

**Document ID:** 12\_14\_98\_1

**Date Received:** 1998-12-14 **Date Revised:** 1999-1-26 **Date Accepted:** 1999-2-5

**Curriculum Topic Benchmarks:** S4.1.1, S15.1.1, S7.2.1, S7.2.2, S11.3.1, S11.3.4

**Grade Level:** : [K-2] Primary

**Subject Keywords:** observation, description, reading, biology, human body, cold, science in literature, Laura Ingalls Wilder, warm blooded, frostbite, heat transfer

**Rating:** moderate

## Hypothermia in the Little House

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**Materials:** Laura Ingalls Wilder's book *The Long Winter*.

**Science in Children's Literature:** Among the cornerstones of science are careful observation and accurate description. Like scientists, authors must also be careful observers. Mrs. Wilder's book presents a fine example in her depiction of the symptoms and treatment of hypothermia. Every time I read it I am more impressed with her scientific accuracy. It is worth starting early to develop skills at noticing what happens around you and at describing what you see.

I have used this example with very young students as an introduction to preparing for outdoor winter activity. I read a few sentences or paragraphs, and then break the narrative to ask questions and begin discussion. By the time Laura and Carrie stumble back into the house, I am stopping at almost every sentence. I emphasize to my students that dressing correctly and eating properly will preserve health and enhance enjoyment of the outdoors. I can also envision using this example within a general unit on health and the human body, or even as an introduction to a writing assignment on observations. I leave it to the individual teachers to incorporate this example into their own curriculums at the appropriate level for their classes.

**Concepts:** Hypothermia occurs when a warm-blooded animal, such as a person, becomes extremely cold, and loses control of his or her body's core temperature. This is much more likely to happen when a person wet rather than dry. Hypothermia can cause death. Oftentimes, it is difficult to know when someone starts to go into hypothermia. It is even difficult to know when you yourself are experiencing the beginning signs.

Below are highlights from Mrs. Wilder's book. The italics are direct quotes from the book. My interpretations are in plain font. I'm working from the paperback First Harper Trophy edition, 1971. I start in Chapter 9 "Cap Garland".

p.83. *"But when Monday came Laura was cross because her red flannel underwear was so hot and scratchy. It made her back itch,....that red flannel almost drove her crazy."* In Laura's time flannel meant wool. She is complaining of itchy wool long underwear.

p 87 *"Laura wrapped the muffler .... and took firm hold of her [Carrie's] mittened hand."* The girls are dressing properly for cold weather. Mittens actually keep your hands warmer than gloves.

p 87-88. The winds make walking difficult. Laura is using energy just to keep up with the group. The physical exertion means her cells are working hard, converting stored food energy to kinetic energy and making metabolic heat. However, they are also using up their own reserves.

p 88. They stopped. *"Then Laura began to know how cold she was."* When she stopped, metabolic heat production slowed down, and now she was cold.

p 88. *"Her mittened hand was so numb..."* When the body starts to go into temperature distress, it makes maintenance of the core temperature its first priority. This means it shuts down circulation to extremities like hands and feet.

p 88-89. *"She was shaking all over..."* Shivering is an involuntary muscular movement. Its purpose is to increase metabolic heat production.

p 90. *"Carrie...stumbling and flopping.."* Partly due to physical exertion, which means she is running out of reserves for temperature maintenance. It may also due to numb feet or loss of motor control. As hypothermia advances it affects higher level brain function. The body's only interest is to maintain life support -- circulation to heart and lungs.

p 93. Laura and Carrie have made it home. *"Laura's hands fumbled at the doorknob..."* Another example of numb extremities and loss of motor control.

p 93. Ma has examined the girls and found no frostbite. Normally the blood carries oxygen to the cells and takes away waste. If blood stops flowing to parts of the body, the tissue in those body parts dies. This happens when cold causes the body to stop servicing the extremities and is called frostbite.

p 93. *"Laura could hardly move."* Advanced hypothermia.

p 93. Snow was driven into her clothing, under her skirts, into her shoes. Her inner clothing was probably wet. Remember that woolen underwear? Wool keeps you warm even when wet. The wool probably saved her life.

p 94. *"she staggered toward the stove. ... Laura sat stiffly down."* Loss of motor control. The stove is Laura's best bet. Her muscles have used every bit of stored energy for heating and now there is nothing left for heating or for movement. That is why she is staggering. To survive she needs external heat until her body builds up enough reserve to maintain temperature again.

p.94 *"She felt numb and stupid."* Disorientation. Mental slowness. Feeling stupid. All are symptoms of advanced hypothermia. The brain shuts down its higher level "thinking" functions. This is why people with hypothermia often don't realize it. They can't think clearly.

p. 94 *"she could feel the heat on her skin, but she was cold inside."* Her core temperature had dropped below the normal of 98.6 F.

p. 94 Pa is holding Carrie next to the fire. Pa is using his body heat to help Carrie regain her temperature regulation. When you are out in the wilderness with no stoves, the only heat source you may have to save someone's life is your own body, transfer that heat directly from skin to skin.

p. 94 Carrie is shivering and can't get warm. Carrie actually may be in better shape than Laura. Her muscles still have some reserves and are shivering in order to make heat. Laura has stopped shivering. This may be because she is starting to warm up or maybe because she is so far gone that her muscles have no reserves left. The end of shivering doesn't necessarily indicate recovery.

p 94. Ma makes ginger tea. Warm food and drink are other sources of external heat. Laura and Carrie are going to need a lot of food in the next few days in order to replenish all the calories that their bodies used in trying to stay warm.

p 95 Ma says that the girls are going to need "*a good long sleep.*" Ma is absolutely right. Sleep and food so that their bodies can build up reserves.

**Notes:** Books by Farley Mowat and Jack London also contain great descriptions of life in cold climates. If you want to know more about hypothermia, I've written up a companion PUMAS example, Preventing Hypothermia, where I suggest 3 additional activities.