

## Did you know?

1. Adelie Penguins have 100 feather/cm<sup>2</sup>, which is more than other birds.
2. The average mass of an Adelie penguin egg is 101-124 g.
3. Chicks weigh 86 g when they hatch and gain 100 g a day until they are about 50 days old when they are ready to take care of themselves.
4. Adelie Penguins can walk 2 km/hr over the sea ice.
5. Adelie Penguins can swim, at speeds sustained for hours, at 8 km/hr; pursued by a leopard seal they probably swim 25 km/hr or faster.
6. The average nest has 200 rocks.

## Direct Observation

Scientists don't always use expensive and complex equipment to gather data. Frequently they use their eyes or simple tools like, binoculars, a meter stick, a spring scale or a timer. Before the age of electronics, these simple tools were all researchers had and good science was accomplished.

Weighing birds to find the average weight of all penguins in a populations, or how much weight gain or loss happens over time is important information. Since penguins can not fly they are easy to catch the first time and we put them in a bag attached to a spring scale for measurement. To gather multiple weights of the same bird researchers need the help of the computer.



*In these pictures you see a penguin in our cloth bag attached to the spring scale. One person reads the scale as the other person records the weight in the field journal. To measure eggs, we slowly lift the nesting parent, pull out the egg, place it in the cloth bag to keep it warm and measure and record its weight. Then we gently replace the egg under the parent. After weighing several eggs we find that the average for Adelie Penguin egg is between 101-124 g, which is about twice a big as a chicken's egg.*

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Adelie Penguins did not leave their nests when we did this, but squawked at us fiercely, and were happy when we returned the egg. We do the same thing for chicks every few days as the season progresses to monitor their weight gain. The data are stored in a computer for comparison with other years. This way we know if things are changing in the population year to year. At the end of the season we analyze all the weights, create a graph and learn that chicks gained about 100 g a day for the 50 days they were being fed by their parents. That gets them to become 30 times their birth weight. Most human babies weigh about 7 lb when they are born. If they gained weight at the same rate as an Adelie Penguin, how much would human babies weigh in 50 days?



*On the left is a one day old chick about 86 grams and on the right, 50 days later, the chick is about the same weight as the parent.*

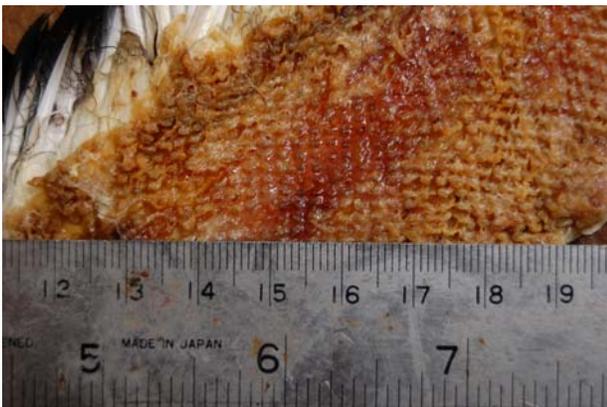
Adelie Penguins would rather swim than fly. During most of the year they live on ice floes on the open ocean. That way they are near their food and do not have to walk very far. However as the breeding season begins they must walk long distances over the sea ice to reach the land where they will build their nests. It can be 30-50 kilometers or more.



*Penguins would rather swim than walk. In these pictures you see penguins walking across miles of sea ice to get to their breeding colony, and as well as a penguin swimming. They swim in a porpoise motion and take a breath of air every time they are in the air.*

To calculate how fast they walk we measure a distance on the sea ice and then with a watch time how long it takes for the penguins to make the trip. Sometimes penguins walk fast, sometimes they walk slowly, sometime they stop for a rest, other times they do not. Average walking speed is about 2 km per hour. To find out how fast penguins swim is a bit harder. Before electronics, researchers would travel along side of a swimming penguin and record the speed of the boat. Now we use satellite tags comparing the distance a penguin swims and how long it takes them to get there. They travel long distances at 8 km per hour.

Sometime there is nothing to do but to count. In past years to find out how many penguins there were, researchers had to walk through the colony and count every bird, recording the totals for each area in their field journal, and then adding them up at the end. Today we take aerial photographs. But some jobs still need to be done by hand.



*The inside of an Adelie Penguin skin. Each bump is where a feather is attached, and you can see how many there are. Count them if you can and do your own calculation. On the right is an empty nest with over 240 rocks in it. Yes, we counted each one.*

Penguins have a very dense coat of feathers. The feathers keep them warm when they are on the ice floes, and they keep them dry when they are in the water. Over 100 feather in each square centimeter. Next time you look at chicken skin, count the feather bumps, you will see far fewer in any 1 cm area.

In this day of electronic gadgets and instruments, scientists still use their eyes and very simple tools to gather much of their information. Being a good observer is an important skill that most scientists have.