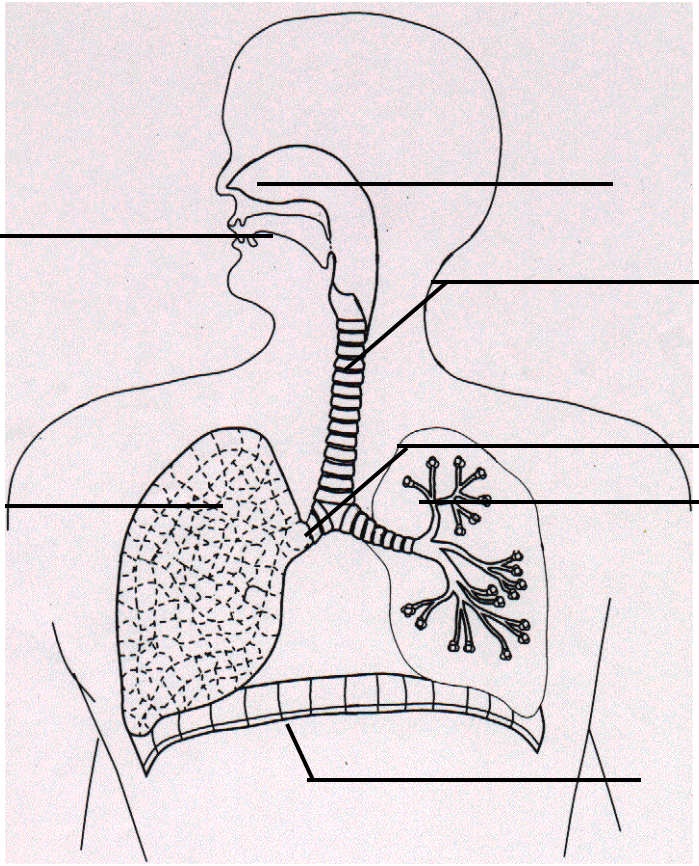
NAME _____

3.3: Review Sheet

3.3.a. Why do we need oxygen?

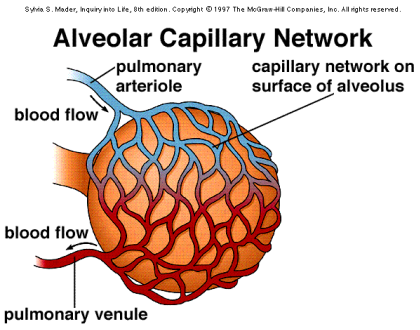
Oxygen is needed for cellular respiration and energy metabolism from food (oxidative phosphorylation).

3.3.b. How do we breathe?



- Label the parts of the respiratory system.

We take in air through our nasal cavity. It passes through the pharynx (along with food) and through the larynx (voice box) into the trachea (wind pipe). The trachea branches into a left and right **bronchus**, which enter the left and right lung, respectively. The 2 bronchi branch into smaller bronchioles. The bronchioles get smaller and smaller, ending in 300-500 alveoli (the *"hollow"* sites of gas exchange). The **alveoli** are wrapped in capillaries that carry oxygen away from the **alveoli** (to all the body tissues) and bring carbon dioxide to the **alveoli** (for removal from the body).



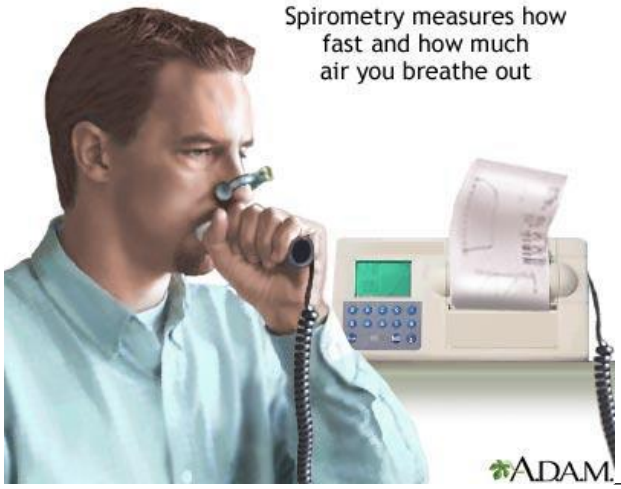
3.3.c. How does the oxygen we inhale get to all of our cells?

- The respiratory system is located in the _____ cavity.
- The respiratory system works with the _____ system to send blood to each cell in the body.

3.3.d. How much air do we normally breathe in and out? 3.3.e. How much air can our lungs actually hold? 3.3.f. How do we measure lung capacity? 3.3.i. How do we measure oxygen capture?

- We process approximately 300 cubic feet of air/day.
- Each individual has different expected ranges. Study the averages to the right.
- On average, male lungs are larger than female lungs.
- Lung capacity is measured using a spirometer.
  - Oxygen content in inhalation is approximately 20.8%
  - Oxygen content of exhalation is about 15.3%
  - Oxygen capture is the difference (approximately 5.5%)

Volume Measurement (L)	Expected Range (L)
Tidal Volume (TV)	0.4 – 0.5
Inspiratory Reserve (IRV)	2.5 – 3.5
Expiratory Reserve (ERV)	1.0 – 2.0
Vital Capacity (VC)	4.5 – 6.0
Residual Volume (RV)	1.5*
Total Lung Capacity (TLC)	5.0 – 7.0

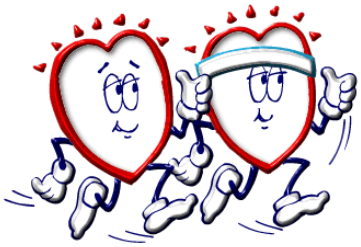


- _____ - The volume of air breathed in and out without conscious effort.
- _____ - The additional volume of air that can be inhaled with maximum effort after normal inhalation.
- _____ - The additional volume of air that can be forcibly exhaled after normal exhalation.
- _____ - The total volume of air that can be exhaled after maximal inhalation: VC = TV + IRV + ERV.
- _____ - The volume of air remaining in the lungs after maximum exhalation (under normal conditions, the lungs are never completely emptied).
- _____ - Total volume of the lungs is the sum of the vital capacity and the residual volume: TLC = VC + RV.
- _____ - The volume of air breathed in one minute without conscious effort: MV = TV x (breaths/minute).

3.3.g. How efficient are our lungs at capturing oxygen from the air?

- Healthy humans use about 10% of their lung capacity at rest.
- 21% of the air around us is oxygen and the air we breathe out is about 15% oxygen.

3.3.h. Why might some people be more efficient at capturing oxygen than others? 3.3.k. How does a respiratory therapist assist patients with ventilation and utilization of oxygen?

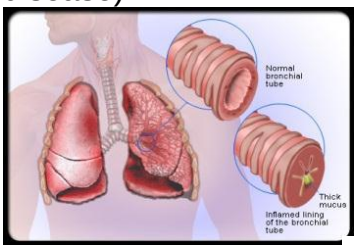


• Efficiency is increased by:
  ○ Regular cardiovascular exercise
  ○ Daily deep breathing
  ○ Avoiding cleaners, pollutants, and smoke
  ○ Eating fruits/veggies with antioxidants
	• Respiratory therapists diagnose respiratory problems and council patients and provide treatment:
	  ○ Supplemental oxygen
	  ○ Inhalers
	  ○ Removal of mucus from lungs
	  ○ Artificial respiration

3.3.j. What are examples of diseases or medical conditions that would affect breathing and/or oxygen capture?

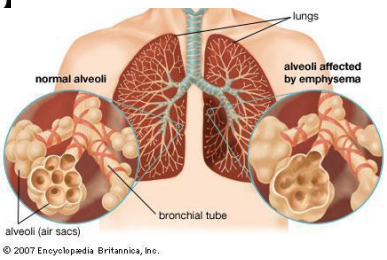
Bronchitis ***("inflammation of bronchi")***

Forms of COPD (chronic obstructive pulmonary disease)



Bronchial tubes are inflamed, irritated membrane swells & blocks air flow

Emphysema

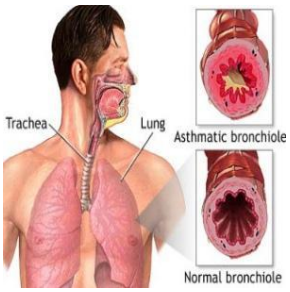


The **alveoli** are destroyed, smoking is the primary cause (can also be genetic), causes shortness of breath

Lung cancer

There's uncontrolled growth of tissue, persistent coughing is common sign, main cause is smoking.

Asthma



Environmental triggers cause inflammation or tightening of **bronchial tubes** and/or excess mucus production, blocking air flow