

Breathing & Energy

Semester A: Basics, Class # A7, Nov 10, 2015

Breathing

Breathing is an essential process of automatic exchange of gases without which life will not exist.

There are two breathing systems:

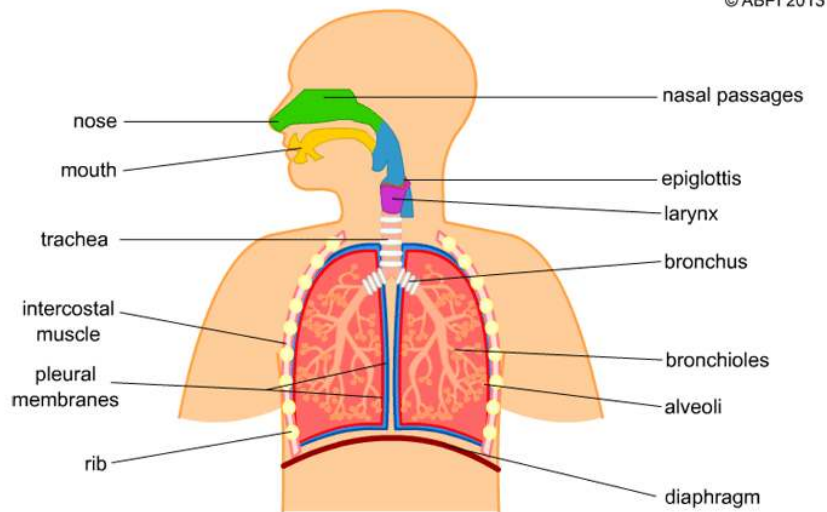
1. Upper Respiratory System
It takes place in the lungs. It is external Mechanical process.
2. Cellular Respiratory System
It takes place in each cell of every organ and tissue of the body.
It is an Internal Chemical process. (It is an aerobic breakdown of glucose in the mitochondria to make ATP.)

Function of Breathing

Respiratory systems allow body to move oxygen (needed for cellular respiration) into body tissues and remove carbon dioxide (waste product of cellular respiration) from cells.

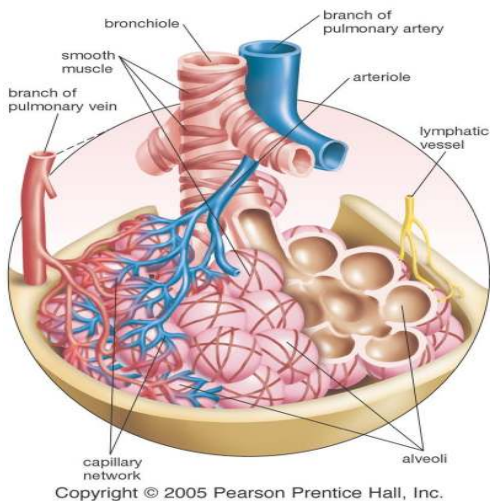
The primary gases (largest volume) at Cellular levels are:

- Oxygen (O₂)
- Carbon Dioxide (CO₂)



The alveoli

(b)



Alveoli are moist, thin-walled pockets which are the site of gas exchange. A slightly oily surfactant prevents the alveolar walls from collapsing and sticking together.

Respiratory System Organs

- Nasal Cavity = 1
- Mouth = 1
- Pharynx = 1
- Trachea = 1
- Epiglottis = 1
- Lungs = 2
- Primary Bronchi (bronchus singular) = 2
- SML Bronchi = 1020
- Bronchioles = 262,000
- Alveoli = 300 Millions
- Lymph ducts = 4.2 Millions
- alveolar ducts, alveolar sacs, Capillaries, Cilia

TOTAL Surface of Alveoli in adult is approx. 5,000 to 10,000 sq. meter i.e. imagine a field of 100 meter x 100 meters

Upper Respiratory System in Action

1. NASAL CAVITIES: It has layers of sagging tissue filled with tiny capillaries. Air is warmed in the Nasal cavities.
2. AIRWAY PATH: Air is moistened by MUCOUS MEMBRANES lining the entire Airway System.
3. INITIAL PART AIRWAYS: Air is cleaned of dust particles and other particulates by CELIA & MUCOUS MEMBRANE in the Initial parts of the Airways.
4. LUNGS: The incoming air mixes with the residual "gasses" and the exchange of gases takes place into and out of blood
5. Air is exhaled.

Upper Respiratory System in Action

There are 2 processes in breathing:

1. Inhalation
2. Exhalation

Inhalation Action

1. The Intercostal muscles contract, sending the rib cage upward and outward
2. The Diaphragm contracts, and moves downward
3. The Volume inside of the chest cavity increases
4. The Pressure inside the chest cavity decreases
5. Air enters the lungs to equalize the pressure

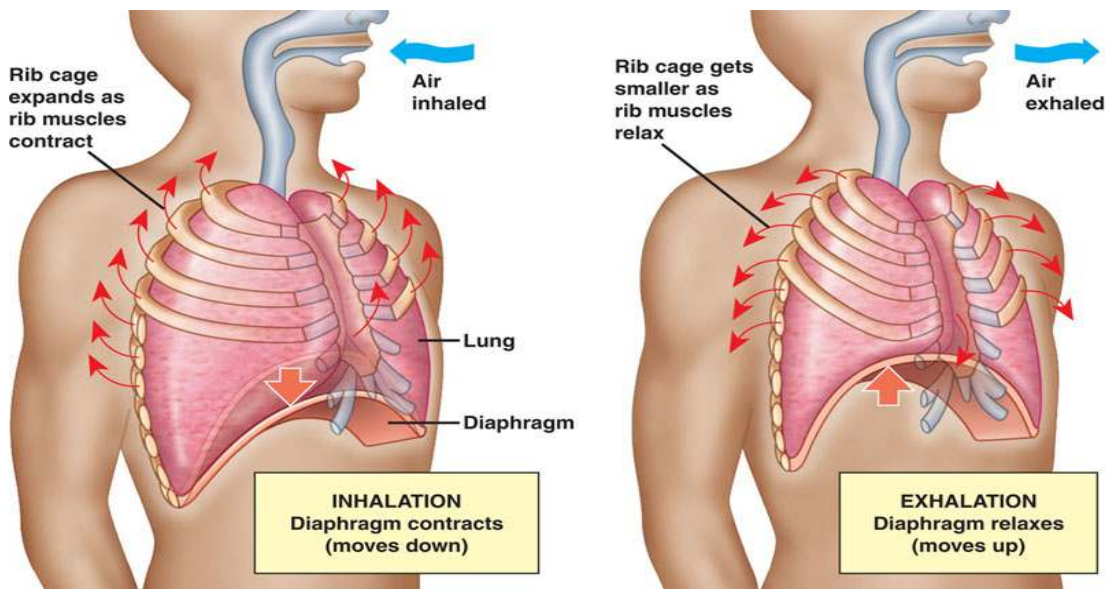
Exhalation Action

1. The Intercostal muscles relax, sending the rib cage downward and inward
2. The Diaphragm relaxes, and moves upward
3. The Volume inside of the chest cavity decreases
4. The Pressure inside the chest cavity increases
5. Air exits the lungs to equalize the pressure

Volume and Capacity

- Tidal Volume - Normal Breathing
- Reserve Volume - with extra effort
- Vital capacity - both combined
- Residual Volume - Air in system after greatest effort to exhale.

Deep Vs Shallow Breathing



- **Deep/Diaphragmatic/Abdominal breathing** requires contraction of the diaphragm increasing the tidal volume and making much more available for gas exchange.
- **Shallow/Costal breathing** requires contraction of the rib/intercostal muscles and very little diaphragm. This makes very little air available for gas exchange.

Volume and Capacity

Both forms of breathing are habit and under your control.

- **hyperpnea**: deep and rapid respiration that occurs normally after exercise or abnormally with fever or various disorders
- **eupnea**: normal, relaxed breathing; healthy condition of inhalation and exhalation

Composition within the Lung, Air sacks (Alveoli)

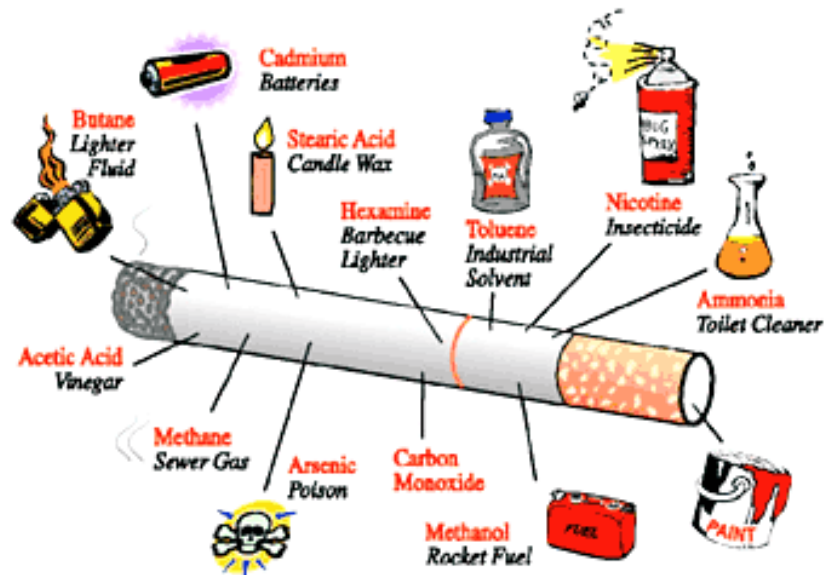
	Inhaled Air	Exhaled Air
Oxygen Concentration	21 %	16 %
Carbon Dioxide Concentration	0.04 %	5 %
Nitrogen Concentration	78 %	78 %
Dryness	Drier	Moist
Temperature	Colder or Warmer than 37 C	Warm (close to 37 C)
Cleanliness	Dirtier	*Cleaner (filtered)

Composition within the Lung, Air sacks (Alveoli)
Gas Exchange by Diffusion only (Greater to Lesser Concentration)

GAS	%
Oxygen	21 %
Carbon Dioxide	0.04 %
Nitrogen	78 %

Air Pollution

- Traffic Exhaust (carbon monoxide CO, CO₂)
- Dust
- Pollen
- Sulfur Dioxide
- Cigarette Smoke
- Volatile organic Compounds (e.g. paint, carpet)



Effects of Air Borne Pollutants

- Cilia and Microcilia become clogged with dust and other contaminants severe enough to become hardened and unable to function.
- Mucous secretions increase with irritation to protect bronchial and lung lining, narrowing the airways and providing sites for bacteria to multiply.
- Lung tissue becomes stiff and less flexible.
- Makes breathing more difficult and the heart works harder to move more oxygen per litre of blood to oxygen starved cells.
- CO has anesthetic effect on cilia tissue and white blood cells.

Some Facts About Respiration

- About half a liter of water per day is lost through breathing.
- Yawning brings more oxygen to the lungs.
- Your right lung is larger than your left.
- We breathe 13 pints of air every minute.
- People under 30 take in double the amount of oxygen in comparison to someone who's 80 years old.
- At rest, the body takes in and breathes out about 10 liters of air each minute.
- The right lung is slightly larger than the left.
- The highest recorded "sneeze speed" is 165 km per hour.
- The surface area of the lungs is roughly the same size as a tennis court.
- The capillaries in the lungs would extend 1,600 kilometers if placed end to end.
- We lose half a liter of water a day through breathing. This is the water vapor we see when we breathe onto glass.
- A person at rest usually breathes between 12 and 15 times a minute.
- The breathing rate is faster in children and women than in men.
- The average adult produces about 125 milliliters of mucus daily, which is slightly more than half a cup.
- Cigarette smoke paralyzes the cilia, which allows mucus to accumulate and leads to what is called smoker's cough.

Presentation by Phil Feilds

Produced by Max Haroon,

Life Transformation Institute

<http://life-transformation-institute.org>

max@maxharoon.org

Hand-out of Healthy Living Presentations

You can download this (and previous handouts) from Life Transformation Institute's Website:

<http://tinyURL.com/healthhandouts>

There are also links to view animation videos of inhalation, exhalation and structure of air pathway at:

<http://teachhealthk-12.uthscsa.edu/sites/teachhealthk-12/files/activity/downloads/AnatomyofBreathing3.swf>

<https://www.youtube.com/watch?v=k4uNapAUCQU>

https://www.youtube.com/watch?v=hc1YtXc_84A

<https://www.youtube.com/watch?v=DCVIEMNPe1E>

<http://tinyURL.com/healthhandouts>

This is the Health Resource page of the Life Transformation Institute, compiled from many classes, seminars and conferences I have attended and from research, I did for my published books. All health resources are grouped into seven sections.

Section 1: Phil Feilds Course

Section 2: Dental Health

Section 3: Glossaries

Section 4: Food, Water and GMO

Section 5: Toxicity

Section 6: Miscellaneous

Section 7: More Resources, like Books, Magazines, My Publications, etc.

Additional Resources

Life Transformation Institute's website

- Publications
- Classic Book Guides
- Reference Guides
- Health Resources
- Other Resources

More Resources

- Over twenty pages of Resources and links listed in the book: "7 Steps to Dental Health"
<http://7stepsdentalhealth.com>
- Health Websites
- Health Organizations
- Glossary of Holistic and Dental Terms
- Dental Knowledge Test

Publications by Max Haroon

<http://tinyurl.com/maxpublications>

The subjects range from the Internet, career, technology, health, and self development.

- Books Authored
- Reference Guides
- Articles Written
- Reflections /Blogs/Messages
- Book Companions/Discussion kits written for the [Inspirational Books Clubs](#)
- Workshop Kits produced for the Society of Internet Professionals:
- Websites Published & Architected by Max Haroon
- Reviews of Books
- Videos Posted on Youtube.com

Presentation by Phil Feilds

Produced by Max Haroon,

Life Transformation Institute

life-transformation-institute.org