

BACKPACKING: SMART, FUN & LIGHT

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Wabash Valley District
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January 21, 2012

A dissertation submitted in partial fulfillment of the requirements for the degree of Ph.D. in the
Crossroads of America Council's University of Scouting Doctoral Program

Acknowledgments

I would like to thank the BackpackingLight.com community as a whole for if I hadn't found BPL with its forum participants sharing all their information and experiences and answering questions, my start into backpacking 3 years ago would have been a whole lot more frustrating and painful. I especially want to thank fellow Scouters Phil Barton, Doug Prosser and Walter Underwood for taking their time to provide significant feedback so you can enjoy a better final product.

I also want to thank my long-time friend, Jim Grey, who cleaned up my first draft with his editing and writing prowess to make it read a bit nicer for you.

Finally, many thanks and much love to my wife and sons who put up with my seemingly endless research on things lightweight and allow me at least a little time in God's creation on my own. I hope we can all share in some future treks and know that we'll have more fun by going light.

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January, 2012

Abstract

Many Scouts and Scouters appear to take backpacking to be car camping without the car, priding themselves in how heavy their packs are when they hit the trail for their adventures. These packs are more suited to a pack mule than a Scout, often exceeding the commonly recommended maximum weight of 25% of the person's body weight, especially for smaller Scouts. Slogging up a hill under a 50 pound pack just isn't fun no matter who you are.

Scouting is meant to develop character and shape boys into fine young men, not set them up for discouragement. Expecting a younger Scout to carry even a 30 pound pack and keep pace with older Scouts is not realistic. The Scout motto of "Be Prepared" is often misinterpreted to "Be Equipped" rather than to be in a state of readiness in mind and body to do your duty. This misconception normally translates into multiple changes of clothing (for different weather conditions even), excessive cooking and first aids kits, and a host of the infamous "miscellaneous" or "just in case" items no Scout could live without (or so he thinks.)

What is missing seems to be our most important piece of equipment – our minds. Common sense should tell us this can be done simpler and better. If we're doing our jobs as adults, Scouts should be able to not only survive but also thrive in the wilderness with likely half the weight they might otherwise have carried. When done properly, lightweight backpacking is safer and more fun for all. This paper addresses some of the gear choices and skills to accomplish this.



Be Prepared?

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Introduction

This paper is largely aimed at Scouters that have never backpacked (the author started at 42) or those that grew up backpacking in the 1980s or earlier. This is because stereotypical backpacking loads back then were quite heavy on average, and you most likely have stuck with what you know. Sadly, that hasn't changed for some, hitting the trail at Philmont with as much as 77-pound packs.¹ Or maybe all you know is car camping so you try to translate that into backpacking, which will not work well for you or your Scouts. Perhaps that 77-pound pack contained a dutch oven and cast iron skillet? While some were wise enough to go as light as possible, the technology that started the noticeable decrease in gear and clothing weights didn't start arriving until the early 1980s and wasn't making a whole lot of headway in the marketplace until the 1990s.

Technology has continued to improve immensely so that today it is within easy reach of anyone to go lightweight, which is a base weight (defined in Chapter 1) of less than 20 pounds, without having to spend a great deal of money. This makes it realistic for younger and smaller Scouts to participate, and all Scouts will have a safer and more enjoyable time by not stressing out their growing bodies under packs that are too heavy and allowing them to travel farther and into more remote areas than they otherwise could have. It has also allowed older Scouters or those with physical limitations to return to a hobby they enjoyed but had to drop because they could no longer carry the heavy loads they once did.

You can enjoy a lightweight pack without:

- spending large amounts of money
- eating roots, berries, plants or nasty freeze-dried meals (unless you want)
- learning a bunch of bushcrafting skills (though that could be fun!)
- freezing or getting soaked

This paper is written for you, the Scouter, with information you should communicate to your Scouts. As such it focuses on thrifty options wherever possible, and what is discussed applies to all regardless of age or size, except where noted. The paper also applies to those outside of Scouting, of course, but it is possible to reduce weight even further by using items that do not meet BSA guidelines and methods, which this paper does not discuss, or spending more for the higher-end products. However, in the interest of brevity this paper makes two big assumptions. **It assumes the backpacking will be done within a day's drive of central Indiana and not during below-freezing weather.** Contact the author for information on backpacking outside of these parameters.

A final note that should be stressed just in case you miss it in Chapter 1. You must use your head and you must know your gear and how to use it properly. You cannot simply give a Scout a backpack full of gear and expect him to have a great time. You, the Scouter, need to instruct him on its use and ensure he understands what his gear can and cannot do. There is less margin for error when going lightweight because you don't have spares of everything, but there's no reason your Scout should be at any more risk if he – and you – both use your heads. This is a great opportunity to reinforce your troop's youth leadership using the EDGE training method.

¹ Prosser, Doug (June 23, 2009). Philmont Scout Ranch: How Light Can You Go? *BackpackingLight.com*. Retrieved July, 2009, from <http://www.backpackinglight.com/cgi-bin/backpackinglight/philmont.html>

Chapter 1: The Principles of Going Light

It may surprise you to learn that going light is nothing new to Scouting. *Boys' Life* ran a series of articles from September, 1949, through May, 1950, detailing how a Scout could make all the lightweight gear he would need for the 1950 National Jamboree and his subsequent adventures. You can find these issues on Google Books. Today, the *Philmont 2011 Guidebook to Adventure* states, "Backpacking requires proper equipment just as any outdoor sport.... Take only what you *need*. After several overnight camps you should be able to conduct your own shakedown to *eliminate items* that you didn't need. Remember, the key to successful backpacking is to go *lightly*. Check your equipment against the recommended list.... This is the maximum. *All* backpackers can *reduce* this list and *still be comfortable, clean and safe*" (emphasis added).²

One of the most well-known pioneers outside of Scouting is Emma Gatewood, a mother of 11, who at age 67 thru-hiked the Appalachian Trail alone in 1955 and earned herself the nickname "Grandma Gatewood." She hiked the trail carrying no more than 20 pounds of gear and food and wearing Keds sneakers.³ While the equipment and clothing to do such a trek in greater comfort and safety has changed quite a bit since then in some areas, the principles behind doing so remain the same. These tenets allowed Ryan Jordan (an Eagle Scout) and two others to hike 1,000 *unsupported* km (600 miles) across the remotest part of Alaska in 2006.⁴ Andrew Skurka (another former Scout) took 176 days in 2010 to walk, ski and packraft a 4,680 mile route by himself in the Alaska-Yukon wilderness,⁵ which was featured in the March 2011 *National Geographic*. Such adventures would have been impossible with "traditional" gear and techniques.

Before getting into the principles though, let's cover why you should go light in the first place. That may seem like a rather obvious, common-sense choice, but if that were the case everyone would be doing it, right? It is better on your body both short-term and long-term, putting less strain on your muscles and joints. It is safer for you as you're less likely to experience strains and sprains, and less likely to trip, stumble, or lose your balance. Tired hikers make poorer decisions so they're more likely to get hurt. It's better for the environment because you're buying less stuff, your foot placement is more accurate, and footfalls are not as heavy. You also can go farther faster to get to infrequently used sites and take better advantage of your precious free time. You use less energy so the amount of food carried could be slightly less.⁶ It's also a great way for patrols to learn to work as a team. There are more reasons, but hopefully you get the idea that this really is a good thing to try.



Lightweight backpacking rests on several principles:

- 1) Know the weight of everything. The first thing recommended to someone new to this is an accurate scale. Don't use your bathroom scale. (Though it should be mentioned the area for

2 BSA (2011). *Philmont 2011 Guidebook to Adventure*. Cimarron, NM : Philmont Scout Ranch. 8.

3 Ed. Emblidge, David (1996). *The Appalachian Trail Reader*. New York : Oxford University Press. 215-223.

4 Jordan, Ryan (July 11, 2006). Arctic Traverse Completed - 1000 km - No Resupply. *Arctic1000.com*. Retrieved Jan, 2012, from <http://artic1000.com>

5 Skurka, Andrew (Sep, 2010). Alaska-Yukon Expedition. *AndrewSkurka.com*. Retrieved Sep, 2010, from <http://andrewskurka.com/adventures/alaska-yukon-expedition/>

6 Ladigin, Don (2005). *Lighten Up!* Helena, MT : Falcon Guides. x-xi.

biggest single improvement is your own body. Do yourself a favor and drop any excess pounds you can. Enough said!) You want a postal or kitchen scale capable of weighing grams or tenths of an ounce. There are many on Ebay or use a digital kitchen scale from Walmart.

Enter everything into a spreadsheet to create a gear list of what you have available. A great example of such a list is from Skurka's Alaska-Yukon trek⁷, which lets you see the categories or systems he used and how he changed his equipment with the seasons as well as his comments.

- 2) Focus on heavier items first. This is typically the “Big 3” - pack, shelter and sleeping bag – though your clothing as a whole may exceed any of those. Heavier items are where you'll reap the most potential savings. Buy the lightest you can afford.
- 3) Question everything. This type of activity is best done at the first troop meeting after a trek so the Scouts learn from one another. What did you take but *not* use? What do you really *need*? The best way to save weight is leave it at home! Can you find a smaller or simpler version? Can you use another item to perform the same function? That leads us to...
- 4) Select multiple-use gear. The lowly bandana is likely the best example of this⁸ – there are many different uses for one so that's potentially a lot of other items you don't need to bring. The corollary to this is don't bring that heavy multi-tool when you will never use all of its functions.
- 5) KISS or “Keep It Simple, Scouts!” A Scout is thrifty and simplicity could be thought of as fundamental to that. Taking less and simpler gear while making better use of your knowledge and skills (which weigh nothing) allow you to see more of the backcountry, but it's more than that. Lightweight backpacking is part of a lifestyle that can benefit you the rest of your life.

Backpacking in the wilderness involves risks no matter what gear you use, so while living your life in a simpler, thriftier manner is a good goal, you *must* use those weightless attributes, your knowledge and skills, to maximize your safety while backpacking, especially when going lighter. You need to understand your personal limits and the limits of your gear. You need to make sure you take your essential safety gear (see Chapter 7) on every hike, no matter how short. You need to make sure you know how to recognize and treat hypothermia, which can occur in summer, as well as other common injuries by using what you have or can easily find. You need to understand what you need to do if your clothing or sleeping bag should get wet. Better yet, you should know how to make sure your bag doesn't get wet in the first place (see Chapter 5)! Hopefully this brief warning will prevent you or your Scouts from endangering yourselves unnecessarily.

A corollary to knowledge and skills is planning. It's been said that fear is heavy. If you don't know the conditions and risks, your pack will quickly be filled with “just in case” items. You know you have planned well enough when those items are absent. What simpler way to save weight than leave it at home? Scouters should have a realistic risk management plan for any wilderness adventure, and every item you take must address at least one of those risks. When you experience an unplanned risk, you may need to abort your trek (you did plan emergency exit points, right?) if your knowledge, skills and gear you have cannot adequately cover the situation. Lightweight backpacking should help you reduce the risks because it forces you to think about all you're carrying, why you are carrying it, and how to use it in sometimes clever ways. At the same time, this gear weighs little so you'll have more fun on your trek. This should make it a duty for Scouters to implement for the benefit of both you and your Scouts.

7 Skurka, Andrew (Sep, 2010). Alaska-Yukon Expedition Gear List Final. *AndrewSkurka.com*. Retrieved Sep, 2010, from http://andrewskurka.com/wp-content/uploads/gearlists_alaska-yukon.pdf

8 Ladigin, Don (2005). *Lighten Up!* Helena, MT : Falcon Guides. 4-5.



Clearly the main objective of lightweight backpacking is to carry less weight without sacrificing safety or much comfort. Pack base weight is the measure usually used to determine how well you are doing in achieving this goal. As mentioned earlier, you are considered lightweight if your base weight is less than 20 pounds. Most people define this as all the items carried in your pack, including the pack itself, that do not change in weight over the course of your trip. Items that do change weight are known as consumables, which include food, water, fuel, sunscreen, bug juice, sanitizer, etc. though the author prefers to include only the first three items in this category. The reason base weight is the common

measure is because it should not change from trip to trip. The items you take on a quick overnighter are the same items you take for a week-long trek in the same season. You will also see references to “from skin out” (FSO) weight, which is *everything* you have from your skin out.⁹ This is not used much for comparison because it is dependent on trip length, weather conditions, terrain, etc. while the base weight for a person should not change.

There a couple good ways you can introduce lightweight backpacking in your troop.¹⁰ If you're starting with little to no lightweight gear, you're limited to Explaining – the first part of EDGE – and one of the best methods to encourage implementation is a competition. You could have prizes for lowest overall weight, percentage of weight lost over time, most precise weighing, etc. As Scouts find a new way to lose weight, have them teach the Troop. If you have a competition, make sure the base weight is accurately represented. Some people like to “cheat” and not include things in their pockets or around their neck in the base weight. All the gear they actually need (you can use the “required personal gear packed” from the suggested list in Appendix A) better be on their list (and in their pack) so you’re comparing apples to apples.

If you have at least one kit of lightweight gear (perhaps borrow or have a local outfitter loan any missing items), you can make up two backpacking kits identical in function, one with more traditional gear and one with more lightweight gear. Have the Scouts (and parents) put them on to compare. Then unpack the gear into parallel lines, comparing like items and Demonstrating the difference between them. Seeing (and feeling) the direct comparison is very eye-opening for Scouts and parents alike.

Even if you use one of these methods, experience shows that some Scouts may return items that were *removed* from their packs during shakedown hikes or pre-trek inspections. Do not let mothers pack for their sons either! If you want to ensure your troop as a whole doesn't suffer because of these Scouts not being able to maintain a consistent pace, you should consider keeping all packs under control from the last inspection time until departure time.

⁹ Clelland, Mike (2011). Ultralight Backpackin' Tips. Helena, MT : Falcon Guide. 5-6.

¹⁰ Kopisch, Manfred (5/3/11 & 1/10/12). Teaching UL to Scouts. *BackpackingLight.com*. Retrieved Jan 10, 2012 from http://www.backpackinglight.com/cgi-bin/backpackinglight/forums/thread_display.html?forum_thread_id=47108

Chapter 2: Footwear and Care

Your feet are your second most important asset (after your head) that you have while backpacking, and thus deserve the most attention. Simply put, if your feet are hurting or injured you are not going to enjoy your trek and may need to abort it. That said, you might be amazed to hear the recommended footwear is trail runners and light socks. “Are you out of your mind?!?” you say. “What about blisters? What about ankle support?” We’ll address both those and more shortly.

Let’s take a look at simple physics first. For example, a typical pair of mid-height leather hiking boots weigh 60 ounces while a typical pair of trail runners weighs 20 ounces. That means for each step taken, an additional 20 ounces must be lifted by the body (legs) and moved forward. Considering that an average person takes 2000 steps in a mile, *over a ton* of extra weight must be lifted. Yes, it’s not quite this simple since it’s not a straight upward lift among other things, but it’s clear that your body must do far more work if you’re wearing traditional hiking boots. It’s been shown that having a pound on your feet is like having at least 5 pounds on your back!¹¹ That’s a steep price to pay for alleged ankle support.

That ankle support turns out to be a myth in reality because your ankles become weaker since the boot restricts the natural mobility that your muscles and ligaments are supposed to provide.¹² Any boot stiff enough or laced tight enough to provide ankle support is too stiff for comfortably walking. The wearer is more likely to stumble and hurt himself if he were to encounter a loose rock on the trail since his ankle isn’t able to move to recover as it should. This is compounded by your legs tiring quicker from the extra weight so foot placement becomes more careless and heavy.

Another issue with boots is water. Tradition says that wet feet causes blisters (though fit is the bigger cause). While you can just walk through creek crossings in trail runners, doing so in leather or Goretex-lined boots would not be a wise choice as they will not dry out like trail runners do. Even just the sweat your feet normally generate can be an issue in these boots. You want footwear that drains and breathes very well so look for lots of mesh on the sides and not much absorbent material like open cell foam in the uppers.¹³ If you hike a lot on dusty or sandy trails you may also want to invest in some lightweight gaiters (such as Dirty Girl Gaiters) to help keep out debris.

Good fit is critical for not getting blisters. Make sure you get larger than your normal size because your feet will expand when hiking many miles and you do not want them to start rubbing the inside of the shoe. Since everyone’s feet are different and every shoe is made from a different last (template), the model that works great for your buddy may be terrible for you so you need to try on as many models as possible to make sure you can’t detect any obvious issues. Unfortunately, some may not become noticeable until your first hike. Once you do find a brand that seems to work well for you, you may want to buy an extra pair if possible as companies seem



11 Legg, S J & Mahanty, A (1986). Energy cost of backpacking in heavy boots. *Ergonomics*, 29(3), 433-438.

12 Gillman, Steve (Feb 16, 2011). You Need Hiking Boots for Backpacking? *99Lies.com*. Retrieved Jan, 2012, from <http://www.99lies.com/hiking-boots.html>

13 Jordan, Ryan Ed. (2005). *Lightweight Backpacking and Camping*. Bozeman, MT : Beartooth Mountain Press. 37.

to replace or change models very quickly.¹⁴ For Scouts with rapidly growing feet, stick with cheap running or trail shoes with lots of mesh. They likely won't last more than a season, but you'll be buying another larger pair soon enough. The author used cheap running shoes from Walmart for his first major trek of 100 miles on mostly decent trails. Once foot growth has slowed down you can look at some of the nicer brands.

Try not to go for *too* light a shoe at the start, especially if your FSO weight is above 30 pounds. There has been quite a lot happening in the minimalist shoe movement in recent years with various sandals, racing flats and rubber foot covers (e.g., Vibram Five Fingers) becoming more popular with backpackers. Unless you've been working your feet up to such footwear, stay away from these for now. Look for a decent sole plate and full toe protection to protect against rocky trails. Indeed, if you've been "pampering" your feet with cushy shoes or boots, you may want to start with some mid-height boots with lots of mesh or add trekking poles to aid support and balance. It's almost guaranteed your feet and ankles won't be happy at the start of this transition because they haven't been used like they were supposed to be for a while. You should strengthen them over the course of shorter hikes before heading out on a week-long trek. Note that everyday walking won't really strengthen your ankles. You need to train on uneven ground.

"Camp shoes" are not necessary. If your shoes aren't comfortable at the end of the day, you need different hiking shoes, not a second pair for camp. Simply loosen the laces once you're at camp. Some people actually prefer to hike with loose laces.¹⁵

There may be reasons you should stick with boots. The most obvious is if you have known foot or ankle problems that you need the added protection. The second would be if you are significantly overweight or carrying a heavy load. The third would be for winter use, which is outside the parameters of this paper, though you can still use trail runners with waterproof socks.

Socks choice is largely personal, but stay away from any cotton. Synthetics will likely stink more and wool or wool blend socks may not dry quick but feel warmer and not as clammy, so test a few types to see what makes your feet happy. Thicker socks take longer to dry, of course. A decent sock to consider if you don't mind looking like a dork is the standard men's black (nylon mostly) dress sock. Hopefully you're not on the trail to look good but to have a good time. It should be stressed you need good fitting socks, too. Friction is the biggest cause of blisters so having sock (or shoe) seams or excess material in a bad place will result in unhappy feet. Socks should fit snugly, but not so tight as to restrict circulation. Unfortunately, dress socks normally come in just two men's sizes, but you could also check youth or women's sizes to get a better fit. Socks made for running and hiking normally come in sizes XS to XL.

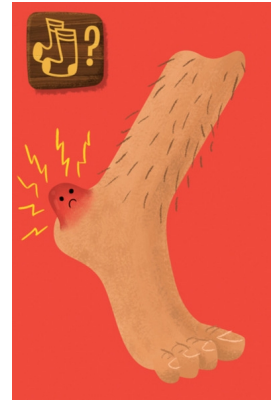
You will need two or three pairs of socks. One pair is only for sleeping if the nighttime temperature will be cool enough for you to need them. This pair is also usually thicker since many people don't like cold feet at night. Whether you take one or two pairs for hiking is largely dependent on what fabric they are made from and how much they stink after a couple days. Some people like to rotate pairs each day. While wearing one pair they wash the other and hang on their pack to dry. Others prefer to just wear the same pair for the whole trek, perhaps rinsing once stopped for the day.

14 Jordan, Ryan Ed. (2005). *Lightweight Backpacking and Camping*. Bozeman, MT : Beartooth Mountain Press. 44.

15 Clelland, Mike (2011). *Ultralight Backpackin' Tips*. Helena, MT : Falcon Guide. 56.

A good way to wash socks (and other lightweight clothing) is to add a couple drops of concentrated biodegradable soap such as Campsuds or Sea to Summit Wilderness Wash to some water in a gallon ziploc. Agitate for a short while and dump the water away from any water source. Add more water for a rinse cycle, dump and hang them up or put them back on to dry.

Caring for your feet on the trail is crucial. As much as you may not want to do so, stopping at the first sign of a hot spot is wisest because it will turn into a blister and cause you to slow down (and not have as much fun) the remainder of your trip. Get out a little bit of duct tape or a Band-Aid and cover the spot. If you know you often get blisters in particular areas, it may be smart to cover them before you start, but it would be smarter to try different shoes or socks that fit better. Pay particular attention after sandy creek crossings as small pebbles or coarse sand may have entered the shoe (even with gaiters) and provide extra friction. Until you're familiar with how your feet react to new shoes or socks, it would be a good idea to inspect your feet at every break. As a Scouter, you should require your troop to inspect their feet frequently the first couple days of a trek. This has the added advantage of dumping out any debris that may have entered or speeding the drying process by wringing out your socks. If you know your feet sometimes suffer from blisters, maceration or that you will be doing a lot of creek crossings during your trek, add some Bodyglide Liquified Powder to your gear list and apply as directed. **Always clean your feet and let them dry out at night!**



Chapter 3: Clothing

The lightweight backpacker will typically have four layers of clothing – a base layer, an insulating layer, a wind shell and an outer shell (rain wear in our case). The layers are chosen to deal with the *worst* environmental conditions one might experience during the trek, but they must also be fairly comfortable during the *best* conditions as well. That was a tall order for just four layers of garments just a couple decades ago but can be achieved fairly readily and without great expense today. These layers can also be used as part of the sleep system to save weight, but it's recommended for Scouts to have separate sleep clothes. This will be discussed more in Chapter 5.

The base layer is meant to control moisture, wicking it away from your body to facilitate drying, while providing some sun and abrasion protection. Base layers are typically made from either merino wool or polyester and form fit your body. While wool has the advantage in some areas, polyester is recommended for Scouts since it is significantly cheaper and more robust. It also happens to be lighter for the equivalent warmth. You should look for garments that have a textured interior that will allow for more dead air space (i.e., insulation) next to skin but smooth exterior so that other garments will easily layer over them.

The insulation layer provides warmth, of course, while still managing any moisture. For Scouts this is either a light fleece or a looser fitting but thicker base layer. You would normally only wear this layer around camp or during breaks in colder temps as you would likely overheat while hiking.

The wind shell layer is normally a very light, tightly woven nylon that breathes very well. It allows great flexibility because it cuts down the convective heat loss due to wind and slows evaporative cooling, thus retaining precious warmth when it's windy or you stop hiking in cooler weather. The added plus is that a wind shell also provides sun and bug protection so you would need to take little or no sunscreen or repellent if you wear this as your main layer.¹⁶

Rain wear is another simple choice – a rain suit made out of propore material such as DriDucks. It is lightweight and low cost. The downside is they are more fragile and may get ripped or torn if you do off-trail bushwhacking, for example, but can be patched with duct tape. They can also double as a poor man's wind layer though they don't breathe as well. The other option is a heavier and more durable jacket and there are tons of options. Ponchos aren't recommended except for the possible use as rain wear/shelter in The 10 Essentials (i.e., emergency use).

For the parameters of this paper there is an alternative to the typical four layers discussed above. In this case the base and insulation layers are combined so you only have three layers. Depending on the low temperature you expect, you may choose a thicker base layer than you would have otherwise. This is the author's preferred setup. While his pants and shirt are not considered as a true wind shell, they are very light (4-5 oz each), tightly woven nylon and function similarly. When he gets chilled, rather than adding his base layer under the wind shell, he will don his DriDucks to act as a *second* wind shell. This allows him to be comfortable down to 40 degrees F unless he's not moving in camp and it's really windy. The hiking pants and hiking shirt in the suggested gear list are meant to fill this role.

¹⁶ Jones, Don F. Jr. (2011). Wind Shells as an Essential Part of a Layering System. *High Country Explorations*. Retrieved Jan, 2012, from http://highcountryexplorations.com/Wind_Shell_Layering.html

Hopefully, you've seen the importance of layering and selecting the right layers. You should never take a piece of clothing that cannot be worn with the other layers. For example, your outer layers may need to be a size larger than normal to fit all your other layers underneath. The corollary is that you should also never have more clothing than you can wear at any one time with the possible exception of an extra pair of underwear and socks. Let's finish by looking at a few small yet important clothing items. The first is underwear, which is pretty simple. You want to stick with synthetics that form fit. Most men find that boxer briefs work the best to prevent chafing. If you choose something like biking or compression shorts, you may want to consider a size larger than normal so they are not too snug.

The second item is hats. Carry two of them. One is for sun and rain protection so it is typically nylon-based and has a wide brim. If a Scout chooses to use a simple ball cap, it won't protect his ears or neck, so make sure he uses his trusty bandana as a drape. A Scout could get by with a cotton boonie hat, though it's twice the weight when dry and will leak more and be much heavier when wet. It can be nice during summer hikes to soak in a stream to provide some cooling. The other hat is for the opposite reason – to provide warmth on cool nights. Humans can lose a lot of heat through their heads¹⁷, and you will feel colder if your head is cold. A simple fleece, wool or PowerStretch watch cap or beanie is all that is needed for above freezing. If your base/insulation layer has a hood, you can skip the beanie. Another related item is gloves. Again, just simple fleece, wool or PowerStretch gloves are all you need.

While maybe not clothing per se, the last item is a headnet. Depending on the season, bugs can make your trek miserable. If you're wearing a wind shell layer, your head and hands are the only exposed skin remaining for bugs to enjoy. A head net and your wide-brimmed hat keeps them off of your face. You can treat your clothing with a permethrin spray from Sawyer to further keep ticks and skeeters at bay. Headnets can also be used to filter floaties out of water if you fold them over several times.¹⁸



17 Author unknown (Feb 14, 2007). Heat Loss Through the Head and Hypothermia. *Wilderness Medicine Newsletter*. Retrieved Dec 10, 2011, from <http://wildernessmedicinewordpress.com/2007/02/14/heat-loss-through-the-head-and-hypothermia/>.

18 Clelland, Mike (2011). *Ultralight Backpackin' Tips*. Helena, MT : Falcon Guide. 35.

Chapter 4: Shelters

There are two main choices when it comes to the size of the shelters you will use. If your troop takes the patrol method seriously, you would try to keep each patrol in its own shelter. There are three major problems with this. It is really hard to find a suitable location to pitch a shelter with such a large footprint, let alone for all your patrols. The troop would need to own the shelters and there are really no suitable lightweight shelters currently produced that could adequately hold up to eight Scouts. The compromise then is having two shelters per patrol (unless it's a small one already). It's more likely you will find more decent smaller sites and there are several light shelters that can fit 4-5 Scouts.

For larger shelters, pyramid tarps are the lightest way to go. They are simple to erect, handle wind and storms well, and have lots of space (though near the perimeter the space is suitable only for excess gear).



The biggest downside might be ingress/egress during a storm – make sure no one sleeps by the door. Silicone-impregnated nylon (silnylon) is recommended for its light weight – an 11'x11' pyramid tarp is only 2.5 pounds. Many of these synthetic fabrics stretch when they get moist so to prevent from having to re-tension the tarp once or twice after setup, attach loops of thin but heavy duty shockcord to the tieout points. Then pitch it with the shockcord stretched about 80-90% of its maximum so the fabric remains taut all night and the tieout connections have some

“give” during gusts to provide a longer service life. To support the peak, you would normally either strap 2 trekking poles together or buy an aluminum pole. You could also tie the peak up from an overhead branch (not recommended in stormy weather).

The other size used a lot is smaller shelters that hold 2-3 Scouts, what might be called the “buddy method.” Plenty of lightweight options are available in this size category and the Scouts are more likely to be able to purchase a shelter this size. The simplest and lightest is the flat tarp, though it takes practice to learn to use. Scouts could have a great time in learning to use such a shelter, and it's highly recommended they practice before taking it into the wild, especially in the rain. There are a number of different pitches that can be done so they can be quite creative from one night to the next on how they set it up, depending on the weather, of course. A nice set of videos was done by Steve Evans and Episode #9 shows three basic pitches (for a small solo tarp).¹⁹ The minimum size in our case should be 8'x10' and a maximum size would be 10'x12', which could easily fit three Scouts in decent weather. These also make nice dining canopies.



Of course, all pitches will require at least one tree, stick or trekking pole for support so if you're not camping in dense forest, you'll need to take a trekking pole or two. A good way to try out a flat tarp is using a generic reinforced polyethylene tarp though they are quite heavy. A very light tarp of less than 12 ounces could be made from taping together two non-mylar 5'x9' space blankets that you reinforce with clear duct tape (3M 2120), which is more UV resistant, to prevent it from stretching to give a 9'x10' flat tarp (you make the tieouts with duct tape also and be

¹⁹ Evans, Steve (Nov, 2010). Ultralight Backpacking Videos. *Suluk 46*. Retrieved March, 2011, from <http://suluk46.com/videos.html>

sure to use shockcord loops). This is what the author uses, and made a short video describing it.²⁰ If you go this route, inexpensive guylines can be made from mason's line or catfish dropline. Braided is preferred so it doesn't unravel unless you tie in permanent knots or stake loops.

The main drawbacks to tarps are no bug protection and no floor. Bugs shouldn't be an issue if you're wearing the wind shell layer and headnet. Once you're in your bag for the night, you just need the headnet. If you're in a seriously buggy area like the Boundary Waters, you could opt for a bug bivy like that from Adventure 16 or a fully enclosed shelter to keep your sanity. Not having a floor is really an advantage since you never have to worry about wearing it out or getting it dirty. Only the area being used for sleeping gear would have groundcloths so you can wear your wet and dirty shoes into the shelter. The only time having no floor may be a liability is during heavy rain on a hard site where water might run under your shelter. Since it doesn't matter if some of your gear gets wet, focus on what needs to remain dry and either keep it in your lined pack (see Chapter 9) or make sure the uphill edge of your ground cloth is tucked under itself, which is good practice anyway, so the water is directed underneath it. Then your bag and anything you put in or on it will be off the wet ground.

Some Scouts might be freaked out being out in the open in a tarp and may prefer a normal double-wall tent, which is a tent with a large rainfly covering most of it. One reason for the traditional heavy packs is that people tend to pack for their fears so do your best to encourage these Scouts to overcome this. If you can't, your best bet for heavy tents that can stand abuse will be from Alps Mountaineering (ScoutDirect.com), but a solid lightweight 2-man single-wall tent like the Black Diamond Betamid (right) will set you back about \$80 on sale for just half the weight (36 oz). You may also be lucky enough to have Scouts at the other extreme that want to cowboy camp with nothing between them and the stars. They would still need to carry a shelter, of course, but there's no reason to put it up in good weather though a bivy sack may be a good option if heavy dew is expected.



The best all-around stake for Scouts is the aluminum Y or V stake. It's very rare to bend one, they hold much better than skewers or nails in soft soil, and can take being beaten into hard or rocky soil. They may be a bit more expensive (at \$1-2 each) than generic steel shepherd's hooks or plastic "T" or "Y" stakes, but they're just as light and take a lot more abuse. Get ones at least 6" long. On minor tieouts (not corners or poles) you can get by with cheaper stakes if you want.

One characteristic of lightweight shelters is that they have more condensation than a typical double-wall tent. The reason is simple thermodynamics. Warmer, moist air under the shelter rises and meets the cooler shelter material and condenses on it. Double-wall shelters don't have this issue as bad since the rainfly keeps the inner layer warmer so the moisture condenses on the fly instead. This is a concern only because you could get water on your insulation if you touch the shelter wall or ceiling. You should simply wipe down the shelter as needed with your bandana in the morning. Condensation can be reduced by having decent ventilation (which most tarps will have), not keeping wet items inside, using a groundcloth and not being close to water sources or low-lying areas.²¹

20 Ray, Michael (Aug 16, 2010). MYOG low-density polyethylene (LDPE) tarptent - Part 2. *topshotrhit's Youtube Channel*. Retrieved Aug 16, 2010, from <http://www.youtube.com/watch?v=PrhEUJcCZgk>

21 Rietveld, Will. (June 20, 2007). Condensation in Single-walled Shelters: Contributing Factors and Tips for Reduction. *BackpackingLight.com*. Retrieved June, 2009, from <http://www.backpackinglight.com/cgi->

Chapter 5: Sleeping Systems

There are 6 components of a lightweight backpacker's sleeping system.

1. **Groundcloth.** This is what keeps your important gear off the wet and dirty ground if you are using a tarp or floorless tent. Most Scouts would likely use a generic blue polyethylene tarp, but even at a small size those are very heavy relative to other options, the best of which is polycro. This is the fancy name for the window shrink wrap film used in the winter that you can find at Lowe's or even Walmart. Find such a kit that you can cut pieces at least 3'x6' in size. You'll likely be shocked at how thin and flimsy it feels, but it's remarkably strong and should last at least a season with care. Of course, if you use a tent with a floor, you don't need a groundcloth, but the tent will be much heavier.
2. **Pad.** This provides comfort and warmth from the ground. Like housing insulation, pads are rated by their R-value. For our parameters of above freezing with extra clothing layers available if needed, the \$6 blue closed-cell foam (CCF) pad at Walmart with an R-value of ~1.5 (for 1/2" thickness) is a decent choice. The Thermarest Z Lite or Ridge Rest offer a bit more insulation and comfort for 4-5 times the cost. Older Scouters, especially side sleepers, may want to invest in an inflatable pad, and the author recommends NeoAir models though there are several cheaper and/or heavier alternatives. Make sure you clear your sleep site carefully to prevent punctures. To save weight and space, cut down the CCF pad to 48-60" or get a shorter version of an inflatable and then use your pack as insulation under your lower legs and feet.
3. **Sleeping bag.** Scouts want a tapered bag known as a mummy. A traditional rectangle bag uses more materials so it's heavier and has extra space inside that also needs to be warmed for no reason. Down is by far the best high-lofting insulating material for the weight. Yes, it's typically more expensive, especially in higher fill powers (800-900+), but it will last much longer than synthetic insulation, which loses about 30% of its loft (insulating ability) fairly quickly²². To save money stick to down bags in the 600-750 fill power range as some can be found on sale for \$80-120 normally. You'll sacrifice some of the weight advantage, but it will remain far more compressible and retain its loft better than even the best synthetics. Yes, down also loses its insulating power when wet, but there's no reason for the bag to get wet. It should only be removed from its waterproof enclosure inside the pack once the Scout has the shelter pitched properly. If the Scout is prone to spills and accidents, it may be wise to go for synthetic insulation though even mere mortals can clean a down bag properly.²³ The better synthetics are Primaloft, Polarguard 3D or Delta and Climashield. Any other type of synthetic bag will almost certainly be bulkier and tip the scales over 3 pounds. Expect to pay at least \$70 for a decent synthetic bag on sale.

Backpacking quilts are a lighter alternative because they only provide insulation on top of you, eliminating the mostly pointless bottom layer of a bag. High-lofting insulation needs to loft in order to work obviously, which can't happen when compressed by your body weight. Insulating your bottom is the job of your pad. Bags do help with drafts, but that's not much concern above

bin/backpackinglight/single_wall_shelters_condensation_factors_tips.html (membership required)

22 Nisley, Richard (May 7, 2008). Insulation / Loft Loss. *BackpackingLight.com*. Retrieved August, 2011, from http://www.backpackinglight.com/cgi-bin/backpackinglight/xdpy/forum_thread/13464/index.html?skip_to_post=99266#99266

23 Author and date unknown. Care and Storage of Your Down Sleeping Bag. *Western Mountaineering*. Retrieved Jan, 2012, from <http://www.westernmountaineering.com/index.cfm?section=Product%20Tips%20and%20Care>

freezing unless it's very windy. Unfortunately, economies of scale push these out of a Scout's budget (unless you find a GoLite one on sale!) so you'd need to make your own gear (MYOG), which is actually pretty simple if you have basic sewing skills and \$60-80 for materials. There are several online resources giving construction details.²⁴

Manufacturer's temperature ratings vary widely on their accuracy because there is no standard in the US, but a bag rated by the European EN13537 standard will be more trustworthy – just make sure you're looking at the “lower limit” rating versus the “extreme” one. An accurately rated 40 degree F *down* bag is all that is needed – but choose a 30 degree F rating for *synthetic* bags to compensate for the loft degradation that will likely make it a 40 degree bag over time. On nights colder than that, you would simply wear more of your normal clothing layers. This way, you don't have to carry the extra weight and bulk of a lower rated bag all the time when you would rarely need it. You don't want to get a bag that is too snug since you don't want your clothing or bag insulation to be compressed as it needs room to fully loft. You should also consider more room if you toss and turn a lot. You can use a bag like a quilt, too, making it easier to vent yourself if it's fairly warm. Simply zip it down past your hips and orient the bag so the zipper is facing the ground. The author has used his 20 degree F down bag very comfortably in temps from -2 F (with significant clothing and pads) to 70 F.

Never store your sleeping bag (or any other high-lofting insulation for that matter) in a compression sack or you risk loft degradation. If you do keep your bag in a compression sack during your trek, don't tighten way down on it and take the bag out of it as soon as your shelter is secure each evening and when you return home. Store it hung up in a closet or lay it out under your bed where it can thoroughly loft and dry.

4. **Pillow.** Lightweight backpackers will use all manner of items for a pillow - shoes, pack, hiking clothes or rain wear in a stuff sack, water bottles, and even ziploc bags. See what gear you aren't using and experiment! Of course, you can go for a basic inflatable pillow for not too much weight. Some have used infant “water wings” for this.
5. **Clothing.** As mentioned earlier in Chapter 3, it's recommended that Scouts have separate sleep clothes. These sleep clothes will simply be a second base layer, but you may choose to get a thicker version since your body produces less heat while sleeping. These won't have food odors and will keep dirty and/or wet clothing from messing up the inside of your bag. You get to sleep in dry clothes each night and keep your bag in better shape so you don't have to clean it as often. Even if your normal hiking clothes *feel* dry, they have moisture from your body in them. Any moisture against your skin will result in evaporative cooling, robbing your body of heat. If you did have to wear your non-sleeping clothing over your sleep clothes on a colder night, the moisture would not be against your skin so you could still sleep comfortably.
6. **Shelter.** These have already been discussed in the previous chapter. They are considered part of the sleep system by many because they can retain warmth (yes, even a tarp) and block wind. Some tarp users will have a layer before this called a bivy sack. It's meant to further protect from bugs, wind or rain splashing under the edge of the tarp. The latter issues aren't much concern if the tarp is large enough and the windward side is pitched to the ground. If for some reason you were getting splash near the foot of your bag, you could pull your pack or DriDucks jacket over it. Do *not* pull a trash bag or anything else that doesn't breathe over your bag as it will trap your body's moisture inside and wet your insulation.

²⁴ Muthig, Chris (Nov 15, 2011). Sin50 Quilt. *Kringlelight*. Retrieved Nov 17, 2011, from <http://kringlelight.wordpress.com/2011/11/15/sin50/>

Chapter 6: Kitchen, Food and Water

There are two main schools of thought on kitchen gear, and while the “buddy method” is more popular with shelters, the patrol method often wins out in the area of food preparation. This is even more so since 2010 when the Guide to Safe Scouting prohibited homemade alcohol stoves and listed alcohol as a “not recommended” fuel. While you can still use a commercial alcohol stove (e.g., Trangia) for now, it’s clear the BSA prefers you don’t. Solid fuel tablets like Esbit are a good choice with 1-2 man kitchen kits, and there are several advantages to such kits such as being lighter and cheaper overall. The “stove” is just a platform to hold the fuel tablet and to support the pot, which is sometimes a grease pot from Walmart or even a large beer can.²⁵ The author prefers this type of kit, but will focus on group cooking.



For patrol or troop cooking, the favorite fuel of Scouts – wood – is a popular choice, but there will be times when you either can't or don't want to use it such as insufficient downed wood supply, a fire ban, inclement weather or you simply don't want to wait to eat! Make sure you follow Leave No Trace guidelines for your fires.



Your last option is a typical backpacking stove. There are two main fuel choices, white gas or isobutane/propane canisters. It’s the author’s opinion that canister stoves would be safer for Scouts and easier to maintain than white gas stoves. They don’t flare up and there’s no pumping or priming to do. You simply light your match and turn the valve on. The downsides to canisters are it's not easy to know how much burn time you have remaining while on the trail, the canisters are normally heavier than a fuel bottle and you cannot take only the fuel you need for a trip.



Canister stoves come in two styles. On an upright stove, the stove screws directly onto the top of the canister. On a remote stove (left), a short length of fuel line connects the canister to the stove. While heavier and more expensive in general, the remote style is recommended for Scouts because using the patrol method of cooking requires the use of larger pots so the much lower center of gravity and wider base of support reduce the chance of tipping. The added benefit is you don’t have to worry about overheating the canister, which would be very bad and can happen with an upright if a heat reflector is not used.

While you can cook in any fashion you want while car camping, when out in the backcountry you want to minimize the overall weight, the amount of water used, the amount of cleanup, and the amount of trash. This leads nearly all lightweight backpackers toward just re-hydrating freeze-dried or dehydrated meals so “cooking” simply becomes boiling water. It further leads many to what is called freezer bag cooking so there’s very little to clean afterward. You just pour the hot water into either the freezer bag with a cozy or an insulated bowl to “cook” the meal.

A cozy or bowl is a simple project either way you choose to go. If you wish to eat direct from freezer

²⁵ Jordan, Ryan (Apr 6, 2010). Troop 676 Cookset. *Bigskyry's Youtube Channel*. Retrieved Jan, 2012, from <http://www.youtube.com/watch?v=h03IeDxnwDE>

bags, get a Tyvek mailing envelope large enough to hold a full quart ziploc and line the inside with thin bubble wrap or CCF high enough to cover the ziploc. If you wish to eat from a more traditional bowl, wrap a 16-20 fl oz butter tub and lid with Relectix or thin CCF. Once water is added, either put your bowl lid on or seal the ziploc while trying to remove excess air, slip it into the cozy and fold it over to trap in the heat. Gently massage or shake your cozy or bowl every now and then to mix the ingredients until the cook time has elapsed. If it's a freezer bag, you eat straight from the bag with a long handled spoon (an iced tea spoon works well) so only spoons need to be cleaned, which can be dipped into the boiling water at the next meal. Most Scouts really appreciate that!

To accommodate the water you'll need a couple thin aluminum pots per patrol. Knowing that the most any meal would require is 2 cups of water per person, the maximum an 8-person patrol should need is 4 quarts. It's recommended then to have a 2-2.5 quart pot in each kit. Since each patrol will have two kits, there will be a backup stove should one fail. If your patrol is larger, go for two 3-4 quart pots (or three kits). When it comes time to pour you'll also need a mug marked as a measuring cup to scoop out the needed water for each bag (don't set it on the ground until everyone is served).



Windscreens are very important also or you will waste a lot of fuel. As the name suggests, they help prevent convective heat loss from the wind. They also direct some heat up along the pot walls before being lost. Thus, they should be as tall as practical, normally whatever will fit along the inside edge of the pot. They are typically cut from aluminum foil turkey pan bottoms, but if the pot circumference is too large you could also use light aluminum flashing that you can purchase in rolls from hardware stores. A related but not so obvious item is a heat reflector of the same material, upon which you will place the stove (or above the canister if an upright). This will reflect the heat back up to the pot and protect the ground from scorching (or the canister from overheating if using an upright stove). Of course, you also want to use lids when heating your water to save fuel so if your pots did not come with those, modify some pie pans to fit.

Aside from the measuring cup, a couple other items you'd have with each patrol's kitchen kits are small containers of hand sanitizer and soap. This is to reinforce hygiene, which can be an issue with young men. Sanitizer can be used if there's no visible dirt, otherwise they should use a couple drops of soap. Finally, the kits will have fire-starting gear. This is typically some combination of a lighter, matches, firesteel or Spark-Lite for ignition and solid fuel like WetFire, Tinder-Quik or Esbit tablets that can be used as tinder in rain or emergencies. You would keep these items in a ziploc. The whole kit would fit inside the pot, which would then be put into a light stuff sack to protect your other gear from the soot of wood or Esbit fires.

Discussing food could take up an entire paper so to KISS here are some very basic guidelines. While your Scouts can survive on anything for a few days, you still want to try to retain somewhat nutritious meals. This is opposed to what you would normally eat since you are striving to get the most calories per ounce, which means foods high in fat like nuts and hard cheese, but some surprisingly good meals are easy and cheap to do. In general, stay away from the freeze-dried backpacker meals (such as Mountain House) as they are not inexpensive. It's much more cost effective (and fun) to make your own meals, although you are faced with limited choices for a base ingredient if you don't have access to a dehydrator. Foods that render themselves ideal for freezer bag cooking that don't require dehydration are ramen, instant potatoes, minute rice, oatmeal and couscous (a grainy pasta often found

near the rice). You can find lots of simple recipe ideas to modify at www.trailcooking.com. Look under Recipes and then Freezer Bag Cooking and start experimenting!

The common guideline is to have 1.4 pounds per day (PPD).²⁶ Note that this assumes nearly all DRY goods and that you've repackaged for individual portions where practical. For some Scouts you may need to go as high as 2 PPD. The author only uses about 1.2 PPD for a week-long trek. Breakfast is typically something like instant oatmeal, muesli with Nido milk powder (typically found with Mexican foods – use wherever milk is called for), Carnation breakfast drinks or that Scout favorite, Pop Tarts (though get some complex carbs, too!). You would want to snack frequently during the day so you have energy always available and the various energy bars, granola bars and GORP variations (with lots of dried fruit) are quite typical. Sometimes lunches are more of a longer snack break. Other times you might do a no-cook recipe from the site above. Dinners should include a good dose of protein (salami, packets of tuna, salmon, chicken, sardines, and so on) to help repair muscle tissue. When dealing with a full patrol, it may make more sense to purchase actual cans of meat and the ones with oil will give you some extra calories though bringing a small container of olive oil to add a tablespoon to each Scout's meal would be healthier. Going to bed with a meal high in fat and protein will help keep you warm all night as well.²⁷

Ideally you should hang your food and other smellables (toothpaste & brushes, sunscreen, etc) as soon as you get to your camping site. Bears are within the parameters of this paper, but raccoons and rodents will be your biggest food snatchers most often. It's recommended to store everything inside an odor-proof bag (the OPSAK is the only practical one available) which is inside a lightweight stuff sack. You can get about a week of food for *one* person within the 12"x20" OPSAK, which can fit within an 8 L sack if you repackage everything and pack it carefully. Follow the directions on how to seal it properly and make sure you have clean hands when touching it. It's best to pack the food in reverse order of the menu so what is planned to eat first is on top and you don't have to dump the bag at each meal. As your trek length extends, you'll find the food is pretty heavy to hang so you may only have two bags per rope to make it easier. There are certainly lighter options available like coated dacron or spectra ropes but 50 feet of 3/16-1/4" braided nylon rope should be sufficient per hang. Just make sure your rope isn't thin enough to cause damage to the branches, which could also leave your food stuck in the tree! If you are within bear habitat, *please* hang your food correctly. A fed bear is a dead bear, and no one but the humans that allowed their food to be eaten are to blame. Your bags must be at least 10 feet off the ground and 4 feet from any limbs or the trunk – think basketball hoop from its base. Tie off your line with a slippery knot or hitch high up on a neighboring tree.

You don't have to treat any water that you heat just to boiling for cooking other than straining out the floaties, but anything else should be treated. Typically, you would use chemicals to treat the water, and chlorine dioxide (such as Aqua Mira) is currently preferred. This comes in both liquid and tablet form, the latter being much easier but more expensive. Philmont supplies you with tablets (Katadyn Micropur Forte currently). You just drop in a tablet and you're ready to drink in 30 minutes to four hours, depending on water temperature, turbidity and what you are trying to guard against. The liquid form of Aqua Mira comes in two parts that you must pre-mix, wait 5 minutes and then add the appropriate amount into your containers. When dealing with large groups, it's best to pre-mix a larger amount to be

26 Clelland, Mike (Mar 1, 2011). Food Planning Using Pounds Per Person Per Day. *BackpackingLight.com*. Retrieved Mar, 2011, from http://www.backpackinglight.com/cgi-bin/backpackinglight/pounds_per_person_per_day_ppppd.html (membership required).

27 Beffort, Brian (2007). *Joy of Backpacking*. Birmingham, AL : Wilderness Press. 106.

used throughout the day into a third bottle.²⁸ You should not use any pre-mixed solution after 24 hours or if it's no longer yellowish in color.

Filters are not recommended in general for Scouts since chemicals are so much simpler and cannot fail in the field. You simply need to wait at least 30 minutes before drinking unless the water is very cold or dirty or you're worried about cryptosporidium. You might have a troop filter as a backup but would tend toward making a gravity filter system based on a Sawyer SP122 rather than using a pump filter.

A solution for quicker water use is UV treatment (such as SteriPEN Opti). It's not clear that would be the best for large groups though as it can only treat 0.5 or 1 liter at a time (taking 90 seconds per cycle), it needs to be used precisely for it to work correctly, and you have to have a container with a large mouth to fit the device (a heavy Nalgene, cook pot, cut-off bottle, etc.). Since it runs on batteries and is electronic you would certainly need a backup purification plan anyway.

As for water storage each Scout should have a couple 1 liter containers at his disposal. Simple water, soda or Gatorade bottles work great and are essentially free. You can be treating one bottle while drinking from the other. This works well for making sure your Scouts drink at least a liter every 4 hours, too! Platypus offers a wide array of lightweight collapsible containers, including 1 liter and larger. Bladders are not recommended because they are harder to fill, hard to get back into your full pack and you cannot see how much water the Scout has consumed. However, if you need greater water carrying capacity, you might get each patrol some 2 liter Platy bottles, that could be distributed to those not carrying the shelter or cook kits.

²⁸ Jordan, Ryan (May 22, 2011). Group Gear for Lightweight Wilderness Travel. *RyanJordan.com*. Retrieved May, 2011, from <http://ryanjordan.com/blog/2011/05/group-gear-for-lightweight-wilderness-travel>

Chapter 7: The 10 Essentials

The classic 10 Essentials list for outdoors survival was created in the 1930s by The Mountaineers club of Seattle. In 2003 it was updated into a more systems approach²⁹, something you see a lot of in lightweight backpacking, so that people *think* more about what they have rather than rely on specific gear. Many of the items on the list have already been discussed, but will be briefly summarized here for emphasis. The outdoor essentials list from the Twelfth Edition of *The Boy Scout Handbook* is covered in all these categories.

1. **Navigation.** For the lightweight backpacker this means the trusty old map and compass – a skill your Scouts should practice anyway. Be sure to use a topographic map that shows enough detail of the surface features that you can find your way. USGS 7.5 minute quads are the standard but there are alternatives available. If your map is not on weatherproof paper put it inside a gallon ziploc bag. Skip the button compass – choose one with a baseplate meant for topo maps. Ideally, each Scout should have his own so he can confirm the proposed route with the patrol's navigator. The Scouters should also have a map, compass, and perhaps a GPS.
2. **Sun protection.** You should wear long sleeves and long pants for sun (and bug and scratch) protection along with a wide-brimmed hat – but if you don't, carry a strong sunscreen. Repackage it into smaller bottles for either an individual or patrol. Don't forget your lips either. The author also uses chapstick as sunscreen for his hands. You also want sunglasses, especially in the conditions outside this paper (snow and high altitude).
3. **Insulation.** Always have some form of rain gear since getting wet can quickly lead to hypothermia. Your sleep clothes serve as extra insulation.
4. **Illumination.** LED headlamps are quite common today. You don't need a whole bunch of lumens even for night hiking so KISS. The author likes a headlamp with red LEDs to preserve night vision (and battery life). Rechargeable batteries are lighter and last longer than normal ones. Lithium ones are even lighter though they aren't as easy to find, cost more and some headlamps don't work well with them.
5. **First aid supplies.** Most pre-packaged kits are not suitable, adding extra items that you really don't need. Each Scout should have their own tiny kit in a ziploc, which contains several bandages in larger sizes, which can be cut down smaller, a couple gauze pads and a couple antiseptic wipes. Additionally, Scouts must carry any prescription medications, including epi-pen, a rescue inhaler, etc. The Scout should instruct the entire group on the location (perhaps having his kit in a red-colored bag) and use of such life-saving devices though it is the Scout's responsibility to dispense them if at all possible.

A Scouter would be carrying a troop kit in a freezer ziploc that might contain an irrigation syringe, a small tube of triple antibiotic ointment, Steri Strips, more bandages and antiseptic wipes, larger gauze pads, Tegaderm dressings, an Ace wrap bandage, nitrile gloves, tweezers (if not on multi-tool), Bodyglide Liquified Powder and a variety of pills – ibuprofen (for joint/muscle pain), acetaminophen (for fever/inflammation), diphenhydramine (an antihistamine), loperamide (for diarrhea) and bismuth subsalicylate (an antacid). For each kind of pill, carry about 20 in a smaller ziploc, but write down the physical description and expiration date of each on the bag. Only a Scouter should dispense OTC medications. Each

²⁹ Author unknown (2010). The New Ten Essentials – A Systems Approach. *The Mountaineers Books*. Retrieved Jan 3, 2012, from http://www.mountaineersbooks.org/client/client_pages/Media%20Archives/mtn_media_TenEssentials.cfm

Scout's medical and release forms should also be here. You could save space and weight by scanning them onto a thumb drive but keep an index card summarizing any known issues and medications of your Scouts. Of course, you can add in other items but remember in a true emergency you're just trying to stabilize the patient and get them out ASAP. You can handle pretty serious injuries, like gashes requiring 30 sutures, with very few first aid supplies if you know what you need to accomplish.³⁰ It's highly recommended that several in your unit attend a wilderness first aid (WFA) course. This is required now for groups going to Philmont. A good course will teach you how to manage emergency situations in a remote area and give you lots of hands-on practice. The Red Cross one does not offer much practice.

6. **Fire.** There are several good options and each has their merits so what you choose is largely personal preference. Weatherproof matches, mini Bic lighters and a firesteel are the most common fire-starting methods. Vaseline-soaked cotton balls make an easy target for a spark or there are several commercial fire starters available. Encourage your Scouts to practice fire making in the rain! Most lighters don't work when wet or below freezing.
7. **Repair kit and tools.** Each Scout should have a few feet of duct tape wrapped around a bottle or similar item. This also doubles as blister prevention and medical tape. Each Scout should have a *small* knife (such as a Swiss Army Classic or a keychain-size Leatherman). This "kit" might be stored with the first aid items.
A Scouter's troop kit should have a few safety pins, large sewing needles, dental floss or fishing line (for thread), a tube of super glue, spare parts for the stoves (if applicable), a couple cable ties, small multi-tool (with scissors and pliers) and perhaps 4 AA and AAA batteries.
8. **Nutrition.** You can survive weeks without food, but should always have at least a power bar or GORP in your pockets except while sleeping. Snack frequently while hiking to have a constant supply of energy without spiking your blood sugar.
9. **Hydration.** Know where reliable water sources are and plan the capacity you need accordingly. Factor in the weather as well. Treat everything unless you are at a campground that marks the water as potable. It would be a good idea for each Scout to carry a couple treatment tablets in their first aid kit. Make sure your Scouts drink at least a gallon a day (one liter every 4 hours).
10. **Emergency shelter.** This is actually missing from the BSA list, but could be critical depending upon the weather. Even if the trek is just a day hike things can go terribly wrong. Take at least your groundcloth or a space blanket if not a tarp.

It should never be an issue with a Scout outing, but if anyone is using this list for their own group, the item that is not on this list that may be the most important is leaving a trek plan with a responsible person at home. That way if you do not return by a certain agreed-upon time, somebody knows that you may be in trouble and can alert authorities as to your route, group numbers, and experience. This also brings up a word of caution. Technology can be a great thing – when it works. The SPOT device is being used by some backcountry travelers so family and friends can follow their trek progress online. It also has the ability to send OK and Help messages. However, several false SAR calls from worried relatives have happened because the SPOT can go for a day or so without sending a new breadcrumb due to user error, the fact that it doesn't use the standard SAR satellite system, or simply a dead battery. Thus, if you're using one, please let everyone know *not* to contact SAR unless a Help message gets sent or the group is truly overdue.³¹

30 Caffin, Roger (Jan 1, 2011). First Aid, Hygiene and Safety. *The Australian Bushwalking FAQ*. Retrieved Aug, 2011, from http://www.bushwalking.org.au/FAQ/FAQ_FirstAid.htm

31 Author Unknown (Mar, 2010). Emergency personal beacons: A primer. *Rocky Mountain Rescue Group*. Retrieved Jan, 2012, from http://www.rockymountainrescue.org/about_PLBs.php

Other items that should be on the list for a true emergency are signaling systems. Each Scout should have a pea-less whistle on at all times. Headlamps and fire are in this category and possibly a tiny mirror, too. The SPOT falls here also as would true personal locator beacons (such as McMurdo Fast Find). Always have a cell phone (leave it off to save battery power) but don't rely on having cell phone coverage. A text message may get through or you might have service somewhere along an evacuation route to contact SAR/EMS sooner. If your trek route is remote (not likely in the Midwest), you could also consider renting a satellite phone. Know the numbers of the local SAR contact.

Let's not forget our common sense, too. Stick with your buddy, know your limitations and don't be afraid to ask for help or stop. Most major accidents in the backcountry are from user error or stupidity, not freak chance. When emergencies do arise, keep a level head and use your training. Again, a good WFA course will help you in this regard. A bunch of gear won't save you if you don't have the attitude, will, and knowledge to survive.

Chapter 8: The Dreaded Miscellaneous Items

This is where a lot of traditional backpackers add in a lot of weight. To be honest though there are very few things that haven't been discussed that you *need* on a backcountry trek.

1. **Towel.** Normally you would use a bandana to wipe down your tarp among many other uses. A Handi-wipe could also be used.
2. **Chapstick.** Lips can get dry or burnt. Also use as sunscreen for your hands unless you brought normal sunscreen. Put in bear bag if scented.
3. **Toothbrush & paste.** Use child size brush and share a travel size tube. These should go in the bear bag at night.
4. **Hand sanitizer.** Each Scout should have a ½ or 1 oz bottle. Soap is in the patrol's kitchen kit.
5. **Potty trowel.** Use a tent (snow) stake or stick instead. The 2 oz plastic orange one is cheap but struggles in rocky or rooty soil. Really only need a patrol trowel so a metal one could suffice.
6. **Toilet paper.** Burn it, bury it, or pack it out, depending upon the land management authority's regulations. *Never* leave “flowers.” One roll per patrol in a ziploc should be plenty.
7. **Trekking poles.** Scouts can get by without these unless their shelter requires one or two, but four legs are better than two. They are definitely useful for Scouters with bad joints. They also help with fast or deeper creek crossings – always maintain 3 points of contact.

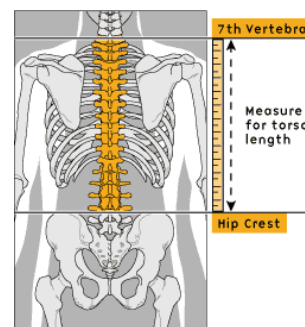
The following aren't really needs, but make it easier to record and share your trek or pass the down time.

8. **Journal & pencil.** Rite in the Rain makes some small weatherproof notebooks that work very well. Use a short pencil.
9. **Camera.** There are many small, inexpensive cameras available. Keep in a ziploc bag. Don't forget the weight of spare batteries.
10. **Games.** Scouts love to play cards and you can find half-size decks. You might consider one of those small magnetic travel sets of chess, Chinese checkers, etc.
11. **Book.** A small one, of course. Possibly a bookreader.
12. **Luxury Item.** If you don't consider the game or book, allow your Scouts one luxury item each (within reason). Lightweight fishing gear may be an example.

Chapter 9: Packs

Finally, we're getting to backpacks. Being one of the "Big 3" items, you can save up to several pounds on just the pack. Just like a scale is the first thing recommended to someone interested in going lighter, the pack is the last thing you're told to get. The reason is quite simple. How do you know what to get when you don't know how much space and weight all your gear will take? Yes, you could just buy a huge pack, but it will likely weigh far more than you need and will be way too big once you've reduced the rest of your kit. In the meantime if you don't already have a pack and can't borrow one, try to purchase a used one that isn't too big. You might even consider a traditional external frame pack since you can strap things to the outside pretty easily. Capacity should not exceed 4900 cubic inches (80 liters) if at all possible. Try to make sure it has several compression straps or a roll-top closure or top strap because as you lighten your gear, it will take less and less space in this pack, and you don't want your gear shifting around throwing off your balance.

The most important thing when looking at a pack is fit, and the most important aspect of fit is what is known as torso length. This is the distance along the curvature of your spine from your C7 vertebra (the bony one at the base of your neck) to a point level with the top of the Iliac Crest (pelvic girdle or hipbone). This isn't easy to measure by yourself so have somebody do it for you. Scouts usually fall anywhere between 12-21". If anything you want to err on the high side and measuring along the spine rather than a straight line should provide that cushion. Once you have this measurement, you can verify whether you should consider a specific pack (that you can physically hold at least) by measuring from the middle of the hipbelt to where the shoulder straps attach. If this distance is shorter or significantly longer than your torso length, it's not going to work well. Keep in mind that some packs are adjustable so that the hipbelt and/or shoulder straps can be moved up to several inches to accommodate a wider range of people (or a growing Scout).



The second most important fitting item is the hipbelt. For your loaner or used pack you will want a fairly wide and *thinly*-padded (i.e., flexible) hipbelt since you're likely carrying a fairly heavy load. The purpose of the hipbelt is to transfer that load onto your hipbone so that your shoulders are not carrying any weight and the belt must be able to conform to your hipbone in order to do this.³² You should be able to slide a couple fingers underneath the shoulder straps to verify this. Generally, the middle of the hipbelt will be just below the crest of the hipbone while the top of the belt is slightly smaller and the bottom flares out a bit. This is why the torso measurement is important. If you get a pack too short, your shoulders will be carrying the weight because the hipbelt will be higher than your hipbone. You can get away with having a pack a couple inches too long though, and some packs will have "load lifter" straps to help pull a too-tall pack back toward your body.

Most lightweight packs are not adjustable since that feature takes weight. The manufacturers typically list what torso range each size should fit. Sometimes those overlap a bit and sometimes they don't. If you find you're close to the top of the range, go with the larger size. Chances are your Scout might still grow some but most lightweight packs will also compress a little when fully loaded, thereby reducing

32 Jordan, Ryan Ed. (2005). *Lightweight Backpacking and Camping*. Bozeman, MT : Beartooth Mountain Press. 59.

the effective torso length.³³ You should also try to find reviews on whether the particular manufacturer runs true to size or not. A quick check to verify (close to) correct pack fit is to load it up full of your gear and maybe two gallon jugs of water (~16 pounds) to represent the maximum consumables weight you might ever carry. Then bounce and twist around a bit and note if the pack moves noticeably side to side, how the hipbelt feels and if the shoulder straps are still loose on the shoulders. If any of those three checks fail, you need to try to adjust something or try another pack.

As far as what to look for in a pack, KISS. That just keeps popping up, doesn't it? The great majority of lightweight packs are what they call top-loaders. This means the pack is essentially like an old military duffle bag – everything goes in one end. The Type A guys who love a gazillion compartments for everything are likely screaming right now. Top-loaders are OK – the author survived using one. Some people, especially those going ultralight, stop at this simple non-nonsense design. It's recommended for Scouts to get one that has side pockets for water bottles, a front pocket (for items you need to access often), maybe hipbelt pockets (to keep snacks, camera, sanitizer, etc in easy reach) and an extension collar, which allows for expansion when carrying more consumables. The top closure will either be a roll-top one like a dry bag or a drawstring that you cinch and roll down the excess material, which is then secured with an adjustable strap over the top. You'll also want at least 2 compression straps per side (but not any straps or cords that interfere with any side or front pockets) to reduce pack volume when carrying smaller loads.³⁴ Aside from the pockets mentioned, *all* of your gear should fit *inside* of the main pack body with the possible exception of a fishing pole, your sleeping pad or trekking poles on flat trails. Gear hanging off the sides or strapped on the top or bottom will be more likely to throw off your balance or get caught on branches.



Cordura is no longer the old standby as the main body of a lightweight pack but is still used in areas like the bottom, hipbelt and straps. Interestingly, there's also been a move recently back to slightly heavier fabrics to make lightweight packs more durable, which is a good thing for Scouts. It's recommended to stay away from those made mostly with silnylon as they don't have as much tear and abrasion resistance. Scouts should look for those made with some type of lightweight ripstop nylon (such as Xpac or Dyneema). Scouters can afford those made with thicker versions of cuben fiber material.³⁵ Honestly, the final weight of a pack is largely in all the straps, pockets, connectors, zippers, loops, etc. since it only takes about a yard of material so this is why we KISS.

There are two categories of lightweight packs, internal frame and frameless. The former typically have a very basic foam, plastic or metal frame that is often removable. This frame should ideally be

33 Rietveld, Will and Reichl, Janet. (June 28, 2011). Lightweight Frameless Backpacks State of the Market Report 2011: Part 2B – Technical Evaluation – Measurement of Pack Load Carrying Capacity. *BackpackingLight.com*. Retrieved July, 2011, from http://www.backpackinglight.com/cgi-bin/backpackinglight/frameless_backpacks_sotm_part2b_2011.html (membership required)

34 Rietveld, Will and Reichl, Janet. (June 14, 2011). Lightweight Frameless Backpacks State of the Market Report 2011: Part 2A – Technical Evaluation – Measurement of Pack Volume and Volume Reduction Capability. *BackpackingLight.com*. Retrieved June, 2011, from http://www.backpackinglight.com/cgi-bin/backpackinglight/frameless_backpacks_sotm_part2a_2011.html (membership required)

35 Rietveld, Will. (May 31, 2011). Lightweight Frameless Backpacks State of the Market Report 2011: Part 1 – Choosing and Using a Frameless Pack. *BackpackingLight.com*. Retrieved June, 2011, from http://www.backpackinglight.com/cgi-bin/backpackinglight/frameless_backpacks_sotm_part1_2011.html (membership required)

somehow attached at the hipbelt to effectively transfer the weight. The latter is basically just a bag since it has no frame. You need to provide the frame and that frame is your sleeping pad. A foam pad is most common, though some do manage with an inflatable pad. You can roll the foam pad, stick it into your pack, expand it against the sides and then put all your gear inside it, or fold the pad as needed to fit against the back of the pack and then put in your gear. While rolling and stuffing (what's called the burrito method) is easier, folding the pad actually provides more support.³⁶ Another drawback to the burrito method is that it may not be as comfortable so try both methods to see what feels best for you.

Even lightweight packs often come with more stuff than you need in an effort to satisfy a wider range of customers. Unless you've paid a good deal for a custom pack or made your own (lots of good examples online, but start with a tarp or quilt first), you can save a surprising amount of weight from your already light pack. This is yet another example of KISS. The author saved 6 ounces simply by removing the foam pad "frame" (his sleeping pad replaced this), the hydration bladder sleeve and clip and shortening all the straps to more reasonable lengths. However, make sure you use your pack on at least a few trips before you start taking a seam ripper and scissors to it and consider that a few conservative "downsizings" are better than a single aggressive one that you may later regret – maybe you'll need that ice ax loop to carry a trekking pole while scrambling or an actual ax on a future winter trip or conservation project.

Here are a few tips on packing. Your pack liner should be an unscented trash compactor bag. Those are fairly small (18 gallon), very light, inexpensive, waterproof and quite tough (typically 2.5-3 mil). This goes in your pack first. Your sleeping bag goes in next. If you have a down bag, just stuff it in. If you have a synthetic bag, it may be wise to use the compression sack it came with to save volume though it will add 2-3 ounces and degrade the loft quicker so don't really crank down on it. Try orienting it



vertically in the center or to one side or horizontally to see which works best for you and the other gear you have. Your sleep clothes and socks are next (or have them *in* your bag), then your insulation layer items. Now you squish down the trash bag to remove the air, twist it off and tuck the tail down the side. Even if you swim in a lake with your pack, your critical gear will stay dry. The remaining items you have can then go in on top of the trash bag. What order you put them in largely depends on what you need access to the most and what patrol gear you might be tasked to carry though you want the heaviest items (such as food) closest to your back around the middle or top of your pack. You'd likely have kitchen gear near the top. Shelter would be below this. Rain wear, hat, and gloves would be on top or in the pack's front pocket if the weather dictates that.

Those Type A guys will try to cheat and have a bunch of stuff sacks so they can still have their little compartments. Each sack is another ounce or two and not much benefit for as little gear as you should have. Your sleeping bag may be in a sack if it's synthetic. The patrol kitchen may be in a sack, especially if you still cook over wood at all that will get soot on the pot. The shelter will be in a sack and the stakes will be in a smaller one (or heavy duty ziploc bag). The first aid kit and repair kit are in a ziploc bag. The food is in a sack. You might also have a small sack ("ditty bag") for all those little

36 Rietveld, Will and Reichl, Janet. (June 28, 2011). Lightweight Frameless Backpacks State of the Market Report 2011: Part 2B – Technical Evaluation – Measurement of Pack Load Carrying Capacity. *BackpackingLight.com*. Retrieved July, 2011, from http://www.backpackinglight.com/cgi-bin/backpackinglight/frameless_backpacks_sotm_part2b_2011.html (membership required)

items so they are easier to find.

One last note before we finish our discussion on lightweight gear. Don't just toss your pack on the ground. You may have done that with your 60 pound mammoth pack (for good reason!), but you could just as well damage it (or the gear inside) as you can a lightweight pack. However, your lightweight pack should actually last just as long if not longer because it's much easier to put on and remove. Finally, make sure you unpack your pack when you get home. Tell the parents about this, too! Bags and clothing need to get dried (perhaps) and hung. Shelters and other gear will likely need to be dried to prevent mildew or mold.



Chapter 10: Things *Not* to Buy

Perhaps controversial, but here is a list of items in no particular order that Scouts (or their parents) might buy when outfitting for backpacking that do not belong in a lightweight kit.

- **Leather boots.** They're heavy! If you really have foot/ankle issues, get modern, lightweight boots.
- **Goretex footwear.** Heavy and they don't drain. Might be OK for winter though.
- **Camp shoes.** Just wear your lightweight trail runners and loosen the laces.
- **Cotton clothing.** A cotton bandana is OK.
- **Bear bells.** Maybe for a solo hiker, but you could sing and perhaps only be half as annoying.
- **GPS.** Men (and boys) love gadgets. Scouts need to work on map and compass skills, which don't take batteries. A Scouter should have one on a trek just in case (unless geocaching will be a focus).
- **Digital compass.** KISS.
- **Flashlight.** Old school now. Use a small LED headlamp instead.
- **Full-size Leatherman or Swiss Army Knife.** Do you even know what all those accessories do?
- **Hatchet/camping saw.** Are the bonfires you're apparently making really Leave No Trace? Acceptable if you're doing trail maintenance as part of your trek.
- **Titanium items.** Far more expensive than equivalent aluminum items with marginal weight savings. Ti stakes would be OK for secondary guy lines, but make sure you paint them or wrap bright-colored electrical tape around the head so they can be seen easier.
- **Carabiners.** You need one to hang your food bag if you use the PCT method. What are all the others for?
- **Ready-made personal first aid kit.** Lots of extra stuff you don't need or could easily improvise. You might use one as a start for the troop kit, though. Take a WFA course to find out what you really need.
- **Camping TP.** Just take a normal roll (in a ziploc bag) and potty trowel per patrol.
- **Chair.** Maybe a Crazy Creek Hexalite for older Scouters.
- **Pump water filter.** Heavy, expensive and not necessary.
- **Water bottles (or canteens).** You may choose to purchase some Platypus collapsible ones, but the mainstay for Scouts should be the free (and light!) drink bottles.
- **Sleeping bag liner.** You have sleep clothes to keep you warmer and your bag cleaner.
- **Sleeping bag more than 3 pounds (or 2.5 pounds for down).** You can do better! Shop around.
- **Compression sack.** You should only have one if you bought a synthetic sleeping bag. Use it loosely to retain the bag's lofting ability.
- **Pack more than 3 pounds.**
- **Pack cover.** Heavy and expensive and harder to get to your gear. It's OK if your pack gets wet.
- **Tent footprint.** Mainstream tent floors are heavy duty enough and waterproof.

Appendix A: Suggested Gear List

Good places to look online for clearance or sale gear include campmor.com, rei.com (outlet also), backcountry.com (outlet also), sierratradingpost.com, campsaver.com, ems.com, moontrail.com, campingmax.com, altrec.com (outlet also), backcountrygear.com, basegear.com, moosejaw.com and sunnysports.com. You can find great deals if you shop around a lot, especially during off seasons. Also check the vendor sites listed in Appendix B.

The following list is based largely upon the one used by Troop 676 in Bozeman, MT.³⁷ Weights given are **maximums** – you can often find much lighter. Examples (Ex) are merely representative of some products that fit well in that category.

This list is meant as something to *strive* toward. It is estimated that it would cost about \$400 if you had to buy all the required *personal* items new (including a MYOG shelter) at the cheapest prices commonly found. Few Scout families could afford that at once, and you want to make sure your Scout has an interest in backpacking first so build up to lighter gear over time. Focus on heavier items first. The dollar signs (\$) give an approximate *relative* cost among items within that category – \$\$\$ would be more appropriate for Scouters unless you find the item on a significant sale.

Required Items Commonly Worn/Carried:

Underwear (3 oz/pair). No more than 2 pair. Form-fitting, synthetic boxer briefs or compression shorts. Can also double as swimwear. Ex: Starter compression shorts (Walmart) - \$, ExOfficio or Patagonia Boxer Briefs - \$\$.

Hiking Socks (2 oz/pair). Above ankle height preferred. No more than 2 pair. Ex: men's dress socks - \$; Bridgedale, Darn Tough Vermont, Smartwool and Injinji models - \$\$ or \$\$\$ but you can often find them on sale.

Hiking Pants (12 oz). Supplex nylon is ideal. Light colors preferred. Works as pseudo wind shell. Convertible pants add weight. Ex: check thrift stores for nylon track pants and remove inner liner if any - \$, light-colored fishing or rain pants at sporting goods stores - \$\$, REI Adventure Pants - \$\$\$.

Hiking Shirt (10 oz). Supplex nylon is ideal. Light colors preferred. Works as pseudo wind shell. Ex: REI Sahara Tech - \$\$; Railriders Adventure Shirt - \$\$\$\$. It's not easy to find woven nylon shirts at thrift stores, but you might look for “fishing shirts” on sale at large sporting goods stores - \$\$.

Hiking Shoes (32 oz). Low or mid-height trail running shoes ideal. No Goretex, high-tops or boots. Ex: Running/trail shoes from Walmart - \$. Once feet stop growing fast look at models from Montrail, Inov-8, Merrell, New Balance, Salomon, Vasque, etc – most of these will be \$\$\$ unless you find last year's models on sale to make them \$ or \$\$.

³⁷ Jordan, Ryan (March, 2010). Troop 676 2010 Backpacking Handbook. *BSA Troop 676*. Retrieved June 8, 2010, from http://troop676.net.s99559.gridserver.com/wp-content/uploads/2010/08/TROOP_676_BACKPACKING_HANDBOOK_2010.pdf

Brimmed Hat (3 oz). Nylon wide-brimmed is preferred but can be cotton or a baseball cap (used with bandana). Ex: Military surplus boonie hat - \$ (but usually 5-6 oz), ExOfficio Adventure Hat - \$\$

Whistle (1 oz). Pea-less so it works when wet. Worn on lanyard at all times. Ex: ACR Emergency Whistle - \$.

Optional Items Commonly Worn/Carried:

Trekking poles (20 oz). Aluminum is cheaper though heavier. Adjustable are better for shelters though heavier. Flick-lock more robust and easier to adjust than twist-lock. No need for anti-shock gizmos. Ex: Outdoor Products flick-lock at Walmart - \$, REI Traverse PowerLock or Black Diamond Trail or Trail Back - \$\$, Black Diamond Distance FL - \$\$\$.

Prescription Glasses (1 oz). Hopefully you don't have bad eyes. Don't do contacts in the wild.

Required Personal Gear Packed (starting with the 10 Essentials):

Compass (1 oz). Simple baseplate model. Ex: Silva Starter 123 or Brunton 7DNL - \$.

Map (3 oz). Take only what you need in a ziploc if the paper isn't waterproof.

Sunglasses (1 oz). Darker-colored, polarized plastic lenses with 99+% UVA & UVB absorption preferred. Neck strap is a good idea unless your shirt has a pocket.

Sunscreen (1 oz). Repackage into smaller container – eyedrop bottle works well. If wearing long sleeves, long pants and brimmed hat as recommended, this is only needed for hands in general so you can substitute unscented chapstick though it usually is just SPF 15. Might consider repackaging into a larger bottle for the whole patrol.

Bandana (1 oz). Cotton. Useful for much more than sun protection.

Sleeping Socks (3 oz). Can be heavier weight (thickness) than hiking socks.

Sleeping Base Layer (12 oz). Lightweight, form-fitting polyester. Ex: poly longjohns at thrift stores - \$, ditto at Walmart - \$\$, Patagonia Capilene 1 (or maybe 2) - \$\$\$.

Normal Base Layer (12 oz). Same as above but used as insulation on non-summer treks. If using the alternate layering that the author does, you might eliminate these and go one weight heavier (e.g., Capilene 3) on the sleeping base layer.

Rain Jacket and Pants (16 oz). Must have hood. Full-zip preferable. Ex: DriDucks - \$, Frogg Toggs - \$\$, Red Ledge Thunderlight - \$\$ (for parka only), non-propore based jacket/pants - \$\$\$.

Warm Hat (2 oz). Fleece and/or wool beanie. Generally only used for sleeping. Can be eliminated if your base layer or optional insulating jacket is a hoodie. Ex: thrift store or Walmart - \$, Name brand fleece - \$\$, most merino wool beanies - \$\$\$.

Gloves (2 oz). Fleece and/or wool. Nice in cold rain. Ex: 100-200 weight fleece - \$, PowerStretch - \$\$, Merino wool - \$\$\$.

LED Headlamp (3 oz). Weight includes batteries. Always start longer treks with fresh batteries. Take spares if avg. runtime < 20 hours. Use “high” output only when needed. More expensive options are regulated so output remains more constant over battery life. Ex: Energizer at Walmart - \$, Princeton Tec Quad or EOS - \$\$, Petzl Tikka series - \$\$\$.

Personal First Aid Kit (2 oz). This was covered in Chapter 7 though as mentioned under hydration you may want to add a couple water treatment tablets. If you really must *buy* a kit the smallest one known is the Adventure Medical Kits Ultralight/Watertight .3

Fire-starting (2 oz). Mini BIC lighter, small box of matches, firesteel/SparkLite – choose any two and keep with dryer lint (or a few cotton balls) in a small ziploc. You can use chapstick on the lint to make it burn longer. Could optionally include some Tinder-Quik tabs or Esbit cubes for little \$.

Personal Repair Kit / Tools (2 oz). This is your small knife or multi-tool. Very helpful to have scissors! Clear duct tape also counts here (or first aid).

Bear Bag System (5 oz). This includes a 12” x 20” OPSAK (there's only one manufacturer for these), a stuff sack or dry sack (8-10 L size) and 50' of braided nylon rope. You'd normally hang 2-4 bear bags from one rope, but no harm in everyone having their own. Paracord or thicker dacron/spectra fishing line could also be used. Ex: Outdoor Products Dry Bags 3-pack (Walmart) - \$.

Water Bottles (2 oz/each). Minimum 2 L capacity. Drink from one while the other is being treated. If you would like to add sports powder to your drink bottle every now and then, get a collapsible one since it will need to be stored in your bear bag at night. Ex: Standard soda bottle – free, Platypus collapsible 1 L bottle - \$.

Groundcloth aka Emergency Shelter (3 oz). At least 3'x6'. Polycro (window shrink film) is preferred, but could also be Tyvek. Not needed if you have a floored tent unless using as an emergency shelter on a dayhike (unless you carry a space blanket or poncho instead).

Pack (40 oz). Max volume of 3500 cu in (60 L). Ex: GoLite Jam (on sale) or Montbell Balance Light 40 - \$, Granite Gear Virga, Gossamer Gear G4 or Six Moon Designs Swift - \$\$, Osprey Hornet 46, ULA OHM, Mountain Laurel Designs Exodus, Gossamer Gear Mariposa Plus or Zpacks Blast 36 (Scouters only) - \$\$\$.

Pack Liner (3 oz). Everything that *must* stay dry goes inside this – your sleeping bag, sleeping clothes, and perhaps high-loft insulating layers (below freezing). Make sure you push out most of the air, twist it off and then tuck it so it is waterproof. Ex: Hefty Trash Compactor Bag.

Pillow (2 oz). No weight if you use what you already have like shelter stuff sack stuffed with clothing, shoes, etc.

Sleeping Pad (12 oz). Closed cell foam is preferred for Scouts. Get small version or cut down to no

more than 20"x60". Ex: Generic blue 1/2" pad - \$, Gossamer Gear Nightlight, Thermarest Z Lite or RidgeRest SoLite - \$\$, most shorter self-inflating or inflatable pads for Scouters - \$\$\$.

Sleeping Bag (40 oz). Down is preferred for weight, compressibility and longevity. Ex (down): Kelty Light Year 40 or Cosmic 20, Lafuma Warm N Light 600 - \$, Marmot Never Winter 30 or GoLite Adventure 1+ Season - \$\$, REI Halo 40 or Montbell Super Spiral Hugger #5 - \$\$\$.

Ex (synthetic): Kelty Light Year XP 20 or Cosmic 35, Lafuma Extreme 950 Pro - \$, Mountain Hardwear Lamina 35 or REI Lumen 25 - \$\$, Montbell Super Spiral Burrow #3, Mountain Hardwear UltraLamina 32 or Sierra Designs Lazer 30 - \$\$\$.

Spoon (1 oz). Lexan or metal. Ex: iced tea spoon (get mom's permission!) - free, GSI - \$.

Bowl or Mug (2 oz). Only really needed if not re-hydrating in freezer bags (yes, you can easily drink hot drinks from ziplocs). Capacity should be > 16 oz and < 24 oz. Ex: Plastic butter/yogurt tubs - free, other plastic bowl or mug - \$.

Cozy (1 oz). Needed if doing freezer bag meals.

Headnet (1 oz). Don't get one with a ring to keep it expanded.

Insect Repellant (1 oz). DEET is the way to go. Repackage into smaller container – eyedrop bottle works well. If wearing long-sleeved shirt and pants made of woven nylon as recommended, this is only needed for hands so it's really optional in that case. Might consider repackaging into a larger bottle for the whole patrol.

Chapstick (1 oz). Get unscented and high SPF.

Toothbrush & paste (2 oz). Repackage paste into small ziploc or share a travel size tube.

Hand sanitizer (2 oz). Weight assumes 1 oz bottle or half full 2 oz bottle, which are easier to find.

Optional Personal Gear Packed:

Comb or Brush (1 oz). You know if you need one.

Gaiters (3 oz). Keep junk out of your shoes. Ex: Dirty Girl Gaiters - \$, Simblissity LevaGaiter - \$\$.

Journal & pencil (3 oz). Ex: small pad in ziploc - \$, Rite in the Rain 374-M - \$\$.

Camera (10 oz). Don't forget the weight of spare batteries. Ex (for Scouters): Canon S100 - \$\$\$.

Game (3 oz).

Book (4 oz).

Luxury Item (8 oz). Fishing gear, cushier pad or pillow, etc. - NO electronics except a bookreader.

Required Patrol Gear Packed: Generally you will assign the heavier items to your strongest Scouts so the patrol as a whole travels more efficiently.

Shelter (64 oz - 4+ / 48 oz - 2+). Either 2 or 4 needed per patrol. Includes:

- **Tarp(tent).** Ex (4+ man): Appy Trails Mark V - \$, Oware 10x10 pyramid or Black Diamond Mega Light - \$\$, Oware 11x11 pyramid - \$\$\$.
Ex (2+ man): make your own - \$, Black Diamond Betamid or Oware Flat Tarps - \$\$, *many* options >\$120.
- **Stakes w/ sack.** Freezer ziploc works. Ex: generic aluminum Y or V, Coghlan's Ultralight Tent Stakes - \$, MSR Groundhog - \$\$
- **Guylines.** Mason's line or catfish dropline from Walmart - \$, Kelty Triptease - \$\$
- **Poles (if needed).**
- **Stuff sack (if not provided).** Whatever lightweight nylon bag fits. Make your own.

Toilet Kit (12 oz). Includes the following in a gallon freezer ziploc

- **Trowel.** Ex: Montbell Handy Scoop - \$\$, make your own from angle iron - \$.
- **TP.** Not the impractical “camping”stuff – just a normal full or partial roll.
- **Soap.** Repackaged into smaller bottle. Forces better hygiene. Sanitizer isn't normally sufficient.

Kitchen Kit (32 oz each – 2 per patrol). Includes the following, all of which fit inside the pot:

- **Soap & Sanitizer.** Once again, force better hygiene. Repackaged.
- **Fire-starting.** Similar to personal kit but skip the lint/cotton balls and stick with solid fuel tinder/cooking cubes such as Tinder-Quik, Wetfire or Esbit. Keep in ziploc.
- **Stove.** Remote canister preferred. Ex: Primus Express Spider - \$\$, MSR WindPro - \$\$\$
- **Windscreen.** Ideally as tall as will fit in pot. Make your own from foil roasting pan or light gauge flashing. Also make a heat reflector for the ground, sized to fit in the bottom of the pot.
- **Measuring Cup.** 16 oz capacity. Used to pour proper water into freezer bags or bowls. Just a simple plastic one from Walmart.
- **Pot.** Capacity 2-4 qt. Make a lid if needed. Ex: Open Country Kettle or Billy Pot - \$
- **Stuff Sack.** Cheap and light, sized to fit the pot. Protects inside of pack from soot.

Water Treatment (3 oz). Tablets for simplicity, liquids for cost or to vary dosage levels. If using liquids, a small pre-mix bottle is recommended. Ex: Aqua Mira or Micropur tablets - \$\$, Aqua Mira liquid - \$.

First Aid Kit (8 oz). TROOP kit carried by Scouter (everyone should know who) rather than patrol one. Recommended items were covered in Chapter 7. Scouter must dispense the meds.

Repair Kit (10 oz). TROOP kit carried by Scouter. Weight includes everything listed in Chapter 7.

Collapsible Water Bottle (2 oz/each). OPTIONAL– only if you need extra capacity. Recommend 2 L Platy bottles but could also carry more soda bottles but they will take space when empty also.

Consumables:

Food (24 oz/day). Used 1.5 PPD for example. That's 168 ounces for 7 full day's of food, which is exactly what the author carried on his last trip.

Fuel (13 oz each). Assumes 8 oz size. Each patrol should have at least 2 (1/stove). A full 8 oz canister would likely last a few days unless you're wasteful.

Water (64 oz). 2 quarts max at any one time unless circumstances dictate otherwise.

Let's take a quick look at the weights from our example gear list.

1	Weight of personal gear worn/carried including optional poles & glasses ¹	84 oz
2	Weight of required personal gear packed ²	188 oz
3	Weight of optional personal gear packed	32 oz
4	Weight of required patrol gear packed (2-man shelter) ³	113 oz
5	Weight of consumables (7 days) ⁴	245 oz
6	Total weight = FSO weight	662 oz

¹ – includes only 1 pair of underwear and socks.

² – includes the other pair of underwear and socks from #1.

³ – includes 1 2-man shelter setup and 1 kitchen kit. No optional bottle.

⁴ – includes 1 fuel canister.

Base weight (2+3+4) = 333 oz or 20.8 pounds. Hey, wait a minute – that's not lightweight! True, but you need to remember 3 important points. First, these weights are the *maximums* allowed and you can easily do better on some of them. Second, it includes *every optional* item (except patrol water bottle). Third, this poor guy is carrying *every* patrol (shared) item, which would never happen in reality. So you can see even in this unrealistic worst-case example, our Scout is barely over the 20 pound limit. A closer reality would be if we gave him the heaviest patrol item, the 48 oz shelter. Then he would have a base weight of 268 oz or 16.8 pounds.

We can also see that even in our *worst-case* scenario, our Scout with 7 days of food and 2 quarts of water has a from skin out weight of just over 41 pounds. That would be near the average for Philmont where you'd rarely have 4 days of food.

Appendix B: Suggested Reading and Resources

Books (K – Kindle available):

- Clelland, Mike (2011). *Ultralight Backpackin' Tips*. Falcon Guide. **K**
- Jardine, Ray (2009). *Trail Life: Ray Jardine's Lightweight Backpacking*. AdventureLore Press.
- Johansson, Jorgen (2010). *Smarter Backpacking*. NUI Publishing.
- Jordan, Ryan Ed. (2005). *Lightweight Backpacking and Camping*. Beartooth Mountain Press. **K**
- Ladigin, Don (2005). *Lighten Up!* Falcon Guide. **K**
- O'Bannon, Allen (2001). *Allen and Mike's Really Cool Backpackin' Book*. Falcon Guide. **K**
- Skurka, Andrew (2012). *The Ultimate Hiker's Gear Guide*. National Geographic. **K**
- Tapon, Francis (2011). *Hike Your Own Hike: 7 Life Lessons from Backpacking Across America*. WanderLearn Press. **K**
- Townsend, Chris (2011). *The Backpacker's Handbook (4th Edition)*. Ragged Mountain Press. **K**

Websites the author particularly enjoys:

BackpackingLight.com

The Australian Bushwalking FAQ - www.bushwalking.org.au/FAQ/index.html

SectionHiker.com

A Web Guide To Light Weight Backpacking - www.verber.com/mark/outdoors/backpack/index.html

TenPoundBackpack.com

TrailCooking.com

Higher Adventure Locations for Midwest Scouts – www.snipurl.com/midwest_scout_ha_locations

Lightweight Gear Manufacturers/Suppliers

AppyTrails.com – tarptents

Arcteryx.com – clothing, shells

BigAgnes.com – bags, pads, tents

BlackDiamondEquipment.com – poles, headlamps, tents, hats, gloves

Bridgedale.com – socks

BruntonOutdoor.com – compasses

CascadeDesigns.com includes:

- MSR – stoves, fuel, filters
- Platypus – water storage
- Thermarest – pads

DarnTough.com – socks

Defect.com – socks, gloves

DrymaxSocks.com – socks

Exped.com – bags, pads, sacks, poles

GoLite.com – packs, bags/quilts, clothing, shells, (tarp)tents

GossamerGear.com – packs, pads, poles, tarps, Lighten Up DVD, accessories

GraniteGear.com – packs, sacks
GSIOutdoors.com – cookware, utensils
Ibex.com – wool base layers, gloves, unders, vest/jackets
Icebreaker.com – wool base layers, gloves, unders, vest/jackets, socks
Injinji.com – socks
Inov-8.com – trail runners and boots
Katadyn.com – water treatment
Kelty.com – packs, bags, tents
Marmot.com – bags, clothing, shells
Merrell.com – trail shoes
MontBell.com – bags, packs, clothing, shells
Montrail.com – trail runners
MountainHardwear.com – bags, clothing, shells
MountainLaurelDesigns.com – packs, (tarp)tents, bivys, accessories
NewBalance.com – trail runners
OptimusStoves.com – stoves, fuel
OspreyPacks.com – packs
OutdoorResearch.com – clothing, shells, gloves, hats, gaiters, sacks
OwareUSA.com – (tarp)tents, pads, bivys
PacOutdoor.com – pads, sacks
Patagonia.com – clothing, shells, gloves
Petzl.com – headlamps
PrimusCamping.com – stoves, fuel, cookware, headlamps
PrincetonTec.com – headlamps
REI.com – bags, pads, packs, tents, headlamps, poles, clothing, shells, accessories
Salomon.com – trail runners
Sawyer.com – insect repellent, water treatment
SeaToSummit.com – bags, sacks, hats, tableware, accessories
SierraDesigns.com – bags, tents, packs, clothing, shells
SixMoonDesigns.com – packs, (tarp)tents, bivy
Smartwool.com – socks
SnowPeak.com – stoves, fuel, cookware (solo or 2-person)
SteriPen.com – water treatment
Tarpent.com – (tarp)tents
TerramarSports.com – synthetic baselayers, gloves, hats
TheNorthFace.com – clothing, shells, gloves, bags
ULA-Equipment.com – packs, sacks
Vasque.com – trail runners
WesternMountaineering.com – bags, shells
Zpacks.com – packs, sacks, (tarp)tents