Respiratory System
Exercise 36 and 37A / 37 (begins page 537 in 9th, 10th and 11th editions, page 541 in 12th edition) and Dissection 6 (begins page 743 in 9th ed., page 737 in 10th & 11th editions, page 745 in 12th edition)
Lab 8 Objectives

Watch the respiratory video to get oriented (no need to take notes)
Read lab Exercises 36 & 37A / 37
For Exercise 36, do Activities 1, 2 (if specimen is fresh), 3
For Exercise 37A / 37, do Activities 1, 2, 3, 5 BIOPAC (optional), modified 7 and 8 (replaced on objective sheet)
Perform cat dissection (optional as per instructor)
Observe fresh specimens if available

Exercise 36 Activity 1
Identify respiratory organs and structures on diagrams, models and cat:

- **Nose**
- **Larynx**
- **External nares**
- **Trachea**
- **Nasal cavity**
- **Primary bronchi**
- **Hard palate**
- **Hilum of lung**
- **Soft palate**
- **Lung**
- **Nasopharynx**
- **Lobes of lung (3 R, 2 L)**
- **Oropharynx**
- **Diaphragm**
- **Laryngopharynx**

Exercise 36 Activity 3
Identify histological features of respiratory structures:

1. **Trachea**
   - Pseudostratified ciliated columnar epithelium
   - Goblet cell
   - Seromucus glands (in submucosa)
   - Hyaline cartilage
2. **Lung Tissue**
   - Alveolus
     - Simple squamous epithelium
   - Alveolar sacs
   - Respiratory bronchiole (no cilia, no cartilage, has cuboidal or squamous epithelium)
   - Terminal bronchiole (has cilia but no cartilage, has columnar epithelial cells)
   - Bronchiole (ciliated columnar epithelium with cartilage in submucosa)
3. **Emphysema lung**
   - Note loss of alveoli structure
Exercise 37 Activity 1
   - Read and understand Mechanics of Respiration and then observe Boyle’s Law
     (increase volume = decrease pressure) on lung model jar.
   - Record your chest measurements during breathing.

Exercise 37 Activity 2
   Auscultate your respiratory sounds.
   Know normal versus disease sounds.

Exercise 37 Activity 3
   - Measure and record respiratory volumes on a non-recording wet spirometer
     (exhale, never inhale!):
     TV
     ERV
     VC
   - Count respirations per minute
   - Calculate IRV: \[ IRV = VC - (TV + ERV) \]
   - Calculate MRV: \[ MRV = TV \times \text{respirations/min} \]
   - Compare your values to normal volumes.

Exercise 37 Activity 5 BIOPAC experiment (optional as per instructor)
   - Measure and record experimental data
   - Answer questions at end of experiment
   - Compare BIOPAC measurements to wet spirometer measurements and calculations.

Exercise 37 Replacement activity for Activities 7 and 8
   - Perform respiration experiment to demonstrate carbonic acid formation and buffering
   - We will not do either activity as listed. Know the concepts for the activities, but demonstrate
     those concepts using the following experiment:
     Add 50ml water + phenol red solution to beaker number 1
     Add 50ml pH7 buffer + phenol red solution to beaker number 2
     Using a soda straw, blow into beaker #1 and record how long it takes to cause
     the water to become acidic (phenol red is a pH indicator: at neutral or
     alkaline pH it is red, at acid pH it is yellow)
     Repeat for beaker #2

   - What chemical reaction occurred in beaker #1 to produce the acid?

   - Why did the results turn out differently for beaker #2?
Optional Computer Activity:
PhysioEx Exercise 37B (On the PhysioEx CD-ROM packaged with the lab book)
   pages PEx-109 to PEx-123 (back of the book) in 9th edition
   pages PEx-113 to PEx-127 (back of the book) in 10th edition
PhysioEx Exercise 7 pages PEx-105 to PEx-117 (back of the book) in 11th & 12th editions

For study:  Review Sheet Exercise 36  pages 545-548 in the 9th, 10th and 11th editions
           pages 549-552 in the 12th edition
          Review Sheet Exercise 37A  pages 569-574 in the 9th and 10th editions
          Review Sheet Exercise 37  pages 567-572 in the 11th edition
                          pages 571-575 in the 12th edition

Answers in the Instructors Manual at the Eastern Campus Library on reserve

Histology photos are available at www2.sunysuffolk.edu/czuraa