# Human Anatomy & Physiology – Nerves Circulation Respiration

I. N\_\_\_\_\_ System

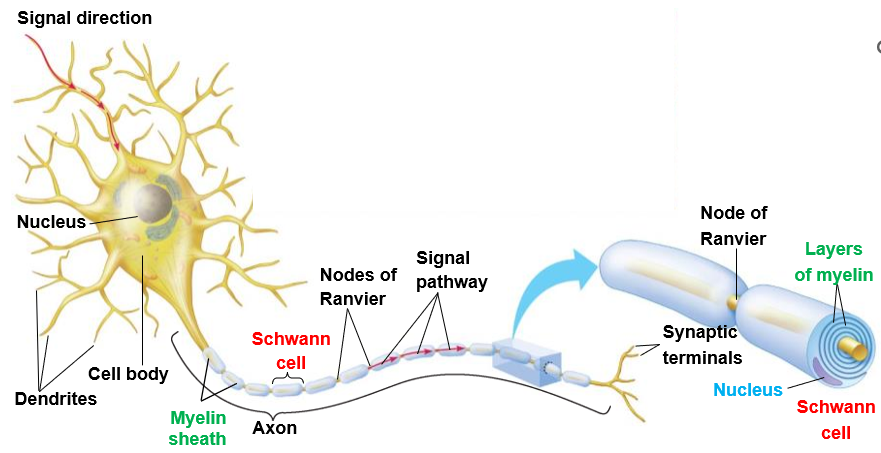
1. Overview
2. Nervous and \_\_\_\_\_ systems work together to coordinate body functions.
3. \_\_\_\_\_ within this system relies on \_\_\_\_\_.
4. Neurons are nerve \_\_\_\_\_ that transmit information via \_\_\_\_\_ and \_\_\_\_\_ signals.
5. MAIN FUNCTIONS:
6. Receive \_\_\_\_\_ Information
7. Integrate the information
8. Coordinate a \_\_\_\_\_
9. Two Main Divisions
10. \_\_\_\_\_ Nervous System (CNS)

* \_\_\_\_\_ & \_\_\_\_\_ Cord

1. \_\_\_\_\_ Nervous System (PNS)

* Nerves which convey information between the CNS and the rest of the \_\_\_\_\_.

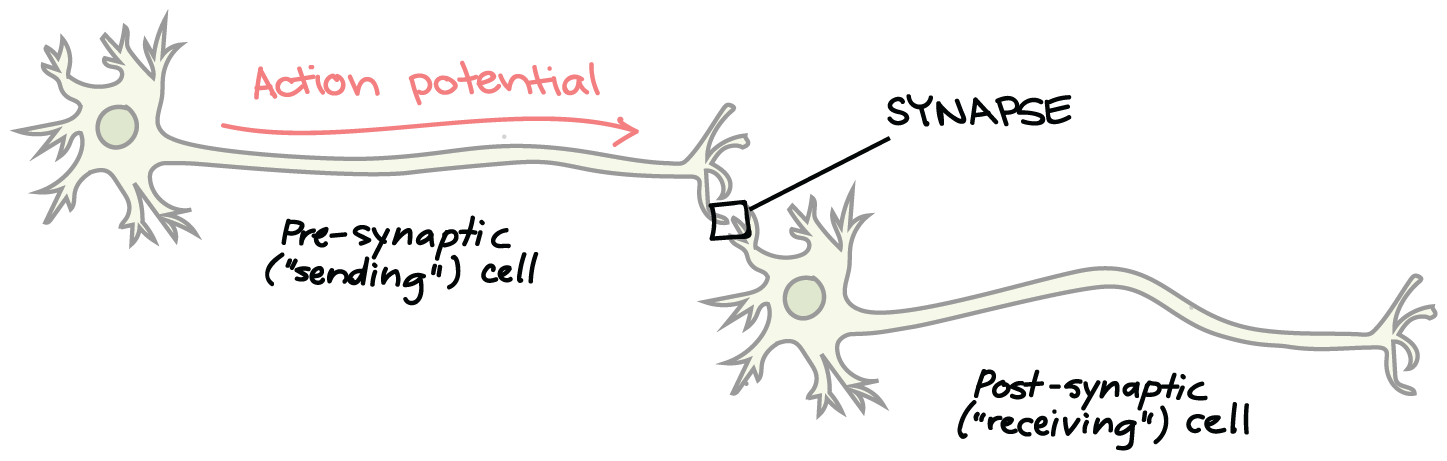
1. \_\_\_\_\_ receptor 🡪 sensory input 🡪 integration in Brain and spinal cord (CNS) 🡪 \_\_\_\_\_ output (peripheral NS) 🡪 \_\_\_\_\_ cells
2. Neurons



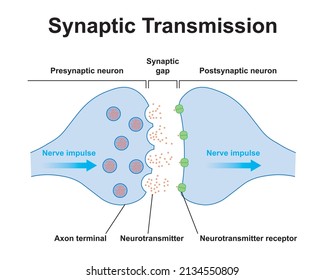
1. \_\_\_\_\_ \_\_\_\_\_ contains the nucleus and other cell organelles.
2. \_\_\_\_\_ *receive* signals from other neurons and convey this information toward the cell body.
3. \_\_\_\_\_: *transmit* signals to other cells.
4. Wrapped in fatty Myelin Sheaths.
5. \_\_\_\_\_ of Ranvier: \_\_\_\_\_ between cells that form Myelin Sheaths.

* \_\_\_\_\_ signal conduction along an axon.

1. A typical axon has hundreds of branches, each with a \_\_\_\_\_ Terminal at the very end.
2. \_\_\_\_\_ cells wrap around axons of motor and sensory neurons to form the myelin sheath.
3. S\_\_\_\_\_



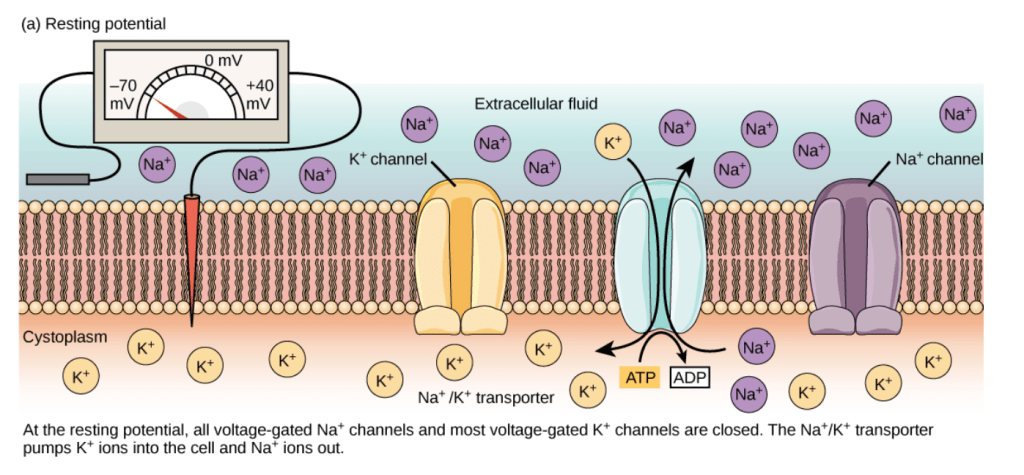
1. The \_\_\_\_\_ between a synaptic terminal and another cell is called a Synapse, or \_\_\_\_\_ point.
2. At a synapse, electrical or chemical signals are transmitted to other neurons or effector cells.
3. Synapses are relay points between a synaptic terminal of a sending neuron and a receiving cell, which could be another neuron.
4. The sending (\_\_\_\_\_) cell secretes a \_\_\_\_\_ *signal*, a \_\_\_\_\_, which crosses the Synaptic Cleft.
5. The neurotransmitter binds to a *specific receptor* on the surface of the \_\_\_\_\_ (\_\_\_\_\_) cell.



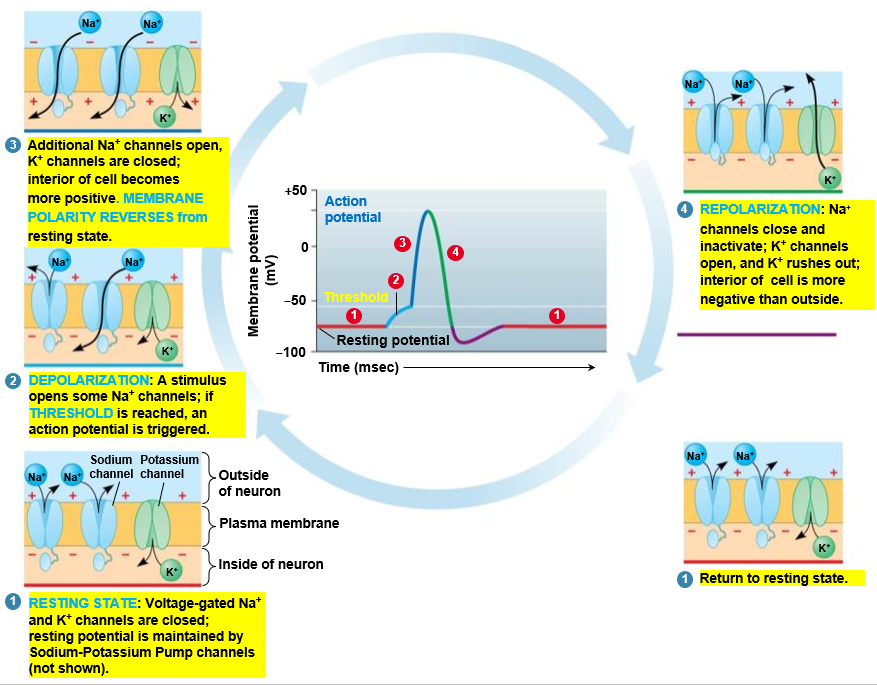
1. Membrane \_\_\_\_\_
2. Nerve function depends on charge differences across neuron membranes.
3. At \_\_\_\_\_, when a neuron is not transmitting a signal, a neuron’s plasma membrane has \_\_\_\_\_ \_\_\_\_\_ — the membrane potential, in which

* just \_\_\_\_\_ the cell is slightly \_\_\_\_\_.
* just \_\_\_\_\_ the cell is slightly \_\_\_\_\_.

1. The \_\_\_\_\_ Potential is the voltage across the \_\_\_\_\_ membrane of a resting neuron.

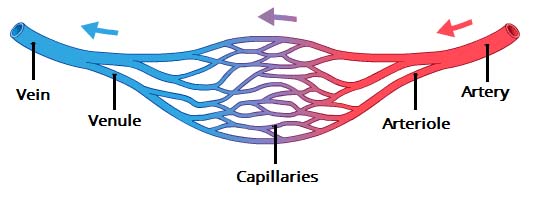


1. All voltage-gated Na+ channels and most voltage-gated K+ channels are closed.
2. \_\_\_\_\_ -\_\_\_\_\_ (Na+-K+) Pumps
3. use energy from \_\_\_\_\_ to actively move \_\_+ out of the neuron and \_\_+ into the neuron.
4. The resting potential exists because of differences in \_\_\_\_\_ concentration of the fluids \_\_\_\_\_ and \_\_\_\_\_ the neuron.
5. The \_\_\_\_\_ \_\_\_\_\_ membrane that surrounds a neuron is \_\_\_\_\_ to charged molecules or ions.
6. To enter or exit the neuron, ions must pass through special \_\_\_\_\_ called ion channels that span the membrane.
7. Ion channels have different configurations: open, closed, and inactive.
8. \_\_\_\_\_ Potential
9. A \_\_\_\_\_ \_\_\_\_\_, called an Action Potential,
10. is a \_\_\_\_\_ in the membrane voltage.
11. that transmits a nerve signal along an \_\_\_\_\_.
12. The rapid flip-flop of the membrane potential is
13. a result of the \_\_\_\_\_ movements of \_\_\_\_\_ across the membrane.
14. at Na+ and K+ *voltage-gated channels*,
15. that open and close in response to stimuli.
16. They propagate in a \_\_\_\_\_ chain reaction along a neuron.
17. They are \_\_\_\_\_ events.

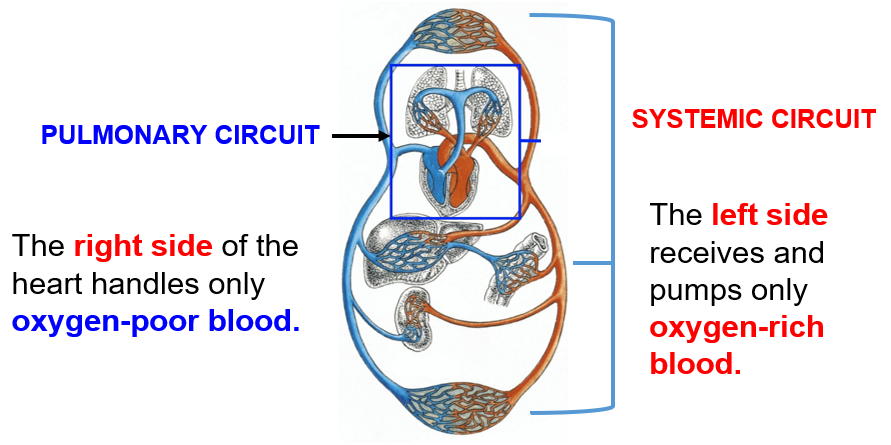


II. C\_\_\_\_\_ System

1. The Circulatory System facilitates exchange with all Body Tissues.
2. To sustain life, the body must
3. acquire \_\_\_\_\_
4. exchange \_\_\_\_\_
5. dispose of \_\_\_\_\_ products.
6. The Circulatory System facilitates these exchanges. It consists of:
7. a \_\_\_\_\_ pump (\_\_\_\_\_)
8. a circulatory \_\_\_\_\_ (\_\_\_\_\_)
9. a set of tubes (\_\_\_\_\_) to carry the circulatory fluid.
10. The vertebrate circulatory system is often called a \_\_\_\_\_ system, with three main types of vessels:
11. \_\_\_\_\_ carry blood \_\_\_\_\_ *from the heart* to body organs and tissues.
12. \_\_\_\_\_ *return blood* \_\_\_\_\_ *the heart*.
13. \_\_\_\_\_ convey blood \_\_\_\_\_ *arteries and veins* within each tissue.
14. Large \_\_\_\_\_ branch into \_\_\_\_\_, which give rise to \_\_\_\_\_, which branch into networks called Capillary \_\_\_\_\_, which infiltrate every organ and tissue in the body.
15. Capillaries converge into Venules, which in turn converge into larger \_\_\_\_\_ that \_\_\_\_\_ blood to the Heart.



1. Land vertebrates have a Double Circulation:
2. The \_\_\_\_\_ circuit carries \_\_\_\_\_ -\_\_\_\_\_ blood between the heart and the lungs.
3. The \_\_\_\_\_ circuit carries \_\_\_\_\_ -\_\_\_\_\_ blood between the heart and the rest of the body.
4. In all Birds and Mammals, the heart has \_\_\_\_\_ chambers with two \_\_\_\_\_ and two \_\_\_\_\_.



1. H\_\_\_\_\_
2. Main component of the circulatory system
3. Muscular Organ (\_\_\_\_\_) about the size of your fist that pumps the blood.
4. \_\_\_ chambers with \_\_\_ valves through which blood must pass on each trip around the body.
5. 70 beats per minute
6. Pumps \_\_\_\_\_ coming from the lungs to all parts of the body through a network of blood \_\_\_\_\_.
7. \_\_\_\_\_ 🡪 special tissue inside the heart that causes it to beat automatically
8. The heart has Four hollow spaces called Chambers.
9. \_\_\_\_\_: upper, \_\_\_\_\_ chambers

* Blood \_\_\_\_\_ the heart through the atria.

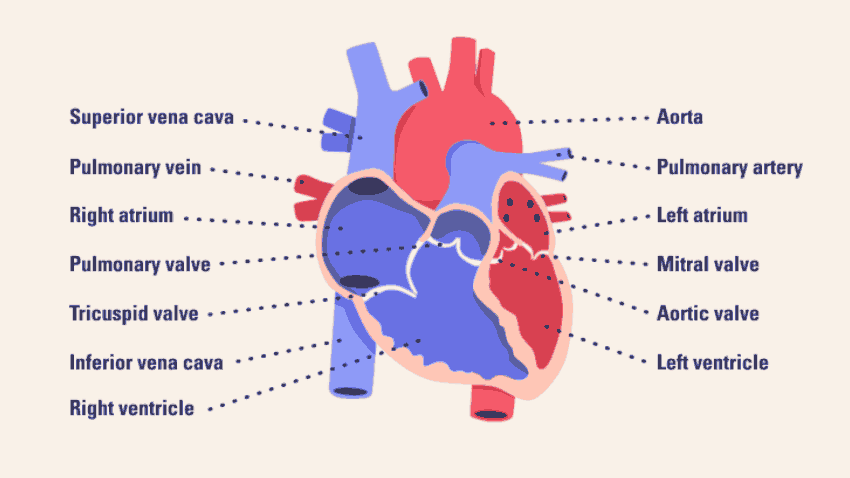
1. \_\_\_\_\_: lower, larger, \_\_\_\_\_ chambers

* Blood \_\_\_\_\_ the heart through the ventricles.

1. Four Valves in the heart direct the flow of blood.
2. \_\_\_\_\_ Valves (Mitral & Tricuspid Valves)
3. \_\_\_\_\_ valves separate the atrium and ventricle on each side of the heart.
4. Allow blood to flow in only one direction: from \_\_\_\_\_ to \_\_\_\_\_.
5. \_\_\_\_\_ Valves (Pulmonary & Aortic Valves)
   * One-way valves allow blood to leave the ventricles, but not return.
6. Each side of the heart pumps blood to a different part of the circulatory system.
7. \_\_\_\_\_ circulation
   1. \_\_\_\_\_ Side of Heart pumps \_\_\_\_\_ from the heart to the \_\_\_\_\_.
   2. Oxygen-\_\_\_\_\_ blood is pumped by the right side of the heart through the lungs.
   3. There it gives off \_\_\_\_\_ \_\_\_\_\_ and picks up \_\_\_\_\_.
   4. This oxygen-\_\_\_\_\_ blood is then returned to the \_\_\_\_\_ side of the heart by the \_\_\_\_\_ \_\_\_\_\_.
8. \_\_\_\_\_ circulation
   1. \_\_\_\_\_ Side of Heart pumps blood \_\_\_\_\_ the heart to the rest of the \_\_\_\_\_.
   2. Oxygen-\_\_\_\_\_ blood leaves the heart to supply the body with oxygenated blood.
   3. By the time blood returns from this systemic circulation, cells throughout the body have absorbed much of the blood’s oxygen, and exchanged carbon dioxide for it.
   4. This blood is now oxygen-\_\_\_\_\_ and ready for another trip to the \_\_\_\_\_ to become oxygen-rich again.
9. Blood flow through the heart:
10. Oxygen-poor blood from the body enters the \_\_\_\_\_ and \_\_\_\_\_ \_\_\_\_\_.
11. Vena Cava empty into the \_\_\_\_\_ \_\_\_\_\_.
12. Blood passes through the Right AV (Triscuspid) Valve into the Right Ventricle.
13. \_\_\_\_\_ Ventricle pumps oxygen-\_\_\_\_\_ blood into \_\_\_\_\_ artery through the semilunar valve (to the \_\_\_\_\_).
14. Pulmonary arteries transport blood \_\_\_\_\_ the lungs for gas exchange.

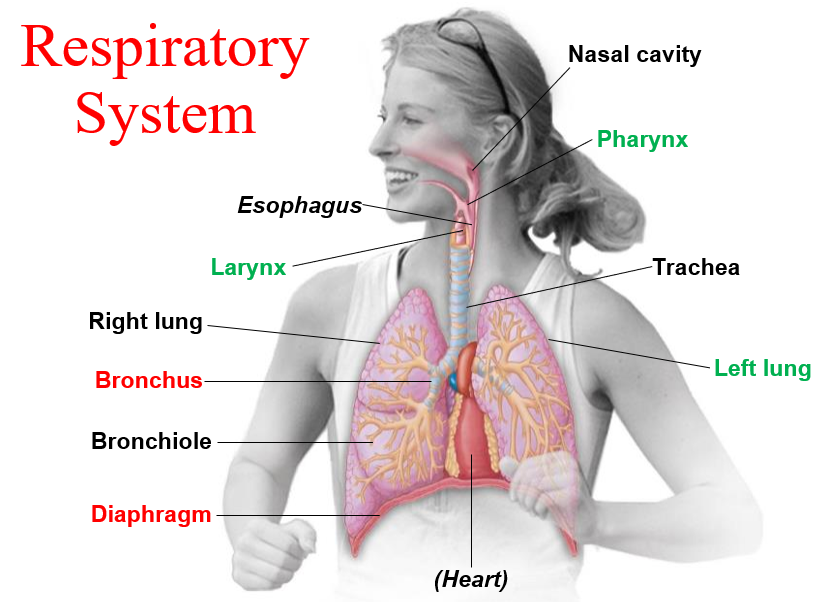
* Blood simultaneously picks up \_\_\_\_\_ and discharges \_\_\_\_\_ \_\_\_\_\_ and other wastes.

1. Pulmonary \_\_\_\_\_ carry \_\_\_\_\_ blood from the lungs to the \_\_\_\_\_ \_\_\_\_\_.
2. Blood passes through the Left AV Valve into the Left Ventricle.
3. Left Ventricle pumps oxygen-\_\_\_\_\_ blood into \_\_\_\_\_ (Largest artery in the body) through the semilunar valve (to the body).
4. As the blood passes through the capillaries, it delivers oxygen to the cells and absorbs carbon dioxide from them.
5. By the time the blood enters the \_\_\_\_\_, it is \_\_\_\_\_.
6. The veins collect the deoxygenated blood and \_\_\_\_\_ it to the \_\_\_\_\_.



1. The working of the heart
2. One drop may circulate through the body at the rate of once every \_\_\_\_\_.
3. The walls of the \_\_\_\_\_ Ventricle are about 3 times \_\_\_\_\_ than the walls of the \_\_\_\_\_ ventricle.
4. Right Ventricle has to pump blood only to the \_\_\_\_\_.
5. Left Ventricle has to push to the rest of the \_\_\_\_\_.
6. Nourishing the Heart
7. The muscle of the heart receives almost no nourishment from the blood that flows through its chambers.
8. The heart’s nourishment is supplied primarily by two \_\_\_\_\_ arteries.
9. These arteries branch from the \_\_\_\_\_ and enter the heart muscle.
10. Blood \_\_\_\_\_
11. When the heart contracts, both atria function together, and then both ventricles function together.
12. Both the right and left atria receive blood at the same time.
13. When atria contract, both AV valves open and blood flows into the ventricles (\_\_\_\_\_).
14. After a brief pause, both ventricles contract, the AV valves close, and the semilunar valves open. (\_\_\_\_\_).
15. The blood is then pumped into the \_\_\_\_\_ artery and \_\_\_\_\_ at the same time.
16. Heart \_\_\_\_\_
17. Each year more than 700,000 people in the United States die of a heart attack.
18. The most common warning sign of a heart attack is a dull \_\_\_\_\_, ache or “heaviness” in the center of the \_\_\_\_\_.
19. This sensation may spread to the neck, shoulders, and arms.
20. Person may feel weak, \_\_\_\_\_, short of \_\_\_\_\_ and \_\_\_\_\_.
21. Caused by a \_\_\_\_\_ supply of blood to the heart muscle – Occluded \_\_\_\_\_ Arteries
22. B\_\_\_\_\_
23. The average adult has about \_\_\_\_\_ \_\_\_\_\_ of blood inside of their body
24. Parts of Blood:
25. \_\_\_\_\_ – straw-colored part of blood that makes a little more than half the substance of blood.
26. \_\_\_\_\_ Blood Cells (WBC) Fight \_\_\_\_\_, infection.
27. \_\_\_\_\_ Blood Cells (RBC)
28. Deliver \_\_\_\_\_, \_\_\_\_\_ and others to body tissues.
29. Remove \_\_\_\_\_ and carbon dioxide from body tissues.
30. \_\_\_\_\_ \_\_\_\_\_ to prevent blood loss.

III. Respiratory System



* + 1. \_\_\_\_\_ \_\_\_\_\_ involves the Respiratory and Circulatory systems in servicing your body’s cells.
    2. Three Phases of Gas Exchange occur in humans:
  1. Breathing.
  2. Transport of gases by the circulatory system.
  3. Exchange of gases with body cells:
     + Body tissues take up oxygen and release carbon dioxide.
     1. B\_\_\_\_\_
        1. \_\_\_\_\_ of the \_\_\_\_\_ through alternating inhalation and exhalation.
* Air is not moved by the lungs, but by the muscles surrounding the lungs: Diaphragm and Rib Cage Muscles.
  + - 1. I\_\_\_\_\_

1. The \_\_\_\_\_ separates the abdominal cavity from the thoracic cavity & helps ventilate the lungs.
2. Diaphragm \_\_\_\_\_,
3. \_\_\_\_\_ Cage moves up and out;
4. Lungs \_\_\_\_\_,
5. \_\_\_\_\_ rushes in.
   * + 1. E\_\_\_\_\_
6. Diaphragm \_\_\_\_\_ and moves up,
7. Rib Cage moves down and in;
8. \_\_\_\_\_ in the Lungs increases,
9. and air is \_\_\_\_\_ out of the lungs.
   * + 1. Pathway In. In humans, AIR is
10. \_\_\_\_\_ through the \_\_\_\_\_ into the \_\_\_\_\_ Cavity.
11. filtered by \_\_\_\_\_ and mucous surfaces.
12. \_\_\_\_\_ and \_\_\_\_\_.
13. sampled for odors.
    * + 1. Pathway to the lungs. From the Nasal Cavity, air next passes
14. to the \_\_\_\_\_,
15. then to the \_\_\_\_\_, past the Vocal Cords,
16. into the \_\_\_\_\_, held open by cartilage rings;
17. into the paired \_\_\_\_\_,
18. into \_\_\_\_\_,
19. to the \_\_\_\_\_, grapelike clusters of air sacs, where \_\_\_\_\_ \_\_\_\_\_ occurs.
    * 1. Gas Exchange
20. \_\_\_\_\_ walls are only \_\_\_\_\_ cell thick.
21. Many tiny Capillaries surround the alveoli; their walls are also one cell thick.
22. In alveoli,
23. O2 diffuses into the blood.
24. CO2 diffuses into the alveoli.
25. \_\_\_\_\_ in the air passes through the walls of both the alveoli and the capillaries to enter the blood.
26. \_\_\_\_\_ \_\_\_\_\_ in the blood can pass just as easily into the alveoli.
    * 1. \_\_\_\_\_ Phases of Gas Exchange occur in humans:

1. \_\_\_\_\_.

2. \_\_\_\_\_ of gases by the circulatory system.

3. \_\_\_\_\_ of gases with body cells:

