Respiratory System Lab

Name: ________________________________ Date: ____________________

STATION 1: ANATOMY OF THE RESPIRATORY SYSTEM: Using the books available at the station, the model of the lung and the poster of the respiratory system, describe the location and explain the function of the following parts of the respiratory system:

- **Nasopharynx:**
  - Location:
  - Function:

- **Oropharynx:**
  - Location:
  - Function:

- **Glottis:**
  - Location:
  - Function:

- **Epiglottis:**
  - Location:
  - Function:

- **Larynx:**
  - Location:
  - Function:

- **Trachea:**
  - Location:
  - Function:

- **Bronchi:**
  - Location:
  - Function:

- **Alveoli:**
  - Location:
  - Function:

- **Diaphragm:**
  - Location:
  - Function:
FUNCTION OF THE RESPIRATORY SYSTEM: Looking at the clues provided at the station. As a group, spend a few minutes brainstorming about the function of the respiratory system. Following the brainstorming discussion, each person will spend the remaining minutes writing a detailed paragraph explaining the function of the respiratory system.
STATION 2: THE BREATHING PROCESS & PULMONARY FUNCTION: Split your group into 2 smaller groups. Group 1 start with the pulmonary function test and group 2 start with the brown bag experiment.

1. PULMONARY FUNCTION TEST (PFT): Using the spirometer, each person in the group will measure their lung capacity (volume of air in the lungs) 3 times, record each trial, and then determine the average lung capacity.

Procedure:
1. Place a disposable mouthpiece on the spirometer.
2. Turn the silver dial of the spirometer until the white dial reads 0.
3. Plug nose
4. Take the deepest breath possible
5. Form a tight seal around mouthpiece
6. Exhale as forcefully as possible
7. Record reading / pass spirometer on to next person for their 1st trial
8. Repeat 2 more times
9. Normal = 3000 – 6000 cc (3-6 liters)

*EVERY PERSON IN GROUP SHOULD COMPLETE 1ST TRIAL BEFORE MOVING ON TO 2ND TRIAL, ETC.

<table>
<thead>
<tr>
<th>TRIAL 1</th>
<th>TRIAL 2</th>
<th>TRIAL 3</th>
<th>AVERAGE</th>
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2. BROWN BAG LAB: THE BREATHING PROCESS: First, read the air exchange explanation at station. Using the materials in the brown bag, design a functioning lung (bottle, balloon, rubber band and theraband). To successfully complete this task, you will need to use all of the materials in the paper bag. Based on the design of your functioning lung, explain the breathing process, paying particular attention to the air pressure changes in the chest cavity.

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**STATION 3: HOW MUCH HOT AIR DO YOU PRODUCE?**

I. **DIRECTIONS:** AIR BAGS: Type a knot at one end of the air bag. EMPTY ALL OF THE AIR OUT OF THE BAG. Cover your mouth with the bag and breathe through your nose normally for 1 minute. At the end of 1 minute, take the bag off of your mouth and twist shut. Continue twisting the bag until it tight. Using a measuring tape, measure the length of the air tube and record your data. Collect data for resting, walking and jogging trials.

   1. **REST:** ________________
   2. **WALKING:** ________________
   3. **JOGGING:** ________________

II. **DIRECTIONS:** FILL THE BAG: How many breaths does it take to fill your bag?

   Number of breaths: ______________________________________________________

   Explain why your number of breaths were greater or less than the number of breaths it took your group members to fill their bags.

III. **ANALYSIS:**

   1. Explain 3 things you learned from the air bag experiment?
2. Within your group, theorize how air borne pathogens can be transmitted. Use information from your air bag experiment to explain and support your theory.

IV. DIRECTIONS: STETHOSCOPE: Place the stethoscope on your partners back and listen to the breath sounds. Write a brief description of the sounds you hear during each of the 3 trials.

1. REST: listen while partner is resting for 1 minute
   - Description: ________________________________________________________________

2. WALKING: listen immediately after partner is finished walking for 1 minute
   - Description: ________________________________________________________________

3. JOGGING: listen immediately after partner is finished jogging for 1 minute
   - Description: ________________________________________________________________

4. Explain what caused the changes in breathing that you heard.
**STATION 6: DISEASES OF THE RESPIRATORY SYSTEM:** Using the Smartboard and any other resources in the classroom to research the disease assigned to you. Create a poster that includes the following:

- What the condition is.
- Where the condition is found in the respiratory system
- Risk factors for the condition
- Signs & symptom of condition
- Preventions for the disease

Group 1: Asthma
Group 2: Acute bronchitis
Group 3: Emphysema
Group 4: Tonsillitis
Group 5: Allergies
Group 6: Tuberculosis
Group 7: Lung Cancer

**STATION 7: SUSTAINED MAXIMAL INSPIRATION TEST**

**DIRECTIONS:**

1. Retrieve a mouth piece and flexible tube from the alcohol and dry.
2. Set spirometer dial to: TRAIL 1: FLOW SETTING OF 200; TRIAL 2: FLOW SETTING OF 600; TRIAL 3: FLOW SETTING OF 1000
3. **Partner 1** Sit with mouthpiece in mouth / **partner 2** prepare timer
4. **Partner 1** begin inspiring (breathing in) forcefully enough to keep red ball elevated / **partner 2** START timer
5. **PARTNER 2 STOPS TIMER WHEN RED BALL RETURNS TO TO RESTING POSITION**
6. Record in trial 1
7. Repeat for trial 2 & trial 3
8. Switch partners (be sure to clean mouth piece and tubing in alcohol)

<table>
<thead>
<tr>
<th>TRIAL 1: 200</th>
<th>TRIAL 2: 600</th>
<th>TRIAL 3: 1000</th>
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</thead>
<tbody>
<tr>
<td>SECONDS:</td>
<td>SECONDS:</td>
<td>SECONDS:</td>
</tr>
</tbody>
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**INSPIRATORY VOLUME CALCULATION:**

\[
\text{INSPIRATORY TIME \times FLOW SETTING} = \text{INSPIRATORY VOLUME IN LITERS}
\]

<table>
<thead>
<tr>
<th>TRIALS</th>
<th>Inspiratory time (seconds)</th>
<th>Flow setting (cc)</th>
<th>Inspiratory volume (liters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (200 CC)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2 (600 CC)</td>
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<td>3 (1000 CC)</td>
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ANALYSIS:

1. **COMPAIRSONS:** Compare your inspiratory volume with the volume achieved by 2 other members in your group.

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<thead>
<tr>
<th>TRIALS</th>
<th>YOUR DATA</th>
<th>PARTNER 1</th>
<th>PARTNER 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (200 CC)</td>
<td></td>
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<td>2 (600 CC)</td>
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<td>3 (1000 CC)</td>
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2. **COMPARE AND CONTRAST:** Give at least 3 reasons why your values were the same or different from each of your two partners. (Use the attached information to help you problem solve. **HINT:** Look at lifestyle choices, diseases, medications and environments.

3. **THE PLAN TO IMPROVE YOUR LUNG FUNCTION:** Look at your risk factors for poor lung function. Write a plan to improve your lung function over the next month. Your plan should include the frequency, intensity, time and type of activity that you will do to improve your lung function.

4. **DISEASES YOU ARE AT RISK OF:** Looking at your risk factors, what do you think will happen if you do not follow through on your plan to improve your lung function?