

Summer School Physiology and Clinical Skills Workshop. Tutor Sheet

10.15-11.15am CSLC

Intended Learning Outcomes:

By the end of this session, pupils will be able to:

1. Understand the process of ventilation
2. Teach a peer the basics of the process of ventilation
3. Undertake a brief respiratory exam

Lesson Plan

Ice breaker and ILOs: 5 minutes

Ask the pupils to tell you who their favourite doctor on TV or in a book

ILOs

By the end of this session, pupils will be able to:

1. Understand the mechanism of ventilation
2. Undertake a brief respiratory exam

Process of Ventilation. 10 minutes

Ask pupils to watch this video on the ventilation process:

https://www.youtube.com/watch?v=0fVoz4V75_E

(10 minute video)

If the video doesn't work, use the annotated notes below to give a 10 minute overview of ventilation to pupils:

- The lungs help you to breathe in oxygen and breathe out carbon dioxide
- Air is breathed in by the diaphragm contracting and pulling the lungs down, and the chest muscles contracting to expand the chest wall - the vacuum created draws air in
- Diaphragm and chest muscle relaxation always the lungs to go back to normal size, causing air to go out
- Air goes first to nasal cavity - hairs and mucous trap particles
- Sinuses - make air warm and moist
- Then goes to pharynx then larynx
- Then trachea, which splits into 2 main bronchi

- Right lung - upper, middle, lower lobes
- Left lung - upper and lower lobes
- Bronchi then become smaller bronchi - cartilage supports them
- Beta adrenergic receptors in walls stimulate sympathetic nervous system to dilate airways
- Muscarinic receptors in walls stimulate parasympathetic system to constrict airways
- Muco -ciliary escalator helps move particles up to pharynx, using movements of ciliated columnar cells
- Terminal bronchioles - last part of conducting bronchioles
- Then become respiratory bronchioles. They have alveoli
- Alveolar wall - lined by pneumocytes. Mainly type 1 but also type 2
- Type 2 pneumocytes secrete surfactant, to reduce surface tension and keep alveoli open
- Blood -gas barrier consists of alveolar wall, basement membrane and capillary wall
- CO₂ diffuses from the deoxygenated blood to the alveoli air.
- O₂ diffuses into the blood- oxygenated blood then travels along pulmonary vein to heart.

(Notes annotated from the Osmosis video https://www.youtube.com/watch?v=0fVoz4V75_E)

Problem solving exercise: 10 minutes

Ask the pupils to consider the following questions:

1. Ask pupils to explain the process of ventilation to their peer (have they understood the process).
2. What are the implications of the muco-ciliary escalator not working and the consequences of mucus being very thick, on a patients respiratory system.

Physical Exam- 15 minutes

Focusing on the back of the chest, demonstrate the following to pupils:

1. Inspection
2. Chest expansion
3. Percussion
4. Auscultation

Also demonstrate how to measure the radial pulse and respiratory at rest over 1 minute.

Then get them to get into pairs and practise on each other.

Females will examine other females and males will only examine other males.

Other activities- 10 minutes

Then get the group to walk on the spot for 2 minutes, and to measure their partner's respiratory rate and heart rate (if running late you can go to running on the spot or straight to summary.)

Get them to then run on the spot for 2 minutes, and to measure their partner's respiratory rate and heart rate again.

Summary- 5 minutes

This is the opportunity for pupils to review their learning and ensure that all the intended learning outcomes have been covered