resources, living a sustainable life, and sharing that with others, inspires people to follow and build their own.

36. Brings people together
You are a hub for positive sustainable change. It attracts people, and educates them on ways to live a self sufficient lifestyle.

37. Strengthens community
Your homestead becomes a bastion of health and happiness for the community at large.

38. You get to give back
Sharing your knowledge with others and seeing how it influences their lives, and the positive change it brings, is an extremely rewarding feeling.

39. You make a difference
Not just in your kids lives, but the lives of all the people you share your knowledge with.

40. Share your skills with others
Sharing your skills with others is simply part of life. It’s one that sadly has become a rarity in the fast paced world that most people live in. It’s easier however on everyone when people share. The rewards are incalculable because it helps people grow in perpetuity. Future generations will benefit from what you share now, and your children and grandchildren are the people who will carry on that legacy.

41. Learn new skills
We all could learn a thing or two. We really don’t know it all, and besides, it’s fun to learn things.

42. Make new friends & become friends with your neighbors
Do you know your neighbor? If you do, then good for you; you’re doing it right. Do you know how many people don’t actually know their neighbors? Too many. It’s a sad fact we live in a world when someone can literally live just a few feet away from us for years and we never even know them. Doesn’t it make more sense to get to know one another? Some people are recluses and that’s ok. No one is saying they must socialize or go out for cocktails. The point is, it’s beneficial in the long term to know your neighbors, help them out, be kind, share, and be social and cordial. You never know when you might need their help, and most importantly, to have a friend, a true friend, is more valuable than anything.

43. Less stressful
Living off grid lowers your stress level. How? Easy. Less to worry about. Since your cost of living is lower, and you’re eating healthier because you’re growing your own food, you’re also exercising more, and this releases the good chemicals in your brain that make you feel good. This in turn lowers stress. That, and when you don’t have huge bills over your head every month, that’s a huge relief.

44. Helps you live longer
Yes, living off the grid helps extend your life because you simply get more exercise and you eat a better diet. When you work on a farm or ranch, or an off grid homestead, you’re always digging, hauling, lifting, moving, drag-
ging, pulling pushing, walking, climbing and sometimes even running all over the property while going through your daily routine. It’s physically demanding, but at the same time, you’ll be in better shape for it. Your physical wellness will extend your life, and if you’re lucky, you could live to be 125 years old and be interviewed by the NYT, asking you what the secret to your long life is.

45. Physical activity makes you happy
It’s a scientific fact that physical activity releases “feel-good” chemical (Dopamine, Endorphin, Oxytocin, and Serotonin) in your brain. These makes you feel happier.

46. Saves you money
Living the off grid lifestyle saves you money. When you cut down your monthly expenses by growing your own food, producing your own energy, and building your own shelter, you don’t spend as much as you normally would before. Cutting expenses is a huge boost to your bottom line business wise, and personally speaking will also help to ease your stress level since you won’t have to worry about your monthly mortgage or car payment. You can concentrate on what really matters. Family.

47. Saving money helps you provide better for your family
Simply put, when you save money by producing and creating your own resources, this allows you to provide a more stable household for your family. And really, that’s what it’s all about. Being financially stable and secure contributes greatly to your happiness and well being.

48. Sets a good example for your children
By living sustainably you’re also living responsibly, and you will be setting a great example for your children to live by. An example that hopefully, they will pass on to their children and so on.
49. You can have a dog (or 3 of them)
When you live in the city or in an apartment, it’s harder to have a dog because there are rules and regulations and policies and restrictions on what you can do in your own apartment. Even in suburban neighborhoods the covenants and restrictions that come with HOA’s (Home Owners Associations) are extremely limiting.

50. Grow your own food
This in and of itself could be a book all by itself. The sheer number of benefits of growing your own food are simply innumerable and impossible to measure with any kind of accuracy because it’s an invaluable skill, priceless in it’s contribution to your life and the lives of those you share your food with. The health benefits alone of growing your own food without pesticides, harsh chemicals, and fertilizers is worth more than any health insurance plan. Eating fresh fruits and veggies simply makes you healthier. And without your health, you have nothing. The old adage, “You are what you eat.” is seriously an understatement. It’s not just true, it’s your life. What you eat affects everyone close to you. If you don’t take care of yourself by eating healthy, then your family suffers. Growing your own food should be something everyone does. Especially when you consider the fact that a healthy diet also improves your mood. So, growing your own food should be equated with happiness, really. Happiness is priceless.

51. Wide open spaces
There’s a sense that you feel freer living in the country. The wide open spaces gives you a feeling of freedom such that you can never get living in a city. It’s truly freeing.

52. Supporting your local farmer’s market with food you grow
Every town needs a farmer’s market, and that means it’s another opportunity to support your local farmers. Being off-gridders you’re familiar with the hard work that farmers and ranchers put into their properties and you respect that. Buying from your local stock shows and farmer’s markets just makes good sense. It not only supports the farmers and ranchers, it strengthens your whole community, and you get to make new friends!

53. Support for your local food bank
I don’t know many farmers who don’t have a good heart. And that extends to donating food to local food banks and neighbors. When you grow your own food, inevitably you will most likely have some surplus. Maybe your chickens lay too many eggs for you and your family to eat on your own. Every farmer I know has always been the generous type and donated to their neighbors pantry or the local food bank.
54. **You get a BIG backyard**
You get to run around your yard, and if your property borders national forest, the forested wilderness becomes your backyard. You can run and hike and explore your extended backyard for days on end if you live near the forest. And even if you don’t, having a few acres of land to run around on and spread your wings is a great feeling.

55. **You help support local businesses and restaurants**
Food donations, and affordable fresh fruits and veggies.

56. **Help educate local school kids**
Offer field trips and tours of your farm to teach kids the value of living a sustainable life.

57. **Wildlife, nature, and animals**
Communing with the natural world is extremely rewarding

58. **Brighter skies and better views**
Less light pollution from city lights means you can actually see the night sky again.

59. **More peace & quiet**
It’s quieter in the country. Once you get used to all the “new noises” of nature.

60. **Always something to do**
This kind of goes without saying. Living on an off grid homestead, farm, or ranch means there will always be something to do. Whether it’s work related or recreational. You’ll never be bored.

61. **Natural beauty**
This is perhaps one of the most important aspects of living off the grid. Because you’ll most likely be living in the country, you’ll most likely be in a more natural setting, close to a forest, in a forest, or mountains, prairies, or the river. Point being, the natural beauty is right out your back door, or kitchen window. Natural beauty is the most beautiful beauty.
62. Great outdoors & access to thousands of acres of outdoor activities
As mentioned before, the great outdoors and wilderness are your backyard. You can hunt, fish, hike, camp, ATV, snowmobile, ride horses, ski, swim, and picnic, all right in your own backyard. Being so close to the wildlife and wilderness gives you the opportunity to enjoy nature in a way most only dream of.

63. Vacation and relaxation without having to leave home
Being in a rural area gives you the advantage of staying home and relaxing with nature instead of having to drive 1000 miles to get to a peaceful vacation spot. On your off grid homestead you’re already there!

64. Cleaner air
Clean fresh air is so...refreshing. Kinda helps you live longer too. Way better than breathing in all the pollution in the city.

65. Lower cost of living
Living off the grid lowers your overall cost of living because your initial expense is higher, and your monthly expense is spread out over a longer period of time. Eventually this will mean you will be pulling in a surplus in excess of your initial expense. Thereby lowering your overall monthly and annual cost of living.

66. You can climb trees!
Try climbing a tree in the city park, and people will look at you funny. Out in the country, you’re allowed to climb trees, and no one will judge you. In fact, we’ll probably join you.

67. TIRE SWINGS!
Nuff’ said.

68. Lemonade & sun sweetened iced tea
This kind of just goes without saying, but it’s so wonderfully refreshing in the heat of the summer.

69. Skinny dipping
Come on, you know you want to. And since you’re in the country, no one will care.

70. You can dance in the field
No one will care or judge you if you decide to dance around in your fields. Except maybe your livestock. They might look at you funny.

71. You can camp out in your own backyard
This is just self explanatory. Your backyard is the natural world!

72. Because, TREES!!!
We all love trees.

73. Fewer rules & more freedom
Technically speaking, fewer rules mean more freedom for you and your family. This stems from the fact that rural areas typically have less strict rules and regulations regarding building and agricultural activ-
ities. There are many rural areas throughout the world that have little to no restrictions on what you can do with your land and how you use it. This gives you more freedom overall to build your off grid homestead however you please.

74. Room to grow & build
You can start and work on more projects. That’s not to say you’ll finish them all, but hey, at least we can work on our projects!

75. Sense of community
When you live off grid, it does have a sense of community, even if your community is spread out around the world, you belong to a group of people who put sustainability ahead of consumerism, and that by itself is rewarding. You belong to a group of people, millions strong who a care about and love the planet we live on. Who love nature, and who know how to give back, share and grow with one another. That is community.

76. Cows
Admit it. You want a cow. You’ve always wanted a cow.

77. Horses
We all love horses. You can ride your horse and enjoy nature on horseback, and if you really feel wild, then head up into the hills for a wilderness trail ride.

78. You get to own a tractor!
Tractors are cool. And from what I hear, women think tractors are sexy. So there’s that.

79. You are your own boss
You set your own hours. Do your own thing.

80. Food tastes better
When you grow your own food, it tastes better because it’s more natural, there are less chemicals, and there’s something refreshingly primal about eating food that you grew yourself.
81. Variety
Living on a ranch or farm in the country will give you the rewarding benefit of adding variety to your life. Every day will be different, there is always something to do on the farm.

82. You actually know where your food comes from
You don’t have to wonder or care about whether your food is GMO or treated with hormones, antibiotics, or harmful chemicals because you grow your own food.

83. A greater sense of purpose
Working a 9-5 job is fine, and great and wonderful. Right? In fact merely having a job in this economy is a good thing. Right? So what’s the purpose? Why do people work 40, 60, and 80 hours per week, just to get by? What’s the point? What’s your goal? Why are you doing it that way? Not that there is anything wrong with working a 9-5 job. It’s rewarding, and brings with it positive aspects. But ask yourself why you punch a clock. What’s your purpose? To pay bills and provide for your family right? That’s what it comes down to. Sure you might have financial goals, and dreams for your dream house. Ask yourself, what’s your real purpose? Security and safety for your family. Happiness. Right? So why are you spending 40-80 hours per week away from your family working to make someone else richer? I’m not saying quit your job and move to the woods. I’m saying that once you realize what your true purpose is, what you truly seek, and what you want out of life, your intrinsic purpose becomes much clearer to you.

84. Fresher food
When you live off grid and grow your own food, the food you eat and feed your family is fresher than what you get at the grocery store. Walk outside, pick the food, and prepare it. It doesn’t get any fresher than that.

85. Bonfires!
If you tried to build a bonfire in the courtyard of your apartment building in the city, you’d probably be arrested, fined for endangering the public, inciting a riot, evicted, and thrown out on the street. But since you’ll be living off grid, you can have a giant bonfire, invite all your neighbors and party it up in the middle of the field out by the barn. Just be careful not to light the hay on fire or you won’t have a barn left. But hey, that would be one helluva bonfire!
86. S’mores!
I personally don’t like s’mores, but, I know you probably do, and you’re welcome to make them at our bonfire. Come on over, bring the beer, and we’ll watch the stars and race tractors into the night.

87. You make your own way
Self sufficiency isn’t just about being independent, but making your own way. You are a trailblazer in a new world. Usher in positive change for you and your family. Creating a world your children will be proud and happy to grow up in, and raise their own children. You are the leader of your family, and as such have the greatest responsibility in the world to lead by example. It’s not just your way. It’s your family’s way.

88. You become one with the land
Since you’re working the land everyday, you become more connected to it, and it makes you more aware of nature and the earth.

89. Getting dirty is sexy
Let’s face it. Seeing your partner getting down and dirty in the field or working on the farm tractor is just plain sexy.

90. Farming is sexy!
See above.

91. Ranching is sexy!
See above.

92. Gardening is sexy!
See...Yes, I said it 3 times! Living off grid is sexy and it probably leads to having more kids. Which, when you look at this way, it gives you more hands around the farm. :)

93. Beauty of the land
Country is more beautiful than the city. Simple as that.

94. Make money from home
Your off grid farm or ranch is your job. It becomes your source of revenue. Whether you are working a home based business inside your home, or your farm is your livelihood, you make your living from the land you live on.

95. You don’t have to commute 50 miles to work each day
The money saved by not commuting back and forth to work every day to pay for a mortgage and car payment, and utility bills, and insurance, and cable, and internet, and... Well, you get the point.

96. Creating great memories with your family
This is perhaps one of the most important things in life. Great memories of your childhood and making those memories with your family.

97. Living off the land is more fulfilling
When you live off the land it’s better for the Earth, and giving back what it is providing for you, and as such it becomes much more fulfilling than any other lifestyle.

98. Sense of well being & contentment
When you know that all your needs and the needs of your family have been provided for you will experience a sense of well being beyond anything you’ve ever imagined.

99. Living local
Supporting the community through shared interests, and a solid connection with local residents.

100. It’s green!

101. Living off grid makes you happy!
Living off grid is a simpler, less stressful, more fulfilling lifestyle, and ultimately, on a much deeper level, truly makes you happy.

Eric Wichman
Founder/Director
Off Grid World
www.offgridworld.com
Got Chickens?

How To Raise Poultry
by Semo Farmgirl

So you have decided that you want chickens. Great! Now what?
Raising chickens for eggs and meat does not have to be an expensive venture. You don’t need tons of costly equipment or bag after bag of pricey feed and supplements in order to have happy, healthy, productive birds. I’ll share some tips on how we have done it.

Shelter
The very first thing you will need for your birds is a secure home. It does not have to be a fancy coop purchased from a feed store; all you need is a well ventilated, predator-proof place where your birds can stay dry and draft free in inclement weather. They will also need a place to lay their eggs.

Chickens need 2 to 3 feet per bird for inside space and 4 to 5 feet per bird of run area outdoors if you intend to keep them confined. That being said, don’t be afraid to get inventive. Your shelter can be anything from a simple hoop house to a recycled dog kennel with a roof and tarp covered sides as the weather cools, an old camper top on a frame, or a recycled dog house if you only intend to keep a couple of hens.

Pictured below is our dog kennel coop. It is 10’ x 10’ x 6’. This kennel is on its fourth manifestation here on our farmstead. It housed our dogs for its first use, turkeys and geese in its second use, our baby goats in its third use, and currently, our chickens. Not bad for less than $300 original cost.

This winter it will have tarps added to the sides for wind breaks. For now, while temperatures are still mild, it provides shade, keeps the birds from getting wet, and allows for plenty of air movement, both to provide a cooling breeze and for ventilation. The tin roof and sides were already laying all over this property from a barn that fell victim to a storm.

Don’t be afraid to get creative when it comes to your coop! This repurposed dog kennel is just one of the coops we use on our farm.
to straight line winds. The extra metal poles were from a chain link fence that our neighbor removed from his property and the barrel in front is the water reservoir made from a food grade barrel purchased from a gentleman in the next town.

Being 10’ x 10’, I could actually house 20 chickens with the 5 feet per bird rule, but I spoil mine just a little. This coop is currently home to just 9 chickens - 8 hens and one rooster.

Other Necessities

Each shelter should contain the basic necessities for chickens: roosts, nest boxes, feeders, and waterers. You can put the feeders and waterers outside, but then during bad weather the chickens would have limited access to them.

Chickens are much happier if given a roost to perch on; without one, they will perch on anything available. Each roost needs to be large enough for each chicken to have the minimum of a man’s hand span - just large enough for them to grip comfortably and then be able to settle down over their feet to keep them warm.

Whether your coop is enclosed year round or only during inclement weather, you will need bedding inside your coop to absorb liquids such as spilled water and manure. This will keep your coop dry and relatively free of odors. If odor does develop, then the bedding either isn’t deep enough or needs to be cleaned out. You can use any kind of absorbent material with the exception of cedar shavings, as cedar can cause respiratory issues in animals.

Feeders can be anything from a hanging commercial feeder to an old pan, a bucket with holes in the side just large enough for a head to fit in, a PVC feeder, or any number of other home built containers. The options are endless and I tend to use whatever I have on hand.

Waterers can be old pots, commercial waterers, buckets with cups, buckets with nipples, PVC pipes with nipples or cups, nipples installed on potable water lines, or a bell waterer hooked to a barrel. If you use barrel, it can also be set up to collect its water supply from a roof top rainwater collection system (where allowed by law).

If you are raising chickens for eggs, you will need to provide one nest box for every three hens. Nest boxes can be made from a variety of materials. For example, empty cat litter tubs with the lids cut in half, handmade wood boxes from reclaimed lumber, old tires, and metal nest boxes purchased new or used are all good options.

Feed & Supplements

Feed does not have to be expensive, or even purchased at all if your chickens are free range. Food sources for free range chickens can include compost heaps, home grown corn, milo, barley, or wheat, kitchen scraps, whey with leftover bits of cheese, home grown...
meal worms, soldier fly larvae, and maggots (I know, YUCK).

Our system here seems to work really well. We have mulch piles in the bottom of each coop into which we add kitchen scraps and old hay with manure and the accompanying bugs that we let them scratch through. Every week we pile it back up, water it down, and add more scraps for them to turn over. They eat the bugs, the worms that come up to work on the pile, the left over feed from the other animals, and any parasites that might be in the pile. Each day we let a different pen of chickens out to free range since all of our coops are separated by breed (part of my off grid income comes from sales of purebred chickens).

Putting our chickens back into their coop at night is easy - I grab a feed tub (an old coffee container) with a corn, barley, and milo mixture, shake it, and they follow us into their coop or beat us there.

By free ranging and giving them ample compost piles to work on, the cost of feed is greatly reduced while not compromising the health or laying ability of our chickens.

During the colder months we raise meal worms in tubs in our utility room to supplement the feed and compost. If the compost is thick enough and hot enough, it can provide bugs and heat in the coops throughout the winter. We clean the compost out about once a month, leaving about a third of it to inoculate the next batch of mulch and scraps. The added benefit of this method is wonderful, rich, dark compost for the gar-

Fresh eggs are just one of the many benefits of raising your own flock of chickens.
dens, including the patches in which the corn, milo and barley are grown for feed.

Poultry digest food by means of a crop, an organ located just at the top of their breast that grinds their food for them. To do this, the birds ingest small rocks which lodge in the crop to act as food grinders. This is grit, and it is essential for food digestion.

If your birds free range during the day, getting grit isn’t an issue, as they will pick up pieces of rock as they roam for food. However, if they are kept confined, giving them access to just a shovel full of sandy soil to pick through it themselves or a small container of fine gravel will work.

Chickens do require calcium supplementation once they start laying. Oyster shells and calcium are available for purchase for poultry, but you can also provide the extra calcium they need simply by rinsing the egg shells from your gathered eggs, letting them dry either in the warm sun, in an oven or on the top of your wood stove, and crushing them up for the chickens.

Another calcium supplementation option, if it is available, is clabbered milk. Have you ever left a glass of milk sitting out until it just turns solid? That is clabbered milk. It not only provides the calcium that chickens need but has the extra benefit of added protein and probiotics.

Choosing your Flock

Once you have all these basics covered, it is time to pick out your chickens. This, honestly, is the hard part because you have to consider what exactly you are looking for in a chicken. Do you want a quiet breed? One that lays heavy or lays a particular color of egg? A chicken that is good at free ranging or one that handles confinement well? A meat breed? One that can handle the cold?

There are several breeds, Heritage and newly developed hybrids (not GM), that could probably match several of your preferred traits. In the end, I usually narrow it down to the two or three breeds that match my wants and needs, then pick the one I like the looks of best. I have learned that if you like the way they look, you are more inclined to spend time with them, which makes for a much calmer, healthier chicken in the long run.

Once you decide on a breed, you have a few options for locating the...
birds you want. You can try asking a local 4H leader, local poultry club, or find your nearest poultry swap. You can also ask your state veterinarian, as they are the ones who do the testing for the National Poultry Improvement Program. Not only can they tell you who raises what and where, but with their recommendations you can be assured that the worst of the diseases won’t be in those flocks.

The breeders who participate in the NPIP program tend to be conscientious about the quality of their flocks and the quality of care they provide their flocks. If you are able to visit one of these breeders, don’t be surprised if you are asked to wear plastic foot coverings on their farms or asked not to handle the poultry for the safety of the flocks.

The last thing to consider is whether you want chickens that are already laying eggs, those that are almost to the point of laying, or if you want to raise your own chicks. Raising your own does take more thought and planning and requires the patience to wait for at least 6 to 8 months before your chickens lay, but is really worth it.

Meat breeds, like the Cornish cross, need to be purchased as chicks, as they are typically harvested at a young age.

Any way you go with your choices – have fun! Be creative and welcome to the addiction of keeping chickens!

Semo Farmgirl
livingplanetfarms@gmail.com

Ready to choose some chickens? These resources can help you decide which breeds will best fit your needs

The Livestock Conservancy - www.livestockconservancy.org
Green Garden Chicken - breed chart
Storey’s Illustrated Guide to Poultry Breeds
Off grid homes and natural building from all over the world.
How To Live On 500 Watts or Less!

*Solar Power on a Budget*  
by LaMar Alexander

WARNING: This information is for a power system connection and must only be done by an adult. Read and follow all equipment manufacturers’ safety and connection guidelines. Wear goggles and gloves when handling batteries.

I was a real newbie to solar power when I started living off the grid over 15 years ago. I had to learn it the hard way by trial and error (lots of errors) as there really were no books or even many people using solar for off grid living around to help. I am going to try to give you a basic crash course in small, off grid solar power systems that will, hopefully, save you some time and frustration with setting up your own system.

**Equipment Recommendations**

Before you go and spend a lot of money on equipment, I highly recommend you get just the basics to start, and use that as a foundation to understand the way solar power works. Then you can expand to a larger system as needed and as money allows. If you adjust your lifestyle to the amount of power you have you will find you can use a very small system (about 500 watts) and still have all the power you need to live comfortably under most conditions.

Most off gridders use alternative fuels and systems for heating, cooling, cooking, and heating water. The system I describe is used to runs lights, a small DC water pump, an LED TV, a laptop computer, a chest freezer or compact fridge, and to recharge gadgets. You should also research propane, natural gas, wood stoves, generators, and passive solar water heating for other off grid needs.

**Solar Panels**

There are three basic types of solar panels: monocrystalline, polycrystalline and thin film. Monocrystalline panels are generally used in areas where sun exposure is good the majority of the time. Polycrystalline panels are used in areas with more cloudy days. Thin film is used for less permanent installations. For most areas I recommend polycrystalline panels. You can get either mono or poly for around a dollar a watt.

When it comes to voltage, most small systems use 12 volt panels because there are so many 12 volt appliances and gadgets that can be charged or run directly from a 12 volt system. 24 volt systems are generally used for larger appliance requirements. 12 volt panels and
batteries can be hooked in series (negative to positive wires) to create a 24 volt system later if you want to up the voltage on your system, so a 12 volt system is a good place to start.

Get good quality panels with a 25 year output and 5 year materials warranty. Most panels operate pretty much within the same ranges, so the brand you buy is not too important, but a few good brands are Renogy, Kyocera, Sanyo, and Evergreen. I recommend a 100 watt panel to start or up to 500 watts for a small off grid system.

**Power Controller**

For a small system - under 500 watts - you can get a 30 amp PWM (Pulse-Width Modulation) power controller for about $40. If you want to get more power out of your system, an MPPT (Maximum Power Point Tracking) controller will average 15% more power from the panels on low sun days, but they do cost more.

The controller monitors the volts and amps from the panels and the voltage in the batteries so the batteries are not overcharged. More expensive controllers might also have additional functions, like to desulfate the batteries, but for a small system, a very basic 30 amp PWM controller will work just fine. Read the directions on the controller so you understand the connections. In most cases, you will connect the controller to the batteries first.

**Batteries**

Any 12 volt batteries will work, even car batteries. For off grid applications you will be drawing the batteries down many times, so you want the batteries to last and hold more power. For this reason, we use good deep cycle batteries. These are not marine batteries used for trolling; they have much thicker plates, are much heavi-
Off grid solar power system component connections
er, and will last on average 7-8 years with many cycles of use. Trojan and Deka carry deep cycle batteries for solar systems. You can also get AGM glass matt sealed batteries that do not require maintenance and can be stored inside so they hold more power in winter, but they are more expensive.

To get a general estimate of how many batteries you will need, consider that you will need 100 amp hours of storage for every 100 watts of panel power to fully recharge in 8 hours of good sunshine. So if you have a 100 watt panel and a 100 amp hour battery, you would need 8 hours of sunshine to recharge it. That is just a rough estimate but close enough. You will find the amp hours of the batteries on the battery label.

**Power Inverter:**

The power inverter converts the DC (direct current) from the batteries to AC (alternating current) which is the same current that runs through the grid power system in your house. If you will be using AC appliances then you need an inverter. Depending on the appliances you use, a 400-1000 watt inverter should be sufficient. You can get expensive pure sine wave inverters if you are running valuable equipment but for most off grid applications we use modified sine wave inverters. These cost about $70 for a 400 watt inverter.

**DC Wiring:**

For a 12 volt system, wiring from the panels should be exterior grade #8 gauge or heavier wire. Wiring
from the controller to the batteries should be #6 gauge or heavier wire and between the batteries and the controller and batteries should be #4 gauge wire or heavier. This assumes you will not be running the wires a very long distance, and under 20 feet from the panels to the batteries. Longer wire runs require heavier gauge wire.

Connecting the pieces:

Place your panels so they are aimed directly at the sun at noon. You can learn about true south and tilt angle on your own for a more accurate orientation.

Hook the controller negative and positive wires to the appropriate battery posts and it should read the voltage or tell you it is charged or undercharged.

Connect the positive wire from the panel to the appropriate posts on the controller and the negative wire from the panel to the negative wire on the battery. The controller should tell you the watts being produced from the panels or have a light that shows the panels are producing power.

If everything looks good and the battery is charging, then you can move on. If not, go back and check all your connections.

Connect the inverter to the appropriate positive and negative posts on the battery and turn it on. It should have a light or indicator and possibly a fan that tells you it is working. If not, check your connections. You now have AC power!

From this point you can plug any small AC appliance under the watts the inverter can handle into the inverter and use it, but be aware this is a small system so you can only use it for so long before the inverter will reach its power shut off. Each appliance uses different amounts of power. When the sun comes up in the morning, the batteries will start recharging from the panels for another days use.

Direct DC Power Connection:

If you want to run DC equipment directly off the batteries, you can do so by using a fuse link (30 amp recommended) between the batteries on the positive wire and a cigarette lighter style plug or direct wiring to the equipment. Be aware, however, that the longer the DC run in feet, the heavier the gauge of wire is needed - at least 8 gauge wire for smaller, low watt gadgets and lights or water pump.

LaMar Alexander
wwwsimplesolarhomesteading.com
In a perfect world, you might be living in a solar powered home with a small wind farm in a sunny, natural wind tunnel at the base of a mountain, with a spring fed stream near the woods, a lake full of fish, very fertile ground for planting, and plenty of wildlife nearby. If so, you can stop reading this article. If not, read on.

Living off the grid means “Not being connected to a grid, mainly used in terms of not being connected to the main or national electrical grid”. Most of us know that, but living off the grid does not mean that you have to live in a pre-electrical world by giving up all the niceties to which we have grown accustomed. Generating electricity off the grid used to be very costly, but advances in technology and the mass production of renewable energy products, primarily pertaining to solar and wind power, have drastically reduced the costs in recent years.

So which off grid energy source do you choose - solar or wind?

There is no simple answer to this question, as it truly depends on the
application and the geography. The intent of this article is to give you information on both technologies to help you make a more informed decision on which may be right for you.

Here are some factors to consider:

A small wind turbine can generate electricity in a breeze when the sun is not shining, while solar panels can generate electricity during the daytime when the wind is not blowing. Both technologies can give direct access to energy or store energy in battery banks for later use. Solar panels are now extremely affordable and very efficient even when there is no direct sunlight or when cloudy. Wind can blow 24 hours a day in some regions and they make a perfect supplement to solar systems and are considered more efficient.

### Wind power

Before choosing wind as a possible power source, you will need to determine if it is a viable option in your location. To find out, you will need to buy an anemometer that measures wind speed and direction. Find one that stores data over time and this will give you an idea of how much power a wind turbine can generate in your location. We were able to find several below $100 and even a few below $50. Change the location of the anemometer during testing to find the best possible location for your turbine. Remember, air flows more evenly at a higher altitude, so to get a more accurate reading, you may need to build a suitable platform for the meter, such as an antenna pole. You will want the minimum height in open rural terrain to be about 10 meters, or 30

Wind is seasonal in many areas, so consider this when averaging your wind speed. The map below shows average wind speeds at 30 meters, or 90 feet, in the U.S. A small turbine requires an average wind speed of about 9 mph. Similar resources are available to determine local average wind speed in other areas.
feet. The average height of a wind turbine is about 80 feet, so measuring wind speeds at this altitude would be even more desirable. Do not mount the meter on a rooftop or a tree, as the results will be inaccurate due to turbulence and altered wind patterns.

The typical wind turbine size necessary to power the average American home is about 5 kilowats. A wind turbine this size would be approximately 18 feet in diameter. The exact size would range between 2 kw to 10 kw, which equates to 12 to 25 feet wind turbine diameter. The average height of a small wind turbine is about 80 feet, twice the height of a standard telephone pole. To prevent turbulence, it is best to keep the wind turbine at least 30 feet above any obstacles. Check local zoning laws before purchasing a wind turbine, as a permit may be required to build one. Also, your neighborhood may have a housing authority that might prohibit building a wind turbine since they are considered eyesores in many communities.

The price of a small wind turbine
averages about $30,000, but they can range anywhere from $10,000 to over $70,000. Much of the cost depends on location, height, and power needed. Wind turbines are, in general, more efficient than a comparable solar system if you live in a windy location.

**Solar power**

The choices for solar power are virtually endless, with a plethora of suppliers ready to compete for your business. According to the Solar Energy Industries Association (SEIA), solar prices have dropped 50% since 2010, and a staggering 98% since 1977. In 1977, the cost for solar was $76.67 per watt, and at the time of this writing, that price has dropped to just 36 cents per watt. The cost continues to decline. What this means to you is that it may already be beneficial to completely switch to solar power, depending on where you live.

The term “grid parity” refers to
the estimate of when a renewable energy source meets, or is below, on grid electrical costs. An estimated 25 states will achieve rooftop solar grid parity by 2017, led in large part by advances in lower solar energy manufacturing costs. Below is a chart showing which states have achieved grid parity, with California leading the way.

The first question you need to ask yourself before going solar is whether your home is oriented properly to take advantage of the sun’s rays. Like wind power, solar power also requires the energy-generating panels be placed in such a way to take full advantage of the energy source, which, in this case, is sunlight. For homes located in the northern hemisphere, it is important that the panels are located on a south facing surface. The inclination of the roof is also another factor to take into consideration. Ideally, you will want to install the system on a surface facing within 40 degrees of direct south (180 degrees on a compass) to ensure the highest efficiency possible. Systems mounted on a flat roof, or the ground, will need to be tilted at an angle to provide a south-facing exposure.

Another factor that weighs into the equation is shading. Over 95% of all solar systems are mounted on rooftops. You will need to make certain there is enough sunlight to maximize the efficiency of the system. Obstacles such as trees, chimneys, other buildings, and tiered roofs can cause shading that will drastically reduce the overall efficiency of your system. Would you consider removing an obstruction if it meant the difference between going solar or not? Is removing a tree that also shades your home, and saves on air conditioning costs, going to offset the difference in efficiency costs? These are important questions that many do not consider before the installation of a system and sometimes become an efficiency issue several years down the road. An example of this would be a new home construction with trees that have not yet reached the level of the roof, but eventually will.
In a near perfect scenario, your roof will have one level, facing directly south, with no dormers, skylights, chimneys, vents, antennas, etc. This would allow the panels to be linked in one continuous series with no breaks, which will keep costs down considerably. However, this is often times not the case and your panels will need to be installed around obstacles and dormers, which may further reduce the efficiency of the system and increase installation costs.

Next, you will need to make certain your location has enough space to make the system practical. Once you have determined the amount of square footage required, and the amount of available sunlight, you can roughly estimate your system’s monthly power output. Again, in a perfect scenario, your system will output enough power to run your entire home. However, in most instances this will not be the case. Depending on the location and design, the typical installation of a 3 to 7 kilowatt system runs anywhere from $18,000 to $40,000.

To determine if a system is going to provide the correct amount of energy for your needs you will need at least a years worth of your regular utility bills. Determine how many kilowatt-hours you use on average and during peak months in winter and summer. Ideally, you will want your system to provide power during all these times. Otherwise, you will be paying the utility at rates that inevitably will rise over time.

Both wind and solar require a bank of batteries to store energy for use during times when there is either no wind or sunshine. The quality of the battery systems vary more than the quality of the panels or wind turbines and this should be factored into any buying decision. Saving a few thousand now on lower quality batteries will probably cost you more in the end. If you do not use a battery back up, the system will switch between your system and the utility company to provide power. You will essentially have 3 power sources - the live solar or wind power, the battery system, and the utility.

**Offsetting Costs**

Both wind and solar are now more affordable than ever. Justifying the purchase of either type of system boils down to basic math. Take the cost of the system and divide that
by the number of months the system is expected, or guaranteed, to last. Compare this cost with your current on-grid electric bill. Both wind and solar systems have a life expectancy of about 30 years, or 360 months. The average price of either system is about $30,000. Assuming you purchase the system outright this equals $83.33 a month over 360 months. If your electric bill is over this amount then obviously the system will pay for itself in that time. This, of course, is assuming the system will take care of 100% of your electrical needs. Today’s systems can easily do that for a typical American home.

If you lease your system, you will find there are usually no up front costs, depending on your credit. The advantage of leasing is that most companies will include the maintenance of the system and will guarantee the system will produce the energy promised. If it does not, the company will typically reimburse the difference to you in the form of rebate checks. Each company is different so make certain you thoroughly research the programs available to you.

Once you have “gone green”, how about making some green by selling the excess power you generate back to the power company? Selling energy back to the power company, in addition to eliminating your electric bill, means your system can pay for itself even faster. This benefit is normally reserved for those who purchase their system outright, but it can be factored into a lease agreement with some companies.

Selling energy back is called “net metering”. If you do this, you will have an electric meter that spins both directions. Spinning one way means the meter will be billing you for power you take from the local power company. Spinning the opposite way means you are producing more power than you require and the company will buy back the extra power you generate at full retail pricing.

If you intend to offset the cost of your system by selling power back to the local power company, make sure your system is preapproved or compliant. This is important, as different types of generators are not compatible with the power company systems. Even if your system is not on the approved list, it may still be compatible after following a compliance check. Some systems generate as much as $3,000 a year in excess electricity and this can, in some cases, completely offset the cost of the system.

**Learn more about renewable energy and your options**

Current rebates and tax credits - http://dsireusa.org/

Wind and solar power information -

http://cleantchnica.com  
http://energy.gov  
http://nrel.gov  
http://dsireusa.org  
http://awea.org
Another way to offset the cost of your system is through rebates and tax credits. The federal government will give you a 30% tax credit for going solar, which you can use to pay your taxes. Unfortunately, there is no federal tax credit for installing a wind turbine system. The solar tax credit was extended through December 31, 2016. Tax credits are far better tax deductions and here is why. With a tax deduction, you deduct a certain amount off your gross income. A tax credit is quite different in that you can actually use it to pay your taxes. That is a huge difference. Although wind power does not get the same credits as solar, you may find your state, county, or city may have

Mike Turber
Garden Harvest

Prepping & Preserving Your Garden Goodies For Winter

by Shannon Oyler
The approaching fall season means cooler temperatures, shorter days, a kaleidoscope of colors, and, for gardeners, harvest time.

If you have a variety of plants in your garden, you have likely already been enjoying an abundance of delicious produce for a good part of the summer. Plants that produce early, like radishes, are often ready to harvest just a few weeks after planting and can be replanted several times, providing multiple harvests before the growing season is over. Other plants take the majority of the summer to grow and aren't ready to harvest until late summer or early fall. Corn, pumpkins, and melons are just a few of these highly-anticipated late summer producers.

**Harvesting**

No matter what plant varieties grace your garden, the best way to keep up with harvesting - throughout the summer and into the fall - is to take a stroll through the garden every day and collect whatever is ready to be picked. By checking the garden often, you can get the fruits and vegetables at the exact moment they are optimally ripe while avoiding letting anything get overripe or rotten. Frequently removing mature growth has the added benefit of allowing for new growth and extended plant production for many different types of plants. This is especially effective with herbs, many types of greens (like chard and kale) green and yellow wax beans, and strawberries.

I make the rounds through my garden nearly every day throughout the summer with a big salad bowl, harvesting the ripe vegetables, herbs, and fruit, and enjoying the new daily growth of all the plants. While the radishes were first to make their appearance for me, they were followed quickly by strawberries, peas, cherry tomatoes, and a variety of herbs and greens that continued to produce all summer long. I don't know about you, but to me, there aren't too many things more rewarding than walking into the back yard every day to pick a delicious, fresh, organic salad or exquisitely fragrant herbs to use for cooking.

To achieve the best taste from produce when harvesting, there are two main factors to keep in mind: ripeness and the time of the day that the food is picked. Knowing when food is ripe takes some practice. Some fruits and vegetables give more obvious signals than others: a plump, red strawberry or bright, juicy tomato is easy to spot amongst the surrounding greenery, signaling its readiness. Many of these plants produce prolifically, blessing you with daily fruits. These can quickly get past their prime if left in the garden for too long. Root vegetables and melons can be a little more tricky when it comes to determining ripeness, but getting to know your plant varieties and paying close attention to
them as they mature will help, and it will get easier over time, especially if you replant your favorite varieties year after year.

Something often overlooked by gardeners is that the time of day that the produce is picked might affect the taste or how well it will store. Most fruits and vegetables are at their best taste and texture when picked early in the morning, before much sun exposure. The second best time of day is in the evening after the sun has waned. This is especially true for leafy greens, which wilt very quickly in the heat. Root vegetables are not affected as much by the sun, so they can be picked any time of the day as long as they are not exposed to the sun or heat for very long. Most of what you pick should be immediately refrigerated to keep it as fresh as possible.

While having all the fresh food you could ever want right out your back door is wonderful, toward the end of the growing season it can become a little overwhelming as the plants reach their full maturity and production. You may likely find yourself inundated with vegetables and fruits when the first frost of the season threatens, especially if you have a large garden. Every fall, my kitchen seems to suffer from a tomato explosion, with almost every available surface covered in green tomatoes, red tomatoes, and in-between tomatoes. But there’s no need for any of it to go to waste; this is the time to start thinking about preserving that bounty to enjoy over a long, cold winter.

**Preserving**

The idea of preserving food for long-term storage often intimidates people, but it doesn’t have to be complicated, tedious, or confine you to a hot kitchen for days on end. There are many, many ways to preserve foods. I’ll just brush over a few of them here, and include some of the ways I have used each method with great results.

The three most common methods used to preserve garden produce are canning, freezing, and drying. These can be used alone or in conjunction with other methods for extending the shelf life of your fruits...
and vegetables, providing delicious, homegrown food all winter long.

**Canning**

Canning is the process of heating food for a specified length of time and vacuum sealing it in glass jars. Many different types of foods can be canned, including vegetables, fruits, and meats. Food can be canned in a boiling water canner or a pressure cooker. Different types of foods have different requirements for achieving optimal safety when canning, so be sure to study the process and requirements before canning your own food.

**Tomatoes** are one of the most popular home canned foods. They are highly acidic, so canning is an ideal method of preservation, as this makes them less prone to bacterial growth. They can be canned whole, chopped, or can be combined with other vegetables to create recipes like salsa (a favorite in my house), ketchup, hot sauce, and tomato soup. Canned tomatoes can be used year round in soups, casseroles, and other recipes.

**Beets** are a prime candidate for canning, and while they are perfectly delectable just plain, they are even more delicious when pickled. I remember my mom spending hours preparing quarts and quarts of pickled beets every fall throughout my childhood. Those jars of purple deliciousness became one of our favorite sides to grab out of the pantry during winter dinners.

**Fruit jams and jellies** are another thing I make a point to can every year. My kids go through a lot of jelly, and I like knowing that what they are eating came from fruits we grew ourselves or picked in the wild. I also like having the freedom
to experiment with sugar content, adding only a fraction of the sugar that is found in store-bought jellies, or using sugar substitutes such as honey.

**Freezing**

When I first began preserving foods that I grew, I lived on a big cattle ranch that, quite literally, defined “middle of nowhere” in locality. I had the space for a huge garden, so fall harvesting and preserving required a great deal of planning, preparation, and dedication. In those days, canning was my favorite preservation method. Besides the huge garden, I had a huge storage area for the rows and rows of canned tomatoes, beets, carrots, onions, and other concoctions I would create every fall, along with plenty of time to dedicate to the task.

These days, living in town with young kids and a business to run, canning vast amounts of food is just not conducive to the time and space I have. For this reason, I love being able to utilize my freezer for preservation. Freezing is, by far, the simplest way to preserve garden produce. Some types of foods need very little preparation for freezing, while others, like leafy greens, require a few extra steps. Freezing retains the natural flavor, color, and nutrition content of fresh foods more effectively than any other preservation method.

**Peppers** are amazingly easy to freeze. They do not require blanching or any other special treatment. Just wash them, let them dry, cut them apart or leave them whole, and pack them into freezer bags or containers. I like saving up my jalepenos over the summer so I can use them all to make salsa in the fall. Freezing is the easiest way to keep them fresh until I am ready to start my salsa batches.

**Rhubarb** is ready to harvest late in the spring and early summer, but it is not always convenient to use it up right when it’s ready. It freezes exceptionally well, either just cut up and frozen dry or packed into a sugar or syrup solution. I like freezing it dry, cut into small pieces and bagged into 2-cup portion sizes. When I am ready to use it in a recipe, I just pull out a bag, thaw it, and throw it in the mix.

**Tomatoes** are another freezer favorite of mine. I wash them and freeze them whole, then bag them into gallon-sized freezer bags. Frozen whole tomatoes are perfect for adding to slow cooker meals and soups throughout the winter. I usu-
ally grow enough tomatoes to keep my freezer stocked with a whole winter’s supply, along with enough to give away to family members.

**Greens**, along with many other vegetables, need to be blanched before they can be frozen. Blanching is the process of boiling the food for a short period of time, then immersing it into ice water for the same amount of time. It stops enzyme growth that can cause spoilage and it retains the flavor and bright colors of the vegetables after they are frozen. I freeze a lot of mixed greens at the end of the summer to use in soups and casseroles throughout the winter.

**Drying**

Dehydrating foods removes the majority of the moisture content, effectively inhibiting bacteria growth. Dried foods are easy to store, last a long time, and are extremely convenient for use in cooking and baking. Foods can be dried in dehydrators, in an oven, or even out in the sun.

**Apples** are one of my favorite foods to dehydrate. I often take buckets and buckets full of apples in the fall and slice them up, dry them in my dehydrator, then pack them into freezer bags for a quick, healthy snack all winter long. They taste wonderful right out of the bag, make a great snack to put into kids’ lunchboxes, and are delicious thrown into oatmeal or homemade bread or muffins. Additionally, they take up a fraction of the storage space that fresh or canned apples require.

**Onions** can be dried and kept in jars or bags and used throughout the year as a quick and flavorful addition to recipes. I add them to soups, scrambled eggs and omelettes, dips, and salads. I learned from personal experience, however, that if you are using a dehydrator to dry onions, you will want to place it outside for the duration of the drying process, unless you don't mind your whole house smelling like a big, hot onion.

**Herbs** dry and store easily, mostly eliminating the need to buy expensive seasonings from the store if you grow a nice variety. I have had luck drying all kinds of herbs in my dehydrator, including dill, cilantro, stevia, parsley, mint, oregano, basil, and a variety of others. I also often hang them to dry in my kitchen or on a covered patio during dry weather, which also seems to work very well.

**Fruit leather** is a fun, simple way to use up all kinds of fruits and and some vegetables to make a deliciously healthy and convenient snack. We love to have it on hand for camping trips and lunchbox treats. If you have a dehydrator, it likely came with plastic sheets made especially for fruit leather. If not, you can cover your dehydrator trays with heavy, food-grade plastic wrap. You can also make fruit leather in the oven using plastic wrap spread over baking sheets. To make the leather, simply puree whatever combination of fruits you want to use until the mixture is thick and smooth, spread it over the trays, and dry it at low temperature to pliable consistency. I tend to make fruit leathers anytime I have too much of something on hand that needs to be used up - bananas, apricots, apples, peaches, pears, and even squash. My kids’ favorite fruit leather combination is apricots and butternut squash (and they have no idea the squash is in there! Ha!).

There are many other food preservation methods that can be used alone or in conjunction with those
I have mentioned, including salting and curing, smoking, fermentation, and pickling. For many types of fruits and vegetables, you will be able to retain their freshness for an extended period just by keeping them cool in a root cellar or refrigerator.

Whatever preservation method you choose, have fun with it, and don’t be afraid to experiment with new recipes. Growing, harvesting, and preserving your own food is a greatly satisfying venture that yields rewards year round. Every time you pull out a homegrown can of tomatoes for cooking or see your kids grabbing fists full of sugar-free dried fruits, you can take pride in what you have created and be confident in its wholesome goodness.

Shannon Oyler
www.sageandsunflowers.com
Bow Making 101

How To Make A Bow & Arrows From Scratch
by Michael Tomlinson

It’s that season again, time to gear up and hunt. Do you like the challenge of hunting with a bow and arrows? How about taking game with a bow minus the training wheels? You don’t need tons of technology to bow hunt. Remember, hunters have been taking game in North America with primitive bows and arrows for over 2,000 years.

You can spend hundreds of dollars or more on archery equipment in no time. But what if I told you that you can make a bow that will perform just as well as an expensive one for under a hundred bucks? It takes some skill, and some practice, but with a few tools, a good piece of wood, and a few cheap supplies, you can make a bow and arrows that will drop the largest of game, and you will have the satisfaction of having made it yourself.

Making a bow is a challenge, and dozens of long books have been written on how to make one the old way. I will touch on the basics of bow making for you here, beginning with an overview of ancient bow styles. My focus here will be on making a simple self (wood) bow.

If you enjoy the process of making your own bow, you can then expand your skills and tackle larger and more rewarding projects.

A history of bows

Worldwide, archery began with a basic stick with a string tied at both ends. Every culture realized that this worked well, was easier to use than an Atlatl (an ancient spear thrower), and could go farther and shoot faster. There are several styles of primitive bows, some more primitive than others.

One obstacle people faced, however, is that bows are breakable. Bend any wood bow far enough and SNAP, you are left with two sticks...
tied together. Each culture found ways to overcome this problem, but they all converged on a few ideas that are universal.

The trick to getting an all-wood bow that will bend further is to follow a single growth ring on the back of the bow (the side that is away from you when pulling) so that splinters cannot lift and the compression on the belly (the side that is towards you while bending) is distributed evenly with no weak spots. Bows usually fail under compression before tension. In other words, they will crush the belly before tearing the back. The first improvement to fix this problem was to back the bow with a material that added strength to the back and kept splinters from rising up.

Rawhide is a good backing material, and fiberglass is often used now. But the best material used before fiberglass was sinew, or tendons taken from along the back bone of large game. If you have ever skinned an animal, you may have noticed the sinew as a shiny silver membrane. It can be removed by hand and scraped with a dull blade, then dried.

The next method used to strengthen wood bows was to add horn to the belly, as horn will not compress as easily as wood. A sinew backed, horn belled, wood core bow can be bent almost twice as far as a self bow. Most cultures figured this out.

Here in America, the Natives used self bows on foot until the horse was introduced. Over about two hundred years the bow evolved into a completely different technology. Some Natives used a horn bow with sinew backing and got rid of the wood altogether. Today these are worth a fortune. The shorter bows allowed them to be used on horseback and at shorter range. On foot the short bow is unforgiving and magnifies every mistake in technique. They are not friendly and slap your wrist and forearm, requiring the use of a heavy rawhide bracer.

Mongols had the best horseback bows. They made them over a five year period in batches of a hundred. They had a wooden core, a heavy sinew backing that pulled them in reverse as the sinew dried, a bone or ivory handle, water buffalo horn bellies, and siyahs that were added for leverage. The string went over a notch in one end, then over a bone riser to the opposite side. These had a lot of stored energy and were difficult to string. However, they were used from horseback to help the Mongols rule the world at the time. They were the apex of archery technology until modern times. I’d still take one over the best modern equipment in a heartbeat.

Bow making

Are you ready to begin making your own bow? To make a basic self bow, you’ll need to gather a few materials before starting: a good piece of wood, a hatchet or heavy bladed chopping tool, a draw knife, a hoof file (which has a rasp on one side and a cutting file on the other), a scraping tool (an old pair of scissors works well), and a burnishing tool such as a glass bottle.

Wood & shaping your bow

Your first bow should be made from an easy, forgiving wood. All types of wood have their benefits and drawbacks (no pun intended). Hickory is a good one for beginners. Osage orange, yew, and ash also work well. You can obtain a good bow stave...
from magazines such as Primitive Archer or even on eBay. They run around $30 to $60 depending on the style and quality. You will also need some sort of vise or bench to hold the wood firmly while you work.

I do about 80% of my bow shaping with a tomahawk or hatchet. I try to find a straight section of wood to rough out the bow I have in mind. You will have to work around knots, bumps and pinholes, insect damage and twists, but we’ll talk about those as we go. Once I have the overall length of the bow roughed out I try and leave it about an inch thick near the handle to the tips.

After roughing out the bow length, the crucial next step is to take it down to a single growth ring on the back side. From the ends you can see the tree rings. There is a hard, dense one for spring and summer, then a soft, thin one for winters. With Osage orange it is easy to find a single growth ring with the draw knife alone, but with yew it is almost impossible, as the rings are less than a sixty forth of an inch thick and an inch can be a very old tree. With yew, the sap wood is usually left on and you have a natural composite. Sap wood is under the bark and is light colored, whereas heart wood is deeper in the tree and darker colored. Osage has a bright yellow heart wood and an almost white sap wood. Hickory can be hard to follow a growth ring from end to end but is forgiving and less likely to break if you make a mistake. Ash is somewhere in between for difficulty.

To rough out your bow stave, start near the handle and work away from it in both directions towards the tips of the bow. Once you find a clear growth ring that crosses the handle to both sides, follow that outwards each tip until a single growth ring is showing from end to end. This used to take me several days, but now I can do an Osage bow in an hour or less. As you encounter knots in the wood, leave them as long as you don’t have to cut the growth ring. They just add character to your bow. Some people even prefer “snake” grained bows that wind back and forth. Each piece of wood will require different compromises from perfection.

Hickory is the best wood for those who like symmetry and less “flaws”. Don’t worry too much about cracks near the handle, or bug damage, unless it compromises the limbs where the bow bends the most. Leave the wood thicker in weak spots to avoid breaking it. You can choose the style of bow you like, either a long bow or a short bow, but try and keep it over 50 inches long unless you intend to sinew back it. I will briefly cover that, but research it before you attempt it.

You now have a stave that is roughed out to bow dimensions in length and near the right handle thickness. Draw a line down the
center of the back of the bow and try to follow the grain. If it wants to be a “snaky” bow, work with it and avoid cutting through the grain, as this will weaken the bow. The formula is along the lines of half the width, half the poundage, half the thickness and you have one eighth the poundage. So go slow or your big game bow might end up as a child’s toy. Draw the lines to the shape of the width of the back along the center line so that it is as symmetrical as possible. It may have one wavy end and one straight, or even have a large knot hole if you work around it. The critical part here is to get it as symmetrical as possible in both limbs from the handle to tips and width.

At this point, you may notice a “propeller twist”, or one limb bending off to a side from center. In order to correct these flaws in the wood, you have to have the bow as near to the finished thickness as possible. The wood will need to be greased and heated to shape the bow and add backsets, recurved tips, and take out twists. I make a wooden jig board that I can use to hold one end while I bend it in the direction I want while heated, then as the wood cools it will retain the shape, for the most part. The same concept will work for making arrows straight later. Try not to scorch the wood, but if you do it can be filed off later and hopefully not compromise the draw weight. It just takes practice.

Now that you have the length and width and major twists out, or have added a backset and recurved tips, you can shape the tips and begin final tillering (uniform bending of both limbs). Tillering is easiest if you make a tillering jig. It can be as simple as a 2 x 4 with a notch at one end to hold the handle, and notches every couple of inches to pull the string down to. Take note of existing bow dimensions and try to get as close as possible before final tillering. I use parachute cord for tillering, then make a string out of artificial sinew when the bow is ready to be strung.

To begin tillering, add the loose cord at each notch and gently begin to bend the bow in your jig. It probably won’t bend evenly right off. This is the tricky part. If you take off too much wood you have a toy, and if you don’t take off enough it won’t bend. Use of the file is recommended at this stage. As the bow starts to bend by slowly working it to each notch in the jig, take a pencil and mark the limb that is stiff and isn’t
bending even. Now slowly shave off a little wood at the stiff spots and re-work it in the jig by pulling it a dozen times or so back to that notch in the jig. As you progress you will notice the further the wood is bent, the harder it gets. This is called “stacking”. The poundage adds up quickly the further down the jig board you get. Don’t go too far or it may snap. Listen to the wood. It will tell you when it is getting stressed too far. If you don’t like the poundage and have a longer bow, you can take an inch or so off the ends and move the notches towards the handle. This will add poundage, but shorten the draw length.

**String your bow**

When you are satisfied with the final tiller you can add a real bow-string and work it some more. I make my strings from artificial sinew, as most people can’t tell it apart from real sinew, and it is not likely to break and damage the bow. You can buy a small roll of artificial sinew, which is what is used for making “dream catchers” and for sewing leather. Pick a natural honey-like color.

I make my strings by wrapping the sinew around two pegs four times, then twisting it with an electric drill until it is wound tight. Then I fold it in half and it twists back on itself, making an eight ply cord. I loop one end with a knot for the top sliding end, and tie off the bottom with a slip knot at the final strung relaxed draw. This is usually the distance of a “thumbs up” gesture from the string to the handle, or where the feathers of the arrow aren’t touching the handle. The closer the string is to the belly, the more likely you will
slap your wrist when firing it.
You should now have a completed
self bow. Shoot it a few dozen times
and tweak it as necessary.

**Sinew backing**

If you want to try adding a sinew
backing to your bow, you will start
by taking dried sinew strips, or leg
tendons, and shredding them into
threads. You can do this with your
bare hands on loin sinew, but leg
tendons require pounding to sepa-
rerate the threads. You must wash all
oils from your hands off the back
of the bow. Then you rough it up
with a small blade to scratch lines
that do not go all the way through
the growth ring on the back, but are
deep enough for the glue to get a
grip on the wood. Separate the sin-
ew threads into uniform bundles of
three or four threads. You will also
need hide glue, which is available at
most Native American stores. Be
sure to get the powder and not the
liquid glue. This is basically gelatin,
or unflavored Jell-O.

Using water that is hot, but not
too hot to place your hand in, add
the glue powder and stir until it is
dissolved and thick, not too runny.
Soak the threads in water, then run
them through the glue. Begin add-
ing them onto the back of the bow
in a brick-like pattern so the ends
don’t line up and create a weak spot.
Let that layer dry, then add a sec-
ond layer, staggering the ends from
across the handle out around the
ends and back onto the belly a few
inches. Then wrap the ends in a spi-
ral, glueing the sinew so it holds the
ends in place and won’t break free
under tension.

Rawhide backing is done similar-
ly. Soak the rawhide and glue it to
the roughed up washed back, then
wrap the rawhide in an ace bandage
to hold it in place until dry. Sinew
backed bows can be tricky and re-
quire some additional research, but
are amazing weapons. Sinew adds poundage and helps insure against breakage.

**Finishing touches**

You can decorate your bow as you like, but avoid beading the limbs as it adds mass and slows speed. Native bows, when decorated, usually had minimal paint, sometimes a snake skin to add water resistance to the sinew backs, a buckskin handle, horse hair locks at the top tip, or even elaborate scalloping of the edges. The Penobsct Indians of the Northeast even had a compound bow of sorts, attaching two bows at the handle - one short bow facing away and one larger main bow. The string ran from the small bow, over the tips of the main bow, across and back to the opposite limb of the small bow.

The final finish on primitive bows was surprisingly smooth, even though they did not possess sand paper. Their method was far superior, leaving a glassy texture. They burnished their bows with a smooth, hard object, such as bone, antler, or even a smooth polished stone. I use a gastrolith (dinosaur gizzard stone) on both my arrows and bows.

**Arrows**

It seems awkward at best to use a modern arrow in your primitive masterpiece. You can make your own from dogwood or chokecherry, or similar woods. Cut them in the fall when the sap is down (same as for bow woods). Take about a dozen shafts and bundle them with the bark on and wound tight so they dry straight. Some people wait a year, but you can heat straighten them as long as they are mostly dry. When the shafts are dry, scrape the bark off. The ground end of the branch is the fletched end and the sky end is the tip. The reason is the wood is larger and straighter at the ground end. A flared knock used by the Natives was cut there, and the fletched area was the straightest. Any heat straightening could be focused on the tip end and not scorch the feathers later on.

Looking at old arrows in museums could lead you to believe that primitive people used twisty arrows that were of poor quality, but this is not the case. These arrows simply went back to their original shape after centuries of humidity. The length of the arrow was supposedly the length of the archer’s arm from the elbow to fingertip, then back to the wrist, though this must have varied depending on the draw length of the bow. Fletching varied tribe to tribe from a single feather to four.

The main consideration when it comes to fletching is to set the feathers so that none strike the handle as they pass by. Modern arrows have a cock feather, or odd feather that lays perpendicular to the handle on the opposite side of the arrow from the bow, and two more at 120 degrees. The feathers have a natural angle to them and all three should be from the same side of the bird. This will allow the arrow to spin for better accuracy. Natives usually fastened the feather down at both ends and rarely glued them down the full length, but be certain the sinew covers the feather that crosses your hand if you do this to avoid getting cut.

Research the different styles of arrows and pick what works best for you. A bunt, or clubbing arrow for small game can be made by scraping down a larger branch and following a growth ring like on the bow.

Natives carried their bows with a few arrows, points up, in the bow hand, and used the flared knock in a pinch grip. The arrows did not grip the string like on modern bows. They raised the bow overhead drew as they lowered the bow onto target, using a snap shot at short range with horse bows.

Quivers were worn across the lower back to hold arrows, and were pulled around front while in use. The “Robin hood” over the right shoulder was invented by Hollywood and was rarely ever used by any culture. Europeans with their long bows stuck arrows in the ground in front of them for easy and quick access.

After making and using primitive archery, a compound bow feels awkward, somewhat like carrying around a mountain bike. Mechanical grips, bubble levels, pulleys and tree stands may be acceptable to a new generation, but by using these contraptions, people are missing out on the oneness with nature that only the traditional, or primitive archer will ever experience. Give it a try! It is well worth the effort.

Michael Tomlinson
GREAT SAWMILLS. SHOCKING VALUE.

Premium band sawmills from only $4397.00. Get your free kit!
Toll Free: 800-661-7746 EXT 660

NorwoodSawmills.com