

**Pom-Pom Shooter: Measuring the Effects of Restricted Breathing on PEF
Pre/Post Test**

For each item, circle the letter to the left that corresponds with the answer you choose.

1. Restrictive pulmonary disorders are those which ...
 - A. impede the flow of air from the lungs.
 - B. reduce the volume of air in the lungs.
 - C. thicken the air inside the lungs.
 - D. trap air in the lungs.

2. Which of the following is an example of a *restrictive* pulmonary disorder?
 - A. asthma
 - B. chronic bronchitis
 - C. cystic fibrosis
 - D. tuberculosis

3. Inflammation in the airways of an asthmatic can bring about symptoms like ...
 - A. abnormal uncontrolled immature cell growth.
 - B. excessive loss of salt from the body.
 - C. coughing, wheezing, or difficulty breathing.
 - D. chronic infection and scarring of lung tissue.

4. PEF (Peak Expiratory Flow) rate gives an indication of how well someone's airways are working and measures ...
 - A. vital capacity of the lungs.
 - B. oxygen content upon inhalation.
 - C. moisture content of residual air in the lungs.
 - D. how quickly one can push air out of the lungs.

5. The independent variable in an experiment is that which is
 - A. manipulated or changed by the investigator.
 - B. measured for the effect of the dependent variable.
 - C. constant and unchanged throughout the test.
 - D. applied to eight out of ten test groups.

6. Which lung disorder is **NOT** primarily caused or strongly linked to cigarette smoking?
 - A. Asbestosis
 - B. COPD (Chronic Obstructive Pulmonary Disease)
 - C. Emphysema
 - D. Lung Cancer

Use the information below to answer questions 7 to 9.



In an experiment using a “*Pom-Pom Shooter*,” a device that propels *pom-poms* into the air, a student examined the effect of different sized “restriction” mouthpieces on the distance that certain *pom-poms* traveled. After taking some practice shots, the student collected this data.

Distance the ½-inch <i>Pom-Pom</i> Traveled (cm)					
Trial #	Station 1 PEF	Station 2 0% Restriction	Station 3 25% Restriction	Station 4 50% Restriction	Station 5 75% Restriction
1	480	1000 cm	700 cm	450 cm	300 cm
2	497	1200 cm	800 cm	500 cm	250 cm
3	478	1300 cm	847 cm	850 cm	325 cm
RESULTS	497 l/min <i>Highest</i>	1166.7 cm <i>Average</i>	782.3 cm <i>Average</i>	500.0 cm <i>Average</i>	258.3 cm <i>Average</i>

7. Given the trend seen in this data set, what would you expect of the distance traveled by the *pom-poms* if a fifth station was set up with an 85% restriction? The *pom-poms* blown from the 85% restriction mouthpiece would, on average, most likely ...
- land at a further distance away from the shooter than those in Station 4.
 - drop directly beneath the shooter due to gravitational pull.
 - match the same distance as those in Station 3.
 - travel fewer centimeters from the shooter than those from other Stations.
8. What was the *independent* variable in this experiment?
- the diameter of the *pom-pom*.
 - the length of the *Pom-Pom Shooter*
 - the percent *restriction*
 - the number of *practice shots*
9. Before starting the experiment, the student checked his PEF using a flow meter. The meter indicated that his PEF (measured in liters per minute) was in the normal range for his age and height. When he used the *Pom-Pom Shooter*, he blew through it in one puff. How might the distance the *pom-poms* traveled be related to his PEF?
- His PEF was greater than that of other students, so his *pom-poms* traveled farther.
 - The distance that the *pom-poms* traveled depended on how hard and fast he blew through the restricted mouthpieces.
 - Pom-poms* travel at the same speed as indicated on the PEF indicator.
 - The mouthpiece restrictions increased his PEF with each trial which, in turn, affected the distance the *pom-poms* traveled.

Use the information below to answer questions 10 – 12.



Ten girls in the class decided to try out the “*Pom-Pom Shooter*.” The data they collected is in the chart below. Determine the measures of central tendency requested in questions 10-12.

Distance the ½-inch Pom-Pom Traveled (cm) – Female Students					
Trial #	PEF	0% Restriction	25% Restriction	50% Restriction	75% Restriction
1	420	1220 cm	910 cm	550 cm	342 cm
2	380	1098 cm	769 cm	496 cm	268 cm
3	365	1032 cm	700 cm	450 cm	226 cm
4	410	1103 cm	847 cm	517 cm	300 cm
5	417	1150 cm	860 cm	542 cm	300 cm
6	378	1065 cm	758 cm	478 cm	243 cm
7	392	1074 cm	800 cm	478 cm	255 cm
8	364	1026 cm	706 cm	430 cm	225 cm
RESULTS	?	?	?	?	?

10. What was the *mean* Peak Expiratory Flow rate for this group of students?
 - A. 386.0
 - B. 390.8
 - C. 420.0

11. What was the *median* distance that the *pom-poms* traveled at 25% restriction among this group of students?
 - A. 700.0
 - B. 784.5
 - C. 793.8

12. What was the *mode* for the data collected at 75% restriction for this group of students?
 - A. 261.5
 - B. 269.9
 - C. 300.0