Physiology Lessons
for use with the
Biopac Student Lab

PC under Windows® 98Se, Me,
2000 Pro or Macintosh® OS 8.6-9.1

Manual Revision
PL3.6.7-ML3.0.7/011904

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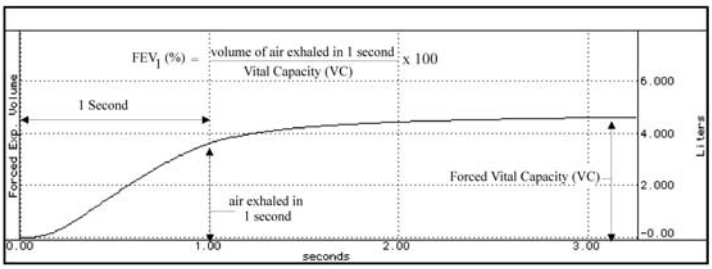
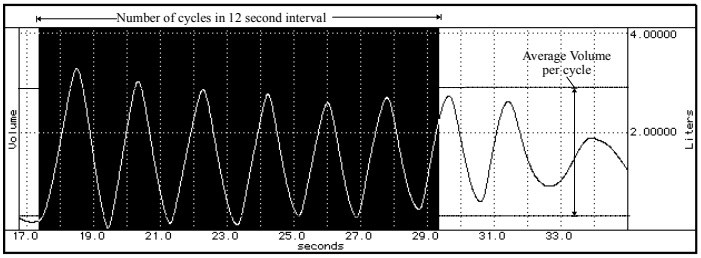
Lesson 13 Data Report

PULMONARY FUNCTION II

Pulmonary Flow Rates

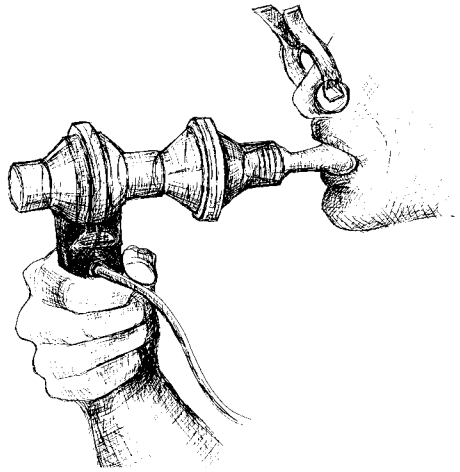
- *Forced Expiratory Volume ($FEV_{1,2,3}$)*
- *Maximal Voluntary Ventilation (MVV)*





Number of cycles/minute = Number of cycles in 12 second interval X 5

MVV = (Average volume per cycle) X (Number of cycles per minute)



Lesson 13

PULMONARY FUNCTION II

Pulmonary Flow Rates

- *Forced Expiratory Volume ($FEV_{1,2,3}$)*
- *Maximal Voluntary Ventilation (MVV)*

DATA REPORT

Student's Name: _____

Lab Section: _____

Date: _____

I. Data and Calculations

Subject Profile

Name_____ Height_____

Age_____ Weight_____

Gender: Male / Female

A. Vital Capacity (VC)

CH 1 **p-p** measurement: _____

B. Comparison of FEV_X% to Normal Values

Table 13.2

Time Interval (sec)	**Forced Expiratory Volume (FEV) [p-p]**	**Vital Capacity (VC)** *from A*	**FEV/VC** *calculate*	**(FEV/VC) x 100 = %** *calculate*	= **FEV_x**	*Averages for reference*
0-1				**%**	FEV_1	83%
0-2				**%**	FEV_2	94%
0-3				**%**	FEV_3	97%

C. MVV Measurements (Note, all volume measurements are in liters)

1) Number of cycles in 12-second interval: _____

2) Calculate the number of respiratory cycles per minute (RR):

RR = Cycles/min = Number of cycles in 12-second interval x *5*

Number of cycles in 12-second interval (from above): _____ x 5 = _____**cycles/min**

3) Measure each cycle

Complete Table 13.3 with a measurement for each individual cycle. If the Subject had only 5 complete cycles/12-sec period, then only fill in the volumes for 5 cycles. If there is an incomplete cycle, do not record it. (The Table may have more cycles than you need.)

Table 13.3

Cycle Number	Measurement [CH 2 p-p]
Cycle 1	
Cycle 2	
Cycle 3	
Cycle 4	
Cycle 5	
Cycle 6	
Cycle 7	
Cycle 8	
Cycle 9	
Cycle 10	
Cycle 11	
Cycle 12	
Cycle 13	
Cycle 14	
Cycle 15	

4) Calculate the average volume per cycle (AVPC):

Add the volumes of all counted cycles from Table 13.3.

Sum = _____ liters

Divide the above sum by the number of counted cycles. The answer is the average volume per cycle (AVPC)

AVPC = _____ / _____ = _____liters

Sum # of counted cycles

5) Calculate the MVV_{est}

Muliply the AVPC by the number of respiratory cycles per minute (RR) as calculated earlier.

MVV = AVPC x RR = _____ x _____ = _____liters/min
AVPC RR

II. Questions

D. Define **Forced Expiratory Volume** (FEV).

_____
_____
_____

E. How do the Subject's FEVx values compare to the average per Table 13.2?

FEV_1	*less than*	*same as*	*greater than*
FEV_2	*less than*	*same as*	*greater than*
FEV_3	*less than*	*same as*	*greater than*

F. Is it possible for a Subject to have a vital capacity (single stage) within normal range but a value for FEV_1 below normal range? Explain your answer.

_____
_____
_____
_____
_____
_____
_____

G. Define **Maximal Voluntary Ventilation** (MVV).

_____
_____
_____

H. How does the Subject's MVV compare to others in the class?

less than *same as* *greater than*

I. Maximal voluntary ventilation decreases with age. Why?

J. Asthmatics tend to have their smaller airways narrowed by smooth muscle constriction, thickening of the walls, and mucous secretion. How would this affect vital capacity, FEV1, and MVV?

K. Bronchodilator drugs open up airways and clear mucous. How would this affect the FEV and MVV measurements?

L. Would a smaller person tend to have less or more vital capacity than a larger person?
_____Less _____More

M. How would an asthmatic person's measurement of FEV_1 and MVV compare to an athlete? Explain your answer.

End of Lesson 13 Data Report