**A Note Regarding Lab Reports:**

1. **ALL group members must contribute equally to all aspects of the report (performing experiments, writing, and final editing), and all members must be ALLOWED to contribute equally to all aspects of the report.**
2. **Percent (%) contribution of each group member should be specified (especially if not equal to the others), & signed.**
3. **Report should be finished and be submitted to ALL group members for FINAL EDITING at least 24 hours before turning it in during your weekly lab time.**

**Part 1: PhysioEx 7 – RESPIRATORY SYSTEM MECHANICS** (6 points)

**In the PhysioEx 10 Simulations, focus on Exercise 7: Respiratory System Mechanics, do Activities 1-3, and answer the following Review Questions:** *You may directly type the lab report into this Report Template DOC file.*

1. **ACTIVITY 1: Measuring Respiratory Volumes and Calculating Capacities.**   
   Answer Review Questions 3-5.
   1. **What was the FEV1 (%) at the initial radius of 5.00 mm?**
   2. **What happened to the FEV1 (%) as the radius of the airways decreased? How well did the results compare with your prediction?**
   3. **Explain why the results from the experiment suggest that there is an obstructive, rather than a restrictive, pulmonary problem.**
2. **ACTIVITY 2: Comparative Spirometry.** Answer Review Questions 1, 3-4, & 7-8.
   1. **What lung values changed (from those of the normal patient) in the spirogram when the patient with emphysema was selected? Why did these values change as they did? How well did the results compare with your prediction?**
   2. **What lung values changed (from those of the normal patient) in the spirogram when the patient experiencing an acute asthma attack was selected? Why did these values change as they did? How well did the results compare with your prediction?**
   3. **How is having an acute asthma attack similar to having emphysema? How is it different?**
   4. **With moderate aerobic exercise, which changed more from normal breathing, the ERV or the IRV? How well did the results compare with your prediction?**
   5. **Compare the breathing rates during normal breathing, moderate exercise, and heavy exercise.**
3. **ACTIVITY 3: Effect of Surfactant and Intrapleural Pressure on Respiration.**   
   Answer Review Questions 1-5,& 7.
   1. **What effect does the addition of surfactant have on the airflow? How well did the results compare with your prediction?**
   2. **Why does surfactant affect airflow in this manner?**
   3. **What effect did opening the valve have on the left lung? Why does this happen?**
   4. **What effect on the collapsed lung in the left side of the glass bell jar did you observe when you closed the valve? How well did the results compare with your prediction?**
   5. **What emergency medical condition does opening the left valve simulate?**
   6. **What do you think would happen when the valve is opened if the two lungs were in a single large cavity rather than separate cavities?**

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| PART 2: PULMONARY FUNCTION (10 points) |

1. **PhysioEx 7: (a) Using PhysioEx data, quantitatively compare the vital capacity (VC) and inspiratory reserve volume (IRV) at normal (5.0 mm) and restricted (3.0 mm) airway diameters. (b) How is FEV affected by reduced airway diameter? Explain your reasoning. (c) What could be some possible causes of reduction in air flow to the lungs? Explain your reasoning.**
2. **Using IP: Pulmonary Ventilation and PhysioEx resources, (a) in your own words, define FEVx. (b) How can FEVx% be used as a diagnostic tool? When writing your answer, pretend you are explaining the test and its results to a patient.**
3. **Expt. 12: (a) Report your Subject’s Resting FEVx values. How do they compare with the typical values presented in Table 15.1 of the lab manual? (b) Report your Subject’s Post-Exercise FEVx values (Table 15.2). Discuss the implications of any significant differences between these and the resting values.** 
   * **(c) Report your Subject’s FEV1 in *LITERS* (not FEV1%), predicted FEV1, actual age and lung age. These are calculated from the website** [**http://www.chestx-ray.com/index.php/calculators/lung-age-for-smoking-cessation**](http://www.chestx-ray.com/index.php/calculators/lung-age-for-smoking-cessation)**. Also report whether your subject is a smoker and whether he/she has ever lived with a smoker either as a child or as an adult, or lived in an area with heavy smog or other air pollution.**
4. **Expt. 12: (a) In your own words, define MVV. (b) Report your Subject’s MVV and compare to the normal ranges cited in the lab manual. *EXPLAIN how different variables might affect an individual’s MVV*.**
5. **Include the SUMMARY (500 words) of your LITERATURE RESEARCH involving respiratory physiology, or if assigned, a clinical use of MVV. Remember to focus on RECENT, PRIMARY literature. Summarize the background and hypothesis, very briefly describe what was done, and summarize the major conclusions.  *Cite your source using APA style*.**

* **Suggested Topics:** 
  + **Respiratory diseases and tested therapies (emphysema, inflammatory lung disease, NRDS)**
  + **Clinical uses of MVV, VC, FEV, etc…**
  + **Physiological effects and/or treatments of Cystic Fibrosis (pulmonary)**
  + **Current research on RCC or Central Pattern Generator mechanisms & functions (DRG, VRG)**

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| PART 3: CONTROL OF VENTILATION (4 points) |

1. **Expt. 13: Graph all data from Expt. 13 and provide a complete caption for the quantitative data from the “rebreathing” test in which you breathed into a paper bag (Lab 16 Ventilation). Cite the numerical data and use it to EXPLAIN how your breathing into a paper bag AND the two types of “hyperventilation” affected the length of time you were able to hold your breath. Include quantitative data from both experiments in your answer.**
2. **Using IP: Control of Respiration information, as well as the Ventilation lab, EXPLAIN (a) how hyperventilation affects the activity of central chemoreceptors, plasma pH and PO2, and (b) why hyperventilation affected the length of time you were able to hold your breath. Quantitatively compare to the length of time after normal breathing.**