

Extreme Outdoor Hiking Clothing - Base, Insulation, Outer Layer TAKE HOME TEST (Keep Warm & Dry) 2013

Name: _____

Outdoor and **Hiking Clothing** used to be any combination of day-to-day items of clothing that were used to keep you warm and dry. Nowadays, the generally accepted way of getting yourself dressed for Hiking and Outdoor Activities is to use a Three-Layer System. Much of the **extreme outdoor clothing** you can find in outdoor shops is part of this system. In this section, know what the Three Layer System is and what the layers are:

Base Layer / Thermal Underwear



The **Base Layer** is the first layer of clothing you put on and it is in direct contact with your skin. For Outdoor Activities, it is very likely that you will be sweating, cooling down, sweating, cooling down, etc. It is important that your clothing works in a way that it can cool down quickly but not too much. This is where the base layer comes in:

Purpose of the Base Layer

A common problem in many Outdoor Activities is 'after-exercise chill'. Cotton T-shirts and other common underwear capture the moisture of sweat in their fabric and after your body has already cooled down and stops sweating, the wet cotton will keep on cooling your body down. Not only is this uncomfortable, it also forces your body to increase its heat production and it increases the chances of under cooling. The base layer should not retain moisture but transport it away from the skin, thereby countering 'after-exercise chill'. This function of this fabric is to manage moisture by wicking it away from the skin to avoid evaporation and cooling of the body

Base Layer Materials

The materials used for Base Layers change constantly as manufacturers come up with new high tech synthetic fabrics or re-invent older materials like wool. In general, they all have common characteristics:



- The materials absorb only a very small percentage (< 1%) of their weight in moisture. In practice, this means that they retract moisture from your skin and dries very quickly.
- The fibers are very lightweight but very durable.
- They are treated to decrease the tendency of base layers to itch and smell due to body odors and/or fungi.

Insulation Layer

The Insulation Layer is the second layer of clothing that is put on after wearing the base layer. The purpose of the Insulation Layer is to retain body heat and the best way to do so is by creating a layer of still or dead air around your body. This still air will seriously decrease the heat exchange between your body and the outside world.

Fleece / Bunting / Pile

The Insulation Layer mostly consists of polyesters that are treated in a way that makes the fibers stand up and trap air between the fibers. This trapped air forms the protective layer of still air forming the main insulation. The most popular materials are:

- **Fleece** Fleece is mostly made out of polyesters. A dense knit of polyester fabric is taken and passed through a 'napping' machine. On one side of the fabric, the machine will pick out and rake up the fabric loops, creating a fabric with a tight solid weave on one side and a fluffy air-retaining surface at the other side.
- **Bunting** This is fleece that has been 'napped' on both sides, creating a tight solid weave with wooly air retaining at the surfaces on both sides.
- **Pile** This is single-sided Fleece that has undergone more 'napping' and has been processed further to create a much thicker open fabric.

Characteristics of Fleece / Bunting / Pile

Fleece, Bunting, and Pile combine a few characteristics that make them so suitable as Insulation Layer materials. First of all, they possess the ability to retain still air which insulates and prevents body heat loss as outlined above. Besides this, the treated Polyesters used have almost the same moisture-transporting qualities as Base Layers. They transport moisture to the outer layer and dry very quickly.

Outer Shells



The Third and final Layer in the Three-Layer System is the Outer Shell which is the only layer with direct contact to the outside world. The Outer Shell serves three main purposes:

- Protection from wind and outside moisture like rain and snow.
- Getting rid of body moisture
- Protection from chafing, cuts, scrapes, and other outside damage.

Before high tech fabrics were developed, these purposes were performed by separate pieces of clothing. Nowadays, however, Outer Shells can be waterproof, shock-absorbing, and breathable windbreakers or **outdoor jackets**.

Using this Three Layer System gives you the best possible protection from outdoor conditions. At the same time, the system is flexible enough to change specific parts for better, worst, or specific conditions. In most cases, the Three Layer System pertains to upper body clothing. The torso and neck area are the most important things to insulate as they protect your body core. In extremely cold conditions, however, this Three-Layer System can be used for full body protection.

Heat Loss through the head and why hat is important!

Now, what about hypothermia and heat loss through the head? If the hypothermia victim is not shivering, they are at rest, and the heat loss through the head remains about 7%. But, this is important, if they are shivering, the percent of heat loss via the scalp can increase to upwards of 55%, so protecting the head well is a very important part of treating the hypothermia

patient. And as you can imagine, the primary defense against the cold and hypothermia is vasoconstriction of the peripheral circulation, this shunts blood to the core, reduces circulation to the skin, and increases the percent of heat loss through the scalp.

Ditch the denim and sport Socks (Cotton kills)

Winter can be unforgiving. Hazards can be matters of small inconveniences, or life-threatening. But with common sense and proper clothes, it is an easy transition from a summer walk in the park to a woodland walk when pine boughs are bent low under snow.

Never ever wear jeans. Cotton, including denim jeans, transfer moisture to your skin when wet. Cotton won't keep you warm when wet. And if it's windy and your jeans are wet, you accelerate the process that leads to hypothermia. And jeans can freeze solid when wet. Jeans are the worst fabric you can wear in winter on a trail. Humans are poorly adapted to winter, but we can compensate for being furless. Layering is a must for a winter hike, cross-country skiing or snowshoeing. The best bet is starting with wicking underwear for tops and bottoms. There are many brands and most are polypropylenes. The wicking layer removes perspiration from your skin. Some folks jump right to an outer layer, a breathable and waterproof fabric such as the all time favorite Gore-Tex. Others use a middle layer made of fleece or other synthetic fibers. Wool is still a favorite of many, and retains its insulation ability when wet. And the beauty of layering is you can add or remove layers. Don't even think about leather gloves. Mittens are warmer and there is a cornucopia of insulated and comfortable gloves available.

Cotton verse wool socks

As we know cottons kills and it is a natural fibre that absorbs water and sticks it close to our skin that take a long time to dry. Wools socks have natural oils that are hydrophobic that allow the fibres to trap dead air and create a layer of insulation even and stay warm when wet and perform well in a sweaty or a soaked hiking boot. Also wool socks are thicker so there are more comfortable and durable.

Short Answer – Answer questions on a separate piece of paper (2) /25

1. What are the three clothing layers of the three-layer system allowing the body to be active and comfortable in the extreme outdoors? (3)
2. What is the purpose of the base layer and give an example of an effective fabric to wear as a base layer? (2)
3. What is the purpose of the insulation layer and give an example of an effective fabric to wear as an insulation layer? (2)
4. What is the purpose of the outer layer and give an example of an effective fabric to wear as an outer layer? (2)
5. How much heat is generally loss through your head? (1)
6. How much heat is loss through your head when you are cold and experiencing hypothermia? (1)

7. Why are warm hats important in the outdoors? (1)

8. What is polypropylene? (1)

9. Name 3 reasons why jeans are the worst possible fabric you can wear in the outdoors? (3)

10. Which are better mittens or gloves why? (2)

11. Name three reasons why wool socks are far superior to cotton socks in the outdoors? (3)

12. What are two keys to being comfortable in the outdoors? Hint, read title of assignment (2)