

Background Reading for teachers- could be given to students at the end and used for discussion.

Seals are mammals, just like you or your pet dog or cat. They are “warm blooded” and must be able to protect themselves against the cold water in the polar regions. The water in the Antarctic and Arctic is about 1.8 degrees below freezing and you would only survive 1-2 minutes in that temperature without protection. But, seals do very well in these conditions. How do they do that?

If the answer was to simply wrap them in a layer of blubber, then the problem would be solved and we'd be done with this discussion. Blubber makes an excellent insulator and can easily protect the animal against the cold water. However, when you exercise in the cold, like when you ski or snowboard, you can unzip your parka if you get too warm. There are no zippers on seal blubber. What happens if a seal gets too hot? What do you do about all that blubber?

This brings up perhaps the most important part about “staying warm in a cold climate.” The real issue is how to thermoregulate your temperature- that is, to be able to control body temperature so that it remains constant whether you need to cool down or warm up. Blubber is the answer to this problem.

Blubber is not just a fat layer like you would see on a steak or in bacon. Blubber has structure; it is an organ. Think about a loofah sponge. Blubber is like that with a protein matrix making up the loofah and then the animal fills or removes lipid (fat) from the protein sponge. The sponge itself never really changes. When you cook bacon, the fat melts and forms a gel in your frying pan when it cools. If you cook a piece of blubber, some of the lipid comes out, but the blubber still sits there. The protein sponge and most of the lipid is still there.

As it turns out, blubber is not only used as a good thermal blanket, but it is also a store of nutrition (lipid), it is a water source (water is a waste product when the animal uses the lipid for energy), it acts in the control of buoyancy (it floats). And it helps streamline the outside of the animal. So, you can see, keeping warm is only one part of how blubber works.

So, how does the seal cool down? Basically, it has blood vessels that go through the blubber out to the skin. If the seal needs to lose heat, it opens up those blood vessels and the animal pumps warm blood out to the cold skin. Seals can warm up their skin enough to actually melt their way into the ice and create great clouds of steam. If they need to stay warm, then they keep the warm blood inside the blubber and the skin stays cold enough for the animal to be completely covered in snow and not melt any of it.

The point is that blubber is dynamic and is an organ..... it is important for the animal at many different levels, including staying warm.