

PENANG SANGAM HIGH SCHOOL
P.O.BOX 44, RAKIRAKI
LESSON NOTES

Subject: Biology

Year/Level: 11

Week 26

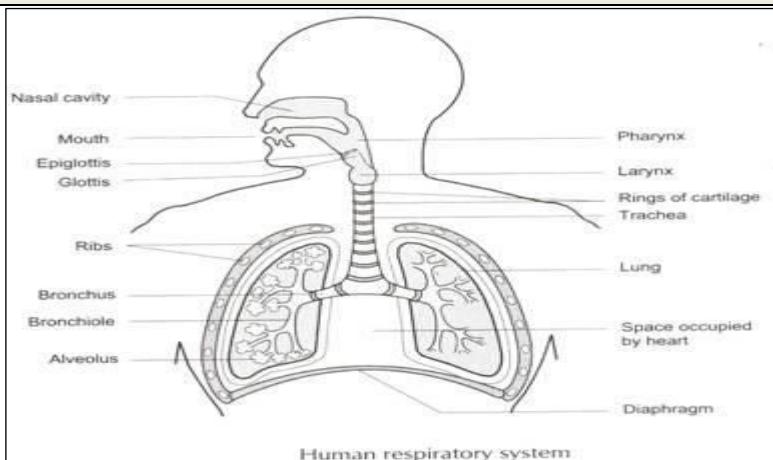
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| Strand | 1 Structure and Life Processes |
| Sub Strand | 1.6 Structure And Functions In Animals |
| Content Learning Outcome | Discuss the respiratory system, its functions and diseases associated with it. |

THE RESPIRATORY SYSTEM

THREE Processes that take place in this system:

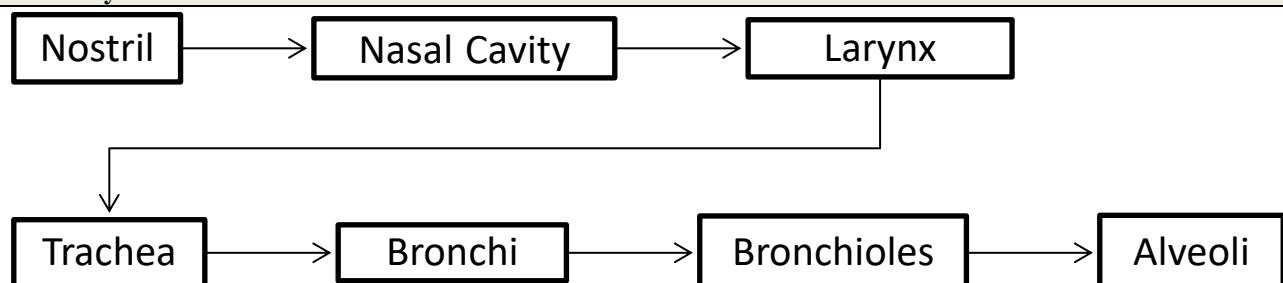
1. Breathing
2. Gaseous exchange
3. Cellular respiration

THE HUMAN RESPIRATORY SYSTEM



The respiratory system enables body to move oxygen (O_2) into and carbon dioxide (CO_2) out of the body by the process of breathing.

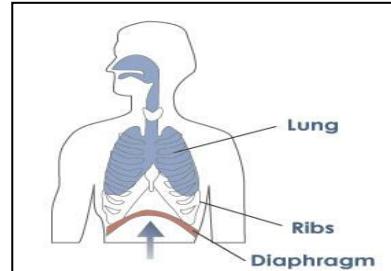
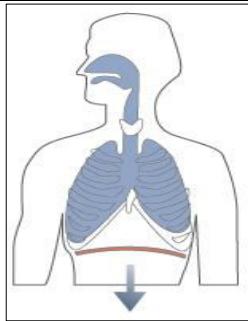
Air Pathway



- Small hairs in the nose traps dust and germs in the air
- Cilia and mucus lining on trachea walls trap dust particles, bacteria and other things which are not needed.
- Air passes into the 2 bronchi
- Gas exchange takes place at the alveoli.

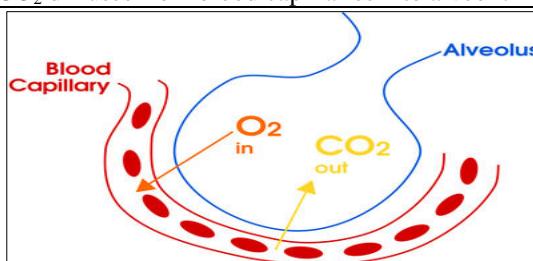
1. The Breathing Process

| Inhalation (taking air into the lungs) | Exhalation (taking air out of the lungs) |
|--|--|
| <ul style="list-style-type: none"> - Diaphragm muscles contracts, flattening beneath the lungs - Intercostal muscles contracts, pulling the rib outwards - Volume of the chest cavity increases, lowering the air pressure. - Air rushes in from outside to equalize the pressure. | <ul style="list-style-type: none"> - Diaphragm muscles relaxes, pushing up against the lungs - Intercostal muscles relaxes, ribs fall back. - This reduces the volume of the chest, increasing the air pressure. - Air rushes out until the air pressure inside and outside the lungs are equalized. |



2. Gaseous Exchange Process

- Alveoli are tiny air sacs which are one cell thick and covered with blood capillaries.
- O₂ concentration is high in the alveoli than in the blood capillaries.
- CO₂ concentration is high in the blood capillaries than in the alveoli.
- O₂ diffuses from alveoli into the blood capillaries.
- CO₂ diffuses from blood capillaries into alveoli.



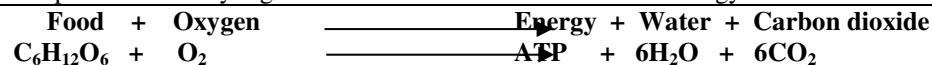
Adaptations of a Gas Exchange Surface:

1. Should be moist
 2. Should have a large surface area.
 3. Should be thin
 4. Should be well supplied with blood vessels.
- Alveoli – extremely thin, moist, has large surface area and are rich in blood capillaries.

Note: the exhaled air is forced through the vocal cords at the top of the trachea. Moving air vibrates the cords making sound.

3. Cellular Respiration

- The process whereby digested food is broken down to release energy:



Malfunctions of Respiratory System

| Disease | Description/ Causes | Signs & Symptoms | Prevention/Cure/ Treatment |
|----------------------------------|--|--|--|
| 1. Asthma | An inflammatory disorder of the respiratory tract. It can be caused by both genetic and environmental factors. | Wheezing, shortness of breath, coughing and tightness of chest. | Prevention: avoid allergens (dust, pollen) Treatment: inhaling corticosteroids |
| 2. Lung cancer | Uncontrolled growth in cell tissues of the lungs | Shortness of breath, coughing and weight loss | Treatment: surgery, chemotherapy, radiation therapy, targeted therapy Prevention: avoid smoking and carcinogens |
| 3. Tuberculosis MTB or TB | A deadly infectious disease caused by various strains of mycobacteria which attack the lungs | Chronic cough with bloodtinged sputum, fever, night sweats and weight loss. It is spread through air- from coughing, sneezing, saliva by infected person. | Treatment- requires long courses of multiple antibiotics |
| 4. Whooping cough (Pertussis) | Caused by an infection with a bacterium known as <i>Bordetella pertussis</i> The bacteria attaches to the lining of the airways in the upper respiratory system and releases toxins that lead to inflammation and swelling. | Besides a cough that sounds like “whoop”, symptoms include a runny nose, nasal congestion and sneezing. Spreads by social contact such as handshakes or sneeze. | Treatment: antibiotics |
| 5. Pneumonia | Infection that inflames air sacs in one or both lungs, which may fill with fluid or pus. The infection can be life | Cough with phlegm or pus, fever, chills and difficulty in breathing Spreads by social contact | Treatment- antibiotics can treat many forms of pneumonia Vaccines can prevent some form of pneumonia. |

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| | threatening to infants, children and people over 65. | such as handshakes or sneezes | |
| 6. Hay fever | An allergic response causing itchy, watery eyes, sneezing and other similar symptoms Caused by: tree/ grass pollen, spores from fungi and molds | Sneezing, runny nose and red, watery and itchy eyes | Diagnosis involves history-taking, examination of nasal passages and sometimes skin testing Antihistamine medications can reduce symptoms |
| 7. Influenza | Caused by influenza viruses The flu attacks the lungs, nose and throat Young children, older adults, pregnant women, and people with chronic disease or weak immune systems are at high risk. | Fever, muscle ache, cough, congestion and fatigue Spreads by social contact such as handshakes or sneezing | Treatment: rest, fluids and sometimes antiviral medications An annual vaccine can help prevent the flu and limit complications |
| 8. Laryngitis | An inflammation of the voice box from overuse, irritation or infection Caused by colds or flu May last for short time (acute) or be ongoing (chronic) | Hoarseness and loss of voice Spreads by social contact such as handshakes or sneezing | Acute Laryngitis- resolves by its own. Chronic Laryngitis- treatment is aimed at the underlying condition such as heart burn or smoking |
| 9. Bronchitis | Inflammation of the lining of bronchial tubes Caused by bacteria & viruses that causes flu Acute Bronchitis- caused by respiratory infection such as a cold and improves itself Chronic Bronchitis- often due to smoking causing constant inflammation and needs ongoing medical attention | Coughing up thickened mucus and shortness of breath | Treatment- ranges from soothing remedies and inhalers to antibiotics and steroids. |
| 10. Emphysema | A group of lung disease that block airflow and make it difficult to breathe. Mostly caused by smoking. | Shortness of breath, wheezing or a chronic cough | Prevention: stop smoking, Avoid other respiratory irritants, Exercise regularly, Protect yourself from cold air, Get recommended vaccinations, Prevent respiratory infections Treatment : Bronchodilators, Inhaled steroids, Antibiotics |

EXERCISE:

1. Name 3 characteristics of the alveoli that helps gases to diffuse more quickly between the blood and lungs.
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2. Describe 1 way in which your respiratory system protects itself from lung infections.
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