

Friction Fire Lighting

The Bow Drill

Although the hand drill is the most universal friction fire method in the world, the bow drill is probably the most dependable. It is certainly the most widely used today by wilderness skills teachers and students. The student of the bow drill will grow in several areas of study other than fire making.

Whilst searching for the correct materials the learner will gain knowledge of countless trees, shrubs and plants. The learner will go way past mere identification, as the bow drill requires different qualities in every part of the set to make it work properly.

Children and beginners can learn the basics of knife work or even stone tool, by constructing the various parts of the set.

I clearly remember the moment when I first blew the smoking coal into flames and produced the warming fire it was the culmination of many hours and days of failed attempts, but when it finally came togetherwhat a feeling.

Identifying What is Needed

Before you start to study and construct a bow set you should have a thorough understanding of the individual items that make up the set, as with many projects in the wilderness arena every individual items needs to be perfect to ensure your success.

Poplar	Sycamore	Sycamore Leaves	Poplar Leaves
			

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Hearth Board – The coal of a friction fire is actually born from the fire board. The board should be about two fingers wide, one finger high, and as long as your small finger to thumb with your palm extended. The fire board should be as soft or softer than your spindle and an impression should be left after piercing it with your thumb nail. Fire boards can also be created from dead and downed Sagebrush, Juniper, Cottonwood, Aspen, Cedar, and other softwoods.

Spindle - The spindle is one of the most important pieces of the fire set. The spindle should be the width of your finger and the length from your pinkie to thumb when your palm is extended. The spindle should be created from dead and downed Sagebrush, Juniper, Sycamore, Poplar, Cedar, and other softwoods. The end applied to the socket should be longer and pointed to reduce friction and the end applied to the fire board should be short and blunt to increase friction. The spindle must be straight as an arrow.

Bow - The bow should be approximately the length from your armpit to fingertips. It should be slightly curved and slightly flexible. It is easier to tie if there is a crotch in one end. Any type of wood can be used, although green wood should be avoided

Hand Hold/Socket - The socket should fit comfortably in the palm of your hand and is used to apply downward pressure to the spindle while creating friction to the fire board. Stones, bones, shells, and hard woods can be used as sockets. Small notches or holes are drilled into the socket to create the least amount of friction where the spindle and socket meet, so choosing the right materials are key. The socket can also be lubed with oils from your face, or green leaves.

Tinder - The tinder bundle is the most essential element in making fire. It is used to blow the coal from the fire set into an actual flame. The tinder bundle should be finely shredded and resemble a birds nest at least the size of a fist. Fluffy and fibrous materials are key. Juniper bark, Sagebrush bark, Cottonwood bark, crushed grasses, and crushed pine needles make good tinder. Cattail down, Milkweed silk, and pocket lint make good coal extenders, but are difficult to ignite. You should make a tinder bundle by tying your material in an overhand knot and then tucking the ends towards the center. The tinder bundle should be tight and the outside should be coarse while using progressively finer material in the center of the nest. The finest sawdust material should be put in the nest last and it will mark the place where the coal will be placed.

Coal Tray – The coal tray is placed underneath the fire board to catch the coal after it is produced to be transferred to the tinder bundle. This can be created from almost anything flat. A piece of bark works well.

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There are a number of factors that can get in-between you and your fire by friction. Some of them are obvious. Wet wood is a no no straight from the start. But some of the other negative factors aren't as obvious. If the wood contains volatile substances like resin or tar, this can evaporate and prevent proper heating. Another factor is using wood that is too soft which disintegrates as opposed to forming dust. What this means that before you begin to try to achieve fire by friction you first need to start off with the right wood. Here is a list of the best UK/European woods to use with bow drills:

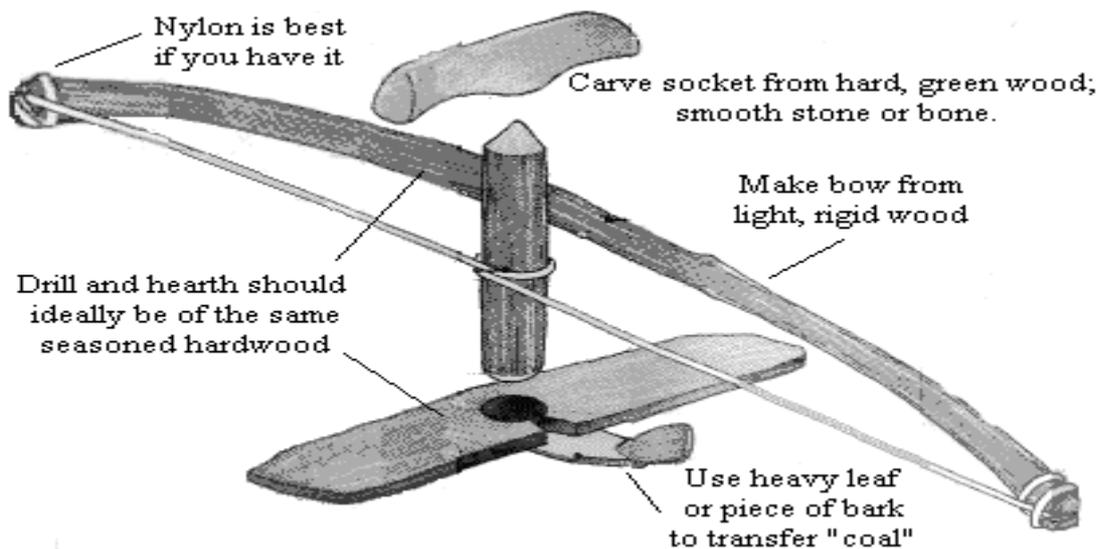
Alder	Birch	Clematis
Elder	Elm	Hazel
Horse Chestnut	Ivy	Lime
Oak	Pine	Poplar
Sycamore	Willow	

Ivy and Alder are considered to be best, but no matter which wood you choose or have available, you need to ensure that it is both dry and not rotten (rotten wood won't make the right kind of dust).

Identifying the right wood to use isn't as easy as it sounds. A good place to begin is by practicing your tree identification skills (one good reason to get good at tree recognition!), but that's just the beginning. Naming a tree is one thing, naming dead wood is harder. Standing dead wood is easier but can still sometime present some difficulties. Finding dry wood is another challenge. This is easier in summer than it is in winter - but remember that you are more likely to "need" a fire in winter. You might be able to dry out damp wood by placing it out in the sun or next to a fire (!!!!) but again this could be tricky in a life-threatening situation. However, it's better to practice skills before you need them for real and to begin with you want everything to be on your side so you can get a feel for the process and maximize your chances for success.

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The Ideal Set



BGMA Tip!

- *A good teaching point to remember is that the 'burning' end should create as much friction as possible – therefore be as FLAT as possible. And the 'handhold' end should reduce friction so will need to be POINTED.*

Correct Teaching Method And Technique

If you are right-handed, it is best if you hold the bow with this hand. Place the board flat on the ground making sure it is stable. Now take the spindle and place the point of it onto the board so that you make a mark. This point should be about the width of the spindle from the edge of the board. This point should also be at one end of the board so that you have room to place your foot on the board. With your knife, gouge a shallow hole similar to the one in the handhold. Now, put your left foot on the board (if you are right-handed) so the inside ball of your foot is next to the shallow gouge you made. Your right knee should be on the ground and you should be sitting on your right foot. Your right leg should be parallel to the board.

Load the spindle by wrapping the string around the spindle so that the spindle is outside of the bow. This may mean that you have to adjust the string. Ideally the spindle should feel like it's going to pop out. The tighter the string becomes, the better, (but don't make it so tight that it breaks the bow!).

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Holding the loaded spindle and bow in your right hand, place the bottom point of the spindle into the hole in the board and place the handhold at the other end and apply a bit of pressure to keep the spindle from popping out. Now here is a test to see if you loaded the bow in the right way - let go of the bow. The bow should be pointing itself up towards you. If it is pointing down, reload the spindle so the bow is pointing up.

Running In

You can now begin the "burn-in" process. This is to form the handhold hole. All you have to do is begin stroking the bow back and forth slowly. Keep the pressure on the handhold fairly high. Eventually, after some effort, you should see a small amount of smoke coming from one or both ends of the spindle. This is your cue to gather up a little bit of speed until both ends are smoking. It is important that you get the handhold end to smoke at this point. If it won't, reload the spindle so the top is now the bottom and vice versa. Repeat until the handhold starts to smoke. Keep going until the hole in the handhold is the same diameter as the drill. It should now also match the curve of the drill point exactly.

Now you must lubricate the handhold end (it is vitally important that you keep track of which end is up and which is down!). The lubrication is added because what you now need to do is reduce the friction at the handhold end. Unload the spindle and clean off the top into the hole in the handhold of any dust. Push the drill into the handhold as hard as you can and slowly rotate the drill. Remove it and blow off any dust once again. Now you can lubricate the handhold end - rub this end into your hair, or along the sides of your nose to transfer the oils found on your skin onto the wood. Another thing you could do is add some earwax (I know, it's gross but now you see that it does have some uses!).

Repeat the process until you remove as much of the friction from the handhold end as possible.

Notching The Board

Now we come to an important but often overlooked part of the bow drill - the notching of the board.

You notch the board by taking your knife and scribing a 45 degree angle in the top of the board that starts from the center of the hole. The two lines will go to the nearest edge of the board. Now cut out the wood in between these lines so that you have removed a section of the burned-in hole (about a sixth to an eighth). This cut needs to go all the way to the bottom of the board so that you can removed a wedge of wood from one side of the board which points towards the middle of the drill hole.

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Making Embers

Place something under the board where the notch is to catch the embers. Birch bark is ideal for this. Now get into the position described earlier and start drilling. Make sure to put the lubricated end of the drill in the handhold - getting this wrong will mess up the whole works!

Now you want to begin making "powder". Drill slowly and carefully, applying firm pressure until the bottom end of the spindle begins smoking. Keep the smoke down to a minimum.

BGMA's Tips!

- *How the powder looks will tell you how things are going - you are aiming for powder that is dark brown/black in color that is has a fuzzy consistency.*
- *If the powder is light brown in colour and dusty, then you are going too slow and not applying enough pressure.*
- *If the colour of the powder is too light but the consistency is right, you're going too slow.*
- *If the colour is right but the consistency is that of little rolls of fibre, you might be going too fast or not pressing down hard enough on the handhold.*
- *If the colour is right but the powder takes on a crusty look, you are either going too fast, pressing down too hard or both.*

You should begin to see powder building up in the notch. Keep the bowing slow and easy until the notch is almost filled. Once it is filled it is time to ease off on the pressure and begin drilling very fast. This is the how you heat up the powder and turn it into an ember. Now things should begin to smoke quite a bit (this might be the point at which you regret doing this indoors!). If you don't get enough smoke, apply some more pressure until it does. Keep going until you have loads of smoke and then stop drilling and carefully remove the drill from the notch. If smoke continues coming from the powder pile you probably have created an ember! Gently blow on the ember until it glows red.