



## TACKY THE PENGUIN by Helen Lester

When a penguin dives into the Antarctic Ocean, it will be in water that is about  $40^{\circ}\text{C}$  lower than its body temperature. We could not survive for more than ten minutes under such conditions. Penguins are much more active in the water than on land; just look at Tacky! Polar penguins are also helped by the fact that they have a 2 to 3 cm (centimeter) layer of subcutaneous (under the skin) fat. This layer provides wonderful insulation. You will make a model of this fat layer and see if it really works!

**MATERIALS:** 1 C solid vegetable shortening, 2 heavy duty *Ziploc*<sup>™</sup> freezer bags (quart size for older students & pint size for younger students), plastic dishpan or large bowl, water, ice.

**ACTIVITY:** Turn 1 *Ziploc*<sup>™</sup> bag inside out. Put 1 C shortening in second *Ziploc*<sup>™</sup> bag (I use plastic yogurt cup and tongue depressor for this part if I am measuring shortening for several bags). Put inside-out bag inside bag full of shortening making sure to match zipper tracks: single w/double and double w/single. Zip bags together and push shortening around to distribute evenly. Prepare ice water.

Put non-writing hand inside the double (insulated) bag and put both hands into the ice water. With students, hold bag at wrist to make sure that the top of the bag doesn't go below the surface of the water. Keep hands in ice water as long as possible; record each time. As soon as removing hands, try to write name, draw a circle or button a button with both hands. Record your observations.

**TEACHER NOTES:** This activity can be enhanced by making another "double" bag using feathers. The students can try the feather bag in the ice water and they can put the blubber bag inside the feather

bag and experiment as a penguin.

This activity also could be used with a book about polar bears. Polar bears don't hibernate; they curl up and let the snow cover them. Sled dogs keep warm in the same manner. An adult polar bear has a layer of fat up to four inches thick. This layer of fat as well as their dense coat protects polar bears in their harsh environment. However, the coat is much better suited to provide an insulating layer on land rather than in the water. A polar bear's skin is really black, and the hairs of the fur, while appearing white, are actually hollow and transparent. Hold a bunch of clear drinking straws in your hand. The straws will appear to be white in the light!

Here are two websites with more information:

[www.polarbearsinternational.org/](http://www.polarbearsinternational.org/)

[www.siec.k12.in.us/~west/proj/penguins/main.html](http://www.siec.k12.in.us/~west/proj/penguins/main.html)

Two book suggestions are:

*Ice Bear: In the Steps of the Polar Bear* by Nicola Davies

*Ice Bear and Little Fox* by Jonathan London

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**STANDARDS:**

**BSL:** 3.3, 4.11, 5.2, 5.3, 5.4, 12.1

**NCTM:** 4d, 10a

**SCS:** A1, A2, B1, C1, C3, H2, H4

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