

Equipment for your Outdoor Action Trip

Here is all the information you need to pack for your backpacking, backpacking and canoeing, or backpacking and rock climbing trip. When selecting gear for the trip, remember that you'll be in the outdoors for six days, so you'll want to bring *only* those things you need to be comfortable. Leave behind what isn't necessary—extra stuff just adds weight. This equipment list is based on 35 years of experience running Outdoor Action Trips. ***If you bring ALL the gear on the list and ONLY the gear on the list, you'll be comfortable in virtually any situation you'll encounter on Frosh Trip.***

Fabrics: For hiking you want clothing that is warm, breathable, and quick-drying. Synthetic fabrics are best because they won't absorb water, dry quickly, and are relatively windproof. Many people already have synthetic clothing at home, so you may not need to go out and purchase clothing just for this trip. Items like running gear, athletic warm-ups, and skiing/snowboarding gear can easily be used on this trip—so check out your closet or borrow from a friend *before* going to the store. Lightweight synthetic/cotton (50/50 blend) shirts, underwear, and pants are fine. You should **avoid** bringing *all-cotton* clothing since it absorbs water easily and won't keep you warm if it gets wet. Cotton also retains water so that it takes a *very* long time to dry. ***Do NOT bring all-cotton clothes such as sweatshirts, sweatpants, or jeans.***

Dressing for the Weather: Weather is unpredictable, so you'll need to bring a range of clothing for various temperatures, as well as rain. During the day, northeast temperatures at the end of summer can range from the 60s F at the low end to the 90s F. Temperatures can be considerably cooler at night, though, dropping into the 30s F and 40s F.

Layering: Dressing in layers is the most efficient way to stay comfortable in the outdoors. By bringing several different layers, you can add or remove clothing to match your activity level and the weather conditions.

- The **Base/Wicking Layer** keeps the skin comfortable and dry, which is essential for controlling your temperature. Polypropylene or other synthetic fabrics are ideal since they wick moisture away from your skin. Such lightweight synthetics or synthetic/cotton blends provide good ventilation for the skin to keep you dry and cool. During the day you'll probably be hiking in a T-shirt and shorts.
- The **Middle Layer** is made up of a long sleeve shirt and long pants, which provide insulation and some protection from the elements. You may wear these while hiking for cooler temperatures or to protect you from sun, or at camp at night and in the early morning.
- The **Outer Layer**—usually a fleece jacket or wool sweater—provides insulation. Synthetic fleece fabrics (such as Polartec) don't absorb water, so they keep you warm even if they get wet. You'll wear this layer around camp at night and in the early morning when it is cooler.
- The **Shell Layer** protects you from wind and rain. ***A waterproof rain jacket is vital in case of bad weather.*** A coated nylon rain jacket is lightweight, inexpensive, and works well. Waterproof-breathable fabrics like Gore-tex also work well but can be expensive. Raingear is not only essential for Frosh Trip, but also will get plenty of use on campus.
- For the final layer, your **Head**, bring a wide-brimmed hat for sun and rain protection. At night, you'll need a wool or synthetic fleece hat to keep you warm—it can get colder than you think at night.

Think Before You Buy! Although backpacking requires specialized gear, you may be surprised how many items you already own or can borrow from a friend or relative. For example, you likely already own the synthetic or 50/50 synthetic/cotton blend clothing that is best for backpacking. ***Borrowing gear not only saves you money, but also contributes to Outdoor Action's effort to be environmentally friendly in all our activities.*** After all, hundreds of incoming freshmen buying hundreds of petroleum-based products for one-time use on Frosh Trip leaves a pretty serious impact on the environment. Borrow (or improvise!) first, then buy used gear if you can so that polluting/non-renewable resources are not being consumed to manufacture your new gear. Items that are most appropriate to buy new are those that require precise fitting (like boots) and those that you will use a lot around campus after Frosh Trip (like a rain jacket). ***If you are buying new gear, please ask retailers to show you products made from recycled or sustainable materials, or search online for different sustainable or environmentally friendly options.***

Outdoor Action Backpacking Trip: Personal Equipment List

Please check off each item as you assemble your equipment to make sure that you have everything.

Outdoor Action can provide the following items on a limited basis. If you already own these items or could possibly borrow them, PLEASE BRING YOUR OWN but there is no need to buy these items if you do not already have them.

_____ **1 sleeping bag with stuff sack:** Any summer weight synthetic fill bag will do (fills like Polarguard Delta, CloudLoft, PrimaLoft, Thermic CF). If the bag has a temperature rating, a 35 to 45° F bag should be fine. The bag should have a nylon shell both inside and outside. Down bags are acceptable, but extra care must be taken to keep them dry. ***Do not bring bags with cotton shell, fill, or lining***—if they get wet, you'll never get them dry.

_____ **1 external or internal frame backpack** with shoulder straps and padded hip belt. External frame packs should have 2,000 - 3,000 cubic inches of volume and internal frame packs 4,000 - 5,000 cubic inches. Make sure the pack fits well and that all straps and zippers are in working order. If you have an external frame pack, bring sleeping bag straps, bungee cord, or rope to hold your sleeping bag onto the pack. Example: EMS Trail 70 Backpack

You MUST bring the following items. Outdoor Action cannot supply them to you.

Feet:

_____ **1 pair of lightweight hiking boots:** Your boots should extend over the ankle for ankle support; have lug soles for traction; and be either leather/nylon or all-leather. Leather/nylon boots that extend over the ankle are fine for Frosh Trip and are lightweight enough to wear around campus. All-leather boots are more durable, but they're generally heavier. If you plan to do more hiking, it may be worthwhile to invest in all-leather mid-weight boots. In addition, waterproof boots are best: the boots may already have a Gore-tex (waterproof/breathable) liner, or you can treat the leather with a waterproofing compound before the trip. Boots should fit comfortably with two pairs of socks: (1) a light synthetic liner sock and (2) a mid-weight wool sock. Having two sock layers means your socks slide against each other, so that the friction from your boots is absorbed by the sock layers rather than your skin. Friction against the skin is what causes blisters. While wearing two layers of sock, you should have a little extra room at the toe of the boot so that your big toe doesn't jam against the front of the boot when walking downhill. ***Make sure your boots are well broken in before you arrive; otherwise your feet will pay the price! Start walking in them weeks beforehand. We cannot emphasize this enough: boots that aren't broken in invariably cause blisters!*** See the excerpt below on boots from *The Backpacker's Field Manual* for more information.

_____ **1 pair camp shoes:** Your feet will be tired at the end of the day, and you'll need comfortable shoes to wear around camp. Also, more lightweight shoes minimize impact on the campsite in comparison to hiking boots with lug soles. Camp shoes could be: sneakers/running shoes, Crocs, or strappy sandals that will stay on your feet (not flip-flops).

_____ **2-3 pairs of light synthetic/polypropylene liner socks:** Wearing liner socks underneath wool socks helps to prevent chafing since the friction is between the two pairs of socks, not between the boots and your feet.

_____ **2-3 pairs of medium weight wool hiking socks:** Wool socks keep your feet warm even when wet and give good cushioning. The higher the wool content of the socks the better (we recommend 85% wool, 15% nylon). ***Do not bring cotton socks.***

Lower Body:

_____ Underwear as needed

_____ 1-2 pairs shorts, loose-fitting

_____ 1 pair long pants, loose-fitting: cotton/synthetic blend, fleece, nylon, or some other synthetic material. Athletic warm-ups are great. ***No blue jeans or cotton sweatpants***—they take too long to dry!

_____ 1 pair lightweight polypropylene long underwear bottoms (optional but highly recommended)

_____ 1 pair waterproof rain pants or rain chaps, coated nylon (optional)

_____ **1 bathing suit (highly recommended)**

Upper Body:

- _____ T-shirts: 1-2 synthetic OR 2-3 synthetic/cotton (50/50 blend)
- _____ 1 long-sleeve shirt: cotton/synthetic blend, polypropylene, athletic warm-up, skiing gear
- _____ 1 synthetic fleece jacket or wool sweater. The mountains get chilly at night!
- _____ 1 rain jacket or poncho: coated nylon or waterproof/breathable fabric like Gore-tex. Make sure it's still waterproof—the waterproof coating on nylon rain jackets degrades over time! Don't bring heavy rubberized rain jackets; they weigh a ton and you'll end up getting very hot and sweaty.

Head:

- _____ 1 brimmed cap (wide-brimmed, baseball, etc) for sun and rain protection
- _____ 1 wool or synthetic fleece hat for warmth at night

Miscellaneous: *The following items should be available at home or can be purchased pretty cheaply.*

- _____ **Any medications you will need to take during the trip (allergy medications, etc.)**
- _____ 1 individual bottle of hand sanitizer (2 oz.) - optional
- _____ 1 closed-cell foam sleeping pad (3/8 in. foam) or inflatable camping pad (like a Thermarest—*not* a full-size inflatable mattress). Sleeping pads provide padding and insulation from the ground for more comfortable sleeping, and they help keep your sleeping bag dry.
- _____ **2 one-quart water bottles, such as Nalgene. *You must have these water bottles! We recommend plastic bottles (a non-BPA plastic or polyethylene). THE SUSTAINABILITY OFFICE WILL BE SELLING PRINCETON NALGENE BOTTLES AT HOUSING CHECK-IN AT BAKER RINK FOR ONLY \$1.00. So bring one with you and buy one on Saturday, September 3.***
- _____ 1 small flashlight or LED headlamp with fresh, alkaline batteries (alkaline batteries last longer)
- _____ Insect repellent. Repellents with high concentrations of DEET may be hazardous, so please do not bring products with more than 35% DEET. No aerosols please—it's bad for the environment.
- _____ 3 heavy plastic garbage bags: one for sleeping bag, one for inside your backpack, and one as a rain cover.
- _____ 5-6 gallon size Ziploc bags or 2-3 plastic grocery bags for packing
- _____ 1 unbreakable cup with handle
- _____ 1 unbreakable bowl (Tupperware works great)
- _____ 1 spoon
- _____ 1 toilet kit: Just the essentials: toothbrush and small tube of toothpaste, comb/brush, sunscreen, lip balm. ***Do not bring "smellables" like shampoo, soap, shaving cream, deodorant, etc.*** Things that "smell good" to us are an attraction for insects and animals. OA will provide biodegradable soap.
- _____ 2 bandannas or handkerchiefs. They are useful for many things in the outdoors.
- _____ 1 pair sunglasses or clip-ons
- _____ 2 pairs glasses or contact lenses (if needed): If you wear contact lenses and will have difficulty cleaning them in the field, you should bring glasses instead.
- _____ Women: bring any feminine sanitary products you expect you will need
- _____ 1 pocket knife to be used for cooking (optional – only bring if you already have one)
- _____ 1 washcloth (optional)
- _____ 1 small notebook and pencil (optional)
- _____ 1 camera and film (optional)

DO NOT BRING: *You'll survive without these things, we promise!*

- Electronics: cell phones, iPods, CD players, etc.
- "Smellables": (attracts bugs) deodorant, makeup, nail polish, hair spray, etc.

Sources for Equipment

You may have a local backpacking shop in your town, or you can go to a chain store or shop online. **There are also a number of websites that resell used gear, this will save you money and reduce the environmental impact of your gear.** Some sources:

EMS -- www.ems.com

REI -- www.rei.com

L.L. Bean -- www.llbean.com

Sierra Trading Post -- www.sierratradingpost.com

Campmor -- www.campmor.com

EMS Online Gear Discounts

OA participants will receive a **15% discount on any items** purchased at EMS.com, and a **30% discount on these select items listed below**. The prices have been calculated below WITH the 30% off. (Subject to change as EMS prices change, but the percentage discount remains.) See “Sustainable Gear” section for some products and prices for environmentally friendly gear. **Login at <https://oa2.princeton.edu/applications/ft/frosh/> and click on the Equipment Discount Link to get the discount code for your online purchases.**

Buying a backpack – If you decide to buy a backpack there are a number of options available from EMS. In order to get the right fit we suggest you got to a store and try packs on before you buy.

Sleeping Bag	Discount Price	Description
EMS Solstice 20	\$62.30	Style: “Regular,” Omnifoil insulation, Weight: 3 lbs 9 oz., Max User Height: 6ft (also available in style: “long”), Temperature Rating: +20° F
EMS Velocity 35	\$132.70	Style: “Regular,” PrimaLoft insulation, folds up to 7”x10”, Weight: 2 lbs, Max. User Height: 6ft (also available in style: “long”), Temperature Rating: +35° F

Sleeping Pad	Discount Price	Description
Basic Pad	\$10.50	Insulating foam, 11 oz, rolled out: 20” x 70”
Therm-o-rest Z-Lite (regular)	\$27.97	Closed-cell foam, 14 oz., folded out: 20” x 72”

Boots	Discount Price	Description
Women’s Merrell Moab Mid GTX	\$87.50	Leather and fabric upper, Gore-Tex waterproof, breathable liner
Men’s Merrell Moab Mid GTX	\$87.50	Leather and fabric upper, Gore-Tex waterproof, breathable liner
Women’s Salomon Mission GTX	\$101.50	Leather and nylon upper, Gore-Tex waterproof, breathable liner
Men’s Salomon 3D Fastpacker	\$105.00	Synthetic and mesh upper, Gore-Tex waterproof, breathable liner
Keen Oregon PCT	\$112.00	All-leather, Gore-Tex waterproof
Vasque Wasatch GTX	\$122.50	All-leather, Gore-Tex waterproof

Clothing	Discount Price	Description
Men’s & Women’s Techwick crew short-sleeve	\$17.50	Mesh polyester, sun protection, dries quickly, classic fit
Men’s Techwick Endurance quarter-zip	\$25.35	Mesh polyester, sun protection, dries quickly, classic fit
Women’s Techwick Essence quarter-zip	\$24.50	
Men’s & Women’s Thunderhead Rain Jacket	\$69.30 Jacket	Waterproof, breathable, nylon ripstop
Rain Pants	\$55.30 Pants	pants optional
Men’s & Women’s Deluge Rain Jacket	\$139.30	Waterproof, breathable, nylon, lightweight
Men’s & Women’s ¼ zip Microfleece pullover	\$27.30	Breathable, versatile, lightweight warmth
EMS Merino Wool Socks 2-pack	\$14.00	Soft, moisture-wicking merino wool, durable, resistant to odor
Fast Mountain Wick Dry Liner Socks	\$3.50	Synthetic blend base-layer socks
Black Diamond Cosmo Headlamp	\$20.97	3 LEDs, 125 ft range

BOOTS (Excerpted from The Backpacker’s Field Manual by Rick Curtis)

Your boots are among the most important pieces of equipment that you bring into the backcountry. With every step, they are the direct interface between you and the land. Boots come in an almost infinite array of heights, weights, materials, soles, etc. They should be selected according to your needs—day trip versus multiday, packweight, terrain, season and temperature, your hiking style (traditional versus ultralight), and personal characteristics (e.g., weak ankles), to name a few. And there isn’t one boot that is best for every condition. The boots that are best for a day hike are not the best boots for a multiday winter camping expedition. Boots are an investment. Selecting, fitting, breaking in, and caring for your boots will help them last a long time and will maximize your own comfort.

What Kind of Boots: There’s no one boot that does it all, although there are boots that will handle a pretty wide range of uses and conditions. It’s generally estimated that every pound (0.45 kg) of weight in your boots is the equivalent in energy expenditure of adding 5 pounds (2.25 kg) to your back. Lifting your feet up for thousands of steps each day takes a lot of energy. When you are looking for boots, go with the lightest weight boot that meets your needs. I think about what I need in a boot in relation to what I am doing on the trail. If I am doing an extended mountaineering trip and I’ve got a 60-pound (27 kg) pack, I want a stiff boot that extends well over the ankle to provide me with the kind of support I need. This boot is going to be somewhat heavy. If I’m going on a multiday trip and carrying 40 pounds (18 kg), I’ll be fine with a lightweight boot that extends just over the ankle. You’ll notice that I defined all of this in terms of my personal needs. I’ve got notoriously weak ankles, so I always opt for a lot of ankle support. Someone else might not need this much support (boot weight) while others might need more. As with clothing systems, you need to decide what your body needs and look for the lightest thing that meets those needs. Some people bring a second pair of “camp shoes” for use in camp. After a long day it feels good to get out of your boots and air out your feet, especially if they are wet from sweat or rain. Changing to camp shoes can also help reduce your impact at camp.

Fitting Boots: Proper fitting of boots is essential, and whole treatises have been written on the subject. One thing to know about boots is that all boots are constructed on what's called a *last*, a representative "average" foot mold (length, width at toes, width at heel, etc.) that the boot is built around for each shoe size. Some boot makers use a unisex last for each size while others have a separate last for women's boots and men's boots (and there are lasts for children's boots). I've found that some manufacturers' lasts just don't work with my feet while others seem to be just right. Finding that winning combination of a boot that has the features you want and the correct last is your goal. You should try new boots on in the afternoon, since your feet swell during the day. Select a sock combination of a liner sock and outer sock that you plan to wear on the trip, and try the boots on. Bring your own socks. A lot of times I've forgotten to bring my own socks to the store and end up using socks from some random pile the store has. Then when I get home it turns out that with my own socks the boots don't fit right. With the boot unlaced, slide your foot all the way to the toe end of the boot. You should be able to get your index finger to fit between the back of your heel and the back of the boot. Lace up the boots with moderate tension. The laces should hold the boot in an "intermediate position"—that is, that you still have room to crank them tighter, pulling the boot together more, or loosening them up, so you can tighten or loosen the boots as needed. You should be able to wiggle your toes inside the boot. With your foot flat on the ground, hold the boot heel down and try to lift your heel inside the boot. There should be only 1/4 to 1/2 inch (6 to 12 millimeters) of heel lift. Too much heel lift will lead to friction and possible heel blisters. You also want to check the boot length. With the boot firmly laced, do some good hard kicks against a post or the floor. Do your toes smash into the front of the boot? If so you've discovered "boot bang." This is a serious problem. On long downhill stretches your toes smashing into the front of the boot can result in lost toenails and other foot problems. Whatever boot bang you experience in the store will be magnified when you are going downhill with a heavy pack. If you are getting boot bang, try lacing differently, another size, different sock combination, or another boot. As we get older our feet tend to get longer—no, we aren't still growing, but most people's arches begin to flatten out and without that curve the feet get longer. So if you haven't been hiking for a while you might be in trouble if you pull that five-year-old pair of boots out of the closet and expect them to fit like they used to. If it's been a while, wear them around *before* your trip and make sure it's not time to buy a new pair.

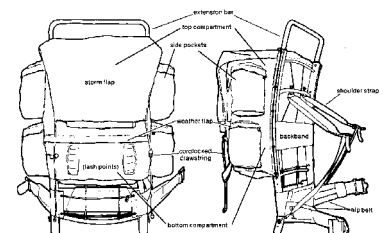
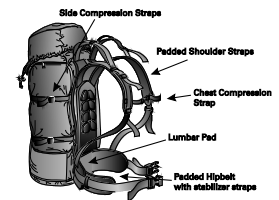
Breaking in Boots: Before you leave the store with your new boots, make sure that you can bring them back if they don't fit. Most stores are good about this if you only wear them indoors and bring them back in good condition and in a reasonable period of time. Start wearing your boots around the house to be sure you have the right fit. Once you are happy with the fit, you need to break the boots in to your feet. Always break in a pair of new boots well before your trip. Most medium to heavyweight boots will require some use to soften up and conform to your particular feet. Even old boots should get a little break-in if you haven't worn them for a while. Begin with short walks and gradually increase the time you wear them. Easy day hikes are a good way to break in boots. Each time you lace your boots, take the time to align the tongue and lace them properly; otherwise, the tongue will set into a bad position, which can lead to hot spots and blisters.

THE BACKPACK (Excerpted from The Backpacker's Field Manual)

There are two basic types of packs: external and internal frame. The purpose of the frame is to transfer most of the weight of your gear onto your hips, so the strong muscles in your legs carry the load, rather than your shoulders. If you remember trying to carry loads of books home from school in a day pack, you know what I mean. The ideal distribution is about 70 to 80 percent of the weight on your hips and 20 to 30 percent on your shoulders. This split in weight also lowers your center of gravity, making you more stable. Recent advances in pack design offer an incredible range of sizes and options.

- **External Frame:** The external-frame pack helped revolutionize backpacking. Suddenly, much larger amounts of weight could be easily and safely carried, allowing for longer trips. External-frame packs typically use a ladderlike frame of aluminum or plastic. The hip belt and shoulder straps are attached to the frame (see diagram below). A separate pack bag attaches to the frame, usually with clevis pins and split rings. Pack bag volumes range from 3,000 to 4,500 cubic inches (49 to 73 liters). There is also space for attaching large items like a sleeping bag to the outside of the frame so the actual carrying capacity of the pack is more than the pack bag volume. Some external-frame packs come in specific sizes based on the length of your spine; others are adjustable to fit a range of sizes. Look for good lumbar padding, a conical hip belt, recurved shoulder straps with good padding, and a chest compression strap.

 - **Pro:** Good for carrying weight. The external frame allows for some air space between your back and the pack bag so your back doesn't sweat as much. The weight is carried higher in the pack, allowing for a more upright posture. Frame extension bars and space for a sleeping bag outside of the pack allow you to strap on lots of gear when you need to, making the carrying capacity of the pack more versatile. Less expensive than many internal frame packs.
 - **Con:** Since external-frame packs carry the load higher, they raise your center of gravity, making you more "top heavy" and less stable. Most external-frame packs don't hug your body as well, so the pack tends to wobble from side to side as you walk. This is usually not a problem on a regular backpacking trip, but can throw you off balance if skiing or snowshoeing. Airline baggage-handling machines are notorious for bending frames. Don't take it on an airplane unless you have boxed it up.
- **Internal Frame:** Internal-frame packs use a wide variety of materials— aluminum stays, carbon fiber, plastic sheets, and foam—to create a rigid spine to which the hip belt and shoulder straps are attached. The pack bag runs the full height of the pack, although it may be divided into several compartments. Pack volumes range from 3,000 to 7,500 cubic inches (49 to 122 liters). Some internal-frame packs come in specific sizes based on the length of your spine; others are adjustable to fit a range of sizes. As with an external-frame pack, you should look for good lumbar padding, a conical hip belt, recurved shoulder straps with good padding, and a chest compression strap. A removable top pocket and a bivy extension (a fabric layer sewn around the top opening of the pack bag that, when pulled up, adds to the overall pack volume) on the pack bag will let you lift the top pocket and store more gear. Also, make sure that the pack has



side compression straps to squeeze the pack down if you are carrying a smaller load.

- **Pro:** Good for carrying lots of weight. Conforms to the body for better balance. Generally more comfortable to wear for long periods.
- **Con:** Since the pack bag and frame are directly against your entire back, back perspiration can be a problem. Since the weight is carried lower in the pack, you may have to bend over more. You can't put as much on the outside, so the overall carrying capacity of the pack is somewhat fixed by its internal volume. Tends to be more expensive than external frame packs.

PACK SIZE

Size is an important factor when selecting a pack. You need to make sure that you can adequately carry all the equipment and food you will need for the length of your trip. Keep in mind that the pack bags of external-frame packs are smaller than those of internal-frame packs. This is because there are spaces on the external-frame pack to strap large items directly to the frame. For example, a sleeping bag in a stuff sack may be anywhere from 700 to 1,500 cubic inches (11 to 25 liters). Here are some rough guidelines on pack size related to trip length:

Length of Trip	External Frame Pack Bag Volume	Internal Frame Pack Bag Volume
2-4 Days	1,500+ cubic inches (25+ liters)	3,500+ cubic inches (57+ liters)
5-7 Days (Frosh Trip)	2,000+ cubic inches (33+ liters)	4,500+ cubic inches (73+ liters)
8-10 Days	3,000+ cubic inches (39+ liters)	5,500+ cubic inches (90+ liters)

FITTING A PACK

It is essential to have a pack that fits properly. The major measurements are your spine length, waist size, and shoulder width to get a pack the correct length and one with the correct size hip belt and shoulder straps. Packs vary from company to company, so check the manufacturer's instructions for both fitting and loading. Many packs come with different size hip belts and/or shoulder straps and some are specifically designed for women's bodies. The idea behind a frame pack is to have the frame transfer most of the weight to your legs through the hip belt. Therefore, when fitting a pack, the place to start is with the hip belt. Here are some general fitting guidelines:

1. Put on the pack and adjust the hip belt to fit your hips. Wear the hip belt on the hip bones just underneath the rib cage. The center of the hip belt is about at the crest of your pelvis. The buckle will be about at your navel. Wearing the hip belt higher transfers weight onto major muscle groups. Wearing the belt too low on the hips can compress arteries and nerves and lead to poor circulation and numbness in the legs.
2. With the hip belt on and properly positioned, tighten the shoulder straps and note their position. Some packs will allow you to adjust the height at which the shoulder straps attach to fine-tune your fit. For an *external-frame pack* the straps should come off the frame about even with the top of your shoulders. If the straps drop too far down, the pack is too small, and too much weight will be pulled onto your shoulders. If the straps go too far up, the pack is too large, and too little weight will go onto your shoulders. For an *internal-frame pack* the frame stays or frame structure should extend 2 to 4 inches above your shoulders. The shoulder straps should follow the contour of your shoulders and join the pack approximately 2 inches (5 centimeters) below the top of your shoulders. The position of the shoulder harness can usually be adjusted. The lower ends of the straps should run about 5 inches (12.7 centimeters) below your armpits. On both types of packs be sure the width of the shoulder straps is positioned so that they neither pinch your neck nor slip off your shoulders. On the shoulder straps you may find load lifters that connect to the pack at about ear level and connect to the shoulder straps in front of your collarbone. These help pull the top of the pack onto your shoulders. Some internal-frame packs allow you to bend the frame stays to adjust them to match the curvature of your back.
3. In both types of packs the sternum strap should cross your chest below your collarbone. If the pack is properly fitted, you can adjust the load lifters and other fine-tuning straps to make the pack hug your back. Adjustments can also be made while hiking, periodically shifting the weight distribution to other muscle groups, which makes hiking less tiring.