



A Breath of Air

When we are resting quietly at the bottom of the ocean of air we live in (the atmosphere) we breathe in about half a litre of air every four seconds. In a lifetime, at that rate, we breathe enough air to fill a hockey arena or about 300,000 cubic metres.

When we exercise, we breathe in much more air and more often. Our total lung capacity is one indicator of our physical fitness.

To measure your lung capacity, take several deep breaths then blow up a 25 x 34 cm plastic bag, emptying your lungs as much as possible.

Seal the bag of exhaled air with a twist-tie.

Now fill a pail with lukewarm water in a sink until the water overflows. Press the bag of breath into the pail with a flat cover until no more water overflows. Remove the cover and bag and measure water into the pail until it is just ready to overflow again. The volume of water you measured is your total lung capacity.

An average adult has a lung capacity of about 3.6 litres. Athletes will have a larger capacity.

People who live on mountains have the largest lungs of all. This is because at sea level air pressure is about one kilogram per square centimetre while at about 8,000 metres above sea level, where some Andean miners work, the air pressure is about half as much. The miners must breathe twice as much air as those who live by the sea. From the air we breathe in, we use about 250 mL of oxygen each minute and we breathe out about 200 mL of carbon dioxide every minute.

We also breathe out eight times more water vapor (steam) than we breathe in. This helps keep our bodies at an even 37 deg. C. The breath in the plastic bag, therefore, contains the same nitrogen (about 80%) and argon (about 1%) we breathed in, but it has less oxygen, more water vapor, and about 100 times more carbon dioxide.

Deep sea divers and space travelers study the chemistry of air very carefully. As they say, "They don't leave home without it".

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by Doug Hayward, University of British Columbia, 1988