

PAL Worksheet
Week 6 Problem Set 2

CLINICAL APPLICATIONS

During a scheduled routine surgery, Beth's left lung was accidentally punctured by the surgeon. The lung was not damaged, but the pleural cavity was pierced, resulting in a **Pneumothorax** (entering of air from the atmosphere into the intrapleural space).

- 1) What will happen to Beth's left lung as a result of the pneumothorax? Clearly explain your answer:
- 2) What will happen to Beth's right lung as a result of the left lung pneumothorax? Clearly explain your answer:
- 3) Discuss how Beth's collapsed lung(s) can be re-inflated:

Diffuse **interstitial fibrosis** is a restrictive pulmonary disease characterized by decreased compliance of lung tissue and also thickening of the alveolar membranes. Using this information, answer the following questions:

- 1) briefly explain why an individual with fibrosis would have a reduced lung volume.
- 2) Why would a patient with fibrosis have decreased systemic arterial O₂ levels?
- 3) Name two factors that normally affect lung compliance:

Chronic obstructive pulmonary disease (COPD) includes a group of lung diseases involving the narrowing of lower airways:

- 1) How does COPD affect airway resistance?
- 2) On your white board write out the relationship between airflow, resistance and airway diameter:
- 3) Why does exhalation become an active process in individuals with COPD?

Examples of COPDs include chronic asthma, emphysema and chronic bronchitis.

1) Inflammatory changes associated with **asthma** lead to bronchoconstriction. Why would death result from a severe asthma attack?

- Why is it beneficial to carry an inhaler containing albuterol (a beta 2 receptor agonist).
- Could an epi pen be used to save an individual suffering from a severe asthma attack?

Please justify your answer:

2) In addition to collapse of small airways, **emphysema** also causes the breakdown of alveoli. In this case, several small alveoli merge and create larger alveoli.

- How will this affect gas exchange?
- What will the systemic arterial O₂ levels of a patient with emphysema be compared to normal?