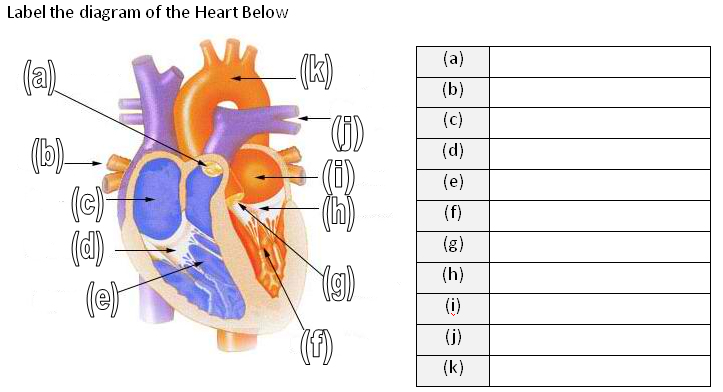
**NAME: .**

PHYSICAL EDUCATION

CV & RESPIRATORY BOOKLET

****



***(Inferior) Vena Cava***

***(Superior) Vena Cava***

**Here are some clues to help you-** (fill in the gaps as you go....................)

**(a)** - Prevents the back flow of blood as it is pumped from the right ..................... to the .....................artery.

**(b)** – Returns from the lungs & is one of the only veins to carry ................................... blood.

**(c)** - Receives deoxygenated blood from the body from the [..........................](http://www.medterms.com/script/main/art.asp?articlekey=5974). ............................... .

**(d)** - Prevents the back flow of blood as it is pumped from the right....................to the right ....................... .

**(e)** – It receives [deoxygenated](http://en.wikipedia.org/wiki/Oxygenation_(medical)) [blood](http://en.wikipedia.org/wiki/Blood) from the [………………….. .atrium](http://en.wikipedia.org/wiki/Right_atrium) via the [……………...………….valve](http://en.wikipedia.org/wiki/Tricuspid_valve), and pumps it into the […………………………. artery](http://en.wikipedia.org/wiki/Pulmonary_artery).

**(f)** - It receives [………………………](http://en.wikipedia.org/wiki/Oxygen) [blood](http://en.wikipedia.org/wiki/Blood) from the [left …………………..](http://en.wikipedia.org/wiki/Left_atrium) via the [……………………. valve](http://en.wikipedia.org/wiki/Mitral_valve), and pumps it into the [……………………………](http://en.wikipedia.org/wiki/Aorta) via the […………………….. valve](http://en.wikipedia.org/wiki/Aortic_valve).

**(g)** - this valve is situated at exit of the left .......................... of the heart, where the largest of all arteries begins. It prevents blood once it is in the.......................... from returning to the heart.

**(h)** – It permits blood to flow one way only, from the left.................... into the left ....................... . This valve is more commonly called the Mitral valve because it has two flaps that look like a bishop's headdress.

**(i)** – It receives.............................. blood from the lungs and pumps it down into the [.....................ventricle](http://www.medterms.com/script/main/art.asp?articlekey=9127) which delivers it to the body via the .............................. .

**(j)** - They are the only [arteries](http://en.wikipedia.org/wiki/Artery) that carry ................................blood. It branches into two arteries (left and right), which deliver ............................... blood to the corresponding [lung](http://en.wikipedia.org/wiki/Lung).

**(k)** - The largest artery in the body. It branches off and serves to supply the head and neck, the arms, the major organs in the chest and abdomen, and the legs with oxygenated blood.

**MATTERS CLOSE TO THE Heart......**

De-oxygenated blood returns from the body to the **Right Atrium** via the ..................................and .................................. Vena Cava. Fill in the boxes below **showing the Cardiac Cycle:** *(use pg 35-36 of text to help)*

**Right Atrium**

**Lungs**

**1. What kind of Muscle does the Heart consist of? .**

**2. What is Stroke Volume *(SV)*?: .**

**3. What is the average adult Stroke Volume *(SV)* at rest?: .**

**4. Does Stroke Volume *(SV)* increase or decrease when you start to exercise? Why do you think this is?**

**5.** What is Cardiac Output *(Q)*? .

**6.** Show the equation for *(Q)* if a person is exercising with a *(SV)* of 100ml and a Heart Beat of 185bpm? *(Q) =*  .

**7.** What is **Diastolic** Blood Pressure? .

**8.** What is **Systolic** Blood Pressure? .

**9.** What is the Instrument used to measure **BP**? .

**10.** Which increases more during exercise? Diastolic or Systolic? .

**11.** .

**12.** What happens if a valve in the heart breaks down or degenerates? What can be done to correct this? .

**13.** The Heart consists of Atriums, Ventricles, Valves, Arteries & Veins.

Questions to Answer……….

1. Comment on the following aspects of the Heart:

* Size .
* Colour .
* Weight .
* Number of openings: .

1. Explain the difference in wall thickness of vessels entering and leaving the heart. Why might this be?

1. Explain the difference in the thickness of the atria and ventricular walls. Why might this be?

1. Which side of the heart is more muscular and why?

1. Name, compare & describe the heart valves found between the upper & lower chambers of the right and left sides of the heart.

1. What is the purpose of the valves in the heart?

1. In which chambers and vessels of the heart would you find oxygenated blood?

1. In which chambers and vessels of the heart would you find deoxygenated blood?

1. Which chambers are the pumping chambers of the heart?
2. Which chambers are the receiving chambers of the heart?
3. Describe the action of the tricuspid valve when you squeezed the water-filled right ventricle.

1. Vessels that carry blood away from the heart are called \_\_\_\_\_\_\_\_\_\_\_\_\_, while \_\_\_\_\_\_\_\_\_\_\_\_\_\_ carry blood toward the heart.
2. Which artery is the largest and why?
3. **Complete the Table below** by matching the Word with its correct definition. (e.g. write the *corresponding number next to the description you think best describes the word)*

|  |  |
| --- | --- |
| Word | Definition |
| 1. Aorta | hollow, muscular organ in the centre of the chest that pumps blood throughout the body |
| 2. Bicuspid (mitral) | smallest blood vessels; materials are exchanged between the blood and the body's cells |
| 3http://a.quizlet.com/i/spacer.gif. Inferior vena cava | upper chambers of the heart that receive blood that comes into the heart |
| 4. Septum | Located between the right atrium and the right ventricle. closes when the right ventricle contracts and prevents backflow into the right atrium |
| 5. Superior vena cava | valve between left atrium and left ventricle http://a.quizlet.com/i/spacer.gif |
| 6. Pulmonary & aortic valve | takes blood away from the heart |
| 7. Tricuspid valve | carry blood back to the heart |
| 8. Heart | http://a.quizlet.com/i/spacer.gifa wall of tissue that divides the right and left chambers of the heart |
| 9. Arteries | lower chambers of the heart that pump blood out of the heart |
| 10. Capillaries | a flap of tissue that prevents blood from flowing backwards |
| 11. Veins | valves stopping blood from flowing back into the ventricles from the arteries |
| 12. Blood | a group of cells that adjusts the rate of the heart beat |
| 13. Atria | receives blood from the head and arms and chest and empties into the right atrium of the heart |
| 14. Ventricles | http://a.quizlet.com/i/spacer.gifreceives blood from lower limbs and abdominal organs and empties into the posterior part of the right atrium of the hearthttp://a.quizlet.com/i/spacer.gif |
| 15. Pacemaker | has plasma, red and white blood cells and platelets |
| 16. Valve | http://a.quizlet.com/i/spacer.gifartery that carries blood directly from the heart to the rest of the body |

A:\heart attack.tif

Below is a description of what happens during a heart attack.

Question: What things can you do to keep your heart healthy?

**Draw & label your own heart diagram** (without copying from another diagram):

**I want your BLOOD..........**

* **Adult Males have approximately.............................litres of blood.**
* **Adult Females have approximately .........................litres of blood.**

**Further elaborate on the *Functions of Blood* within the body:**

**Transport Wastes from Cells:**

**Protection against Infection:**

**Maintains Homeostasis:**

**Blood Clotting:**

**Transport to Cells: .**

**WHAT’S IN YOUR BLOOD!**

**Blood CONTAINS the following 4 things: (write a brief description/function of each):**

**1. Red blood cells -**  .

**2. White blood cells -** .

**3. Platelets –** .

**4. Plasma –**  .

BLOOD CONTAINS .................% PLASMA AND ................% BLOOD CELLS (rbc, wbc, platelets)

What is the function of *Heamaglobin? .*

**BLOOD VESSLES....**





***Complete the Cycle*** *of Blood around the body.......write a small description and function of each component. (use pg 34-35 to help)*







****

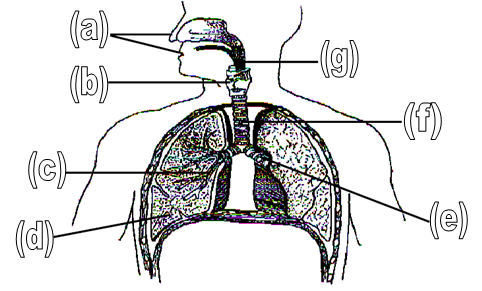
|  |  |  |
| --- | --- | --- |
| **VS.** | **Arteries** | **Veins** |
| **Transports blood (Away/Towards)** |  |  |
| **Blood (Oxygenated/De-oxygenated)** |  |  |
| **Wall Thickness (Thick/Thin)** |  |  |
| **Elasticity (Elastic/Flacid)** |  |  |
| **Valves ( Yes/No)** |  |  |
| **Pressure (High/Low)** |  |  |

***Blood flow in Capillaries is controlled by , which can enable*** .

r e s p i r a t o r y s y s t e m

The Respiratory System consists of all the Pathways through which air travel travels to reach the lungs.

**Finish the sentence......** *“Basically, in a ‘nutshell’, the function of the Respiratory System is.....* .



**Label and Describe each part of the Respiratory System in the Table below**

|  |  |
| --- | --- |
| **(a)** |  |
| **(b)** |  |
| **(c)** |  |
| **(d)** |  |
| **(e)** |  |
| **(f)** |  |
| **(g)** |  |

**How we get into the blood!**

|  |
| --- |
| **The exchange of gases in the lungs takes place between which two structures?** |
| **&** |

**Q:** What is ***this section*** of the diagram showing?

**Answer**:

**Describe how pressure difference allows this to occur:**

**Q:** Describe what is occuring in the **Pulmonary Vein**?

**Answer:**

.

**Q:** Describe what is Occuring in the **Pulmonary Artery**?

**Answer:**

.

**Remember:** Gasses always move from areas of...................................pressure into areas of ............................... pressure

**Respiration** basically means = ............................................, while **"cellular respiration"**; refers to the gaseous exchange that takes place as unwanted carbon-dioxide is expelled through the cell walls and oxygen is diffused into the cell for energy purposes within the cell itself.

How does **cigarette smoke** affect the respiratory system? .

How does **Asthma** affect the respiratory system? .

Describe (in sequence) how **O2**gets from the outside atmosphere to the working muscles; and how **CO2** gets from our muscles back to the outside atmosphere:

****Take a deep breath....

What is the **DIAPHRAGM?**

What are **‘Hiccups’**, and how do they occur ?

.

Explain the term **‘being winded’** and how it happens?: .

Describe How **Inspiration (breathing in) occurs: .**

Describe how **Expiration (breathing out) occurs: .**

**EXPLAIN THE FOLLOWING LUNG CAPACITIES**

**Vital Capacity? .**

(What instrument is used to measure Vital Capacity?).................................................................................

**Tidal Volume *(TV)***? **.**

|  |  |
| --- | --- |
| **Average Tidal Volume *(TV)*** | |
| **Men: mL** | **Woman: mL** |

**Inspiratory reserve volume:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Expiratory reserve volume:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Residual volume:**

What is **Minute Ventilation *(VE )*?** How is it calculated? **.**

If someone said “I felt really good when I got to my **Steady State”....**What do they mean**? .**

What does the term **VO2 Max** mean? .

What is **VO2 Max** a good indicator of?

What is the only accurate way to test **VO2 Max? .**

What is **a-vO2 difference**? (in your own words): .

If you have 20mL of O2 /100mL blood, and your muscles use 4.5mL O2.....Your **a-vO2 diff = .**

**LABORATORY – Heart Rate** Date: \_\_\_\_

**AIM:**

To record resting heart rate in various anatomical positions and compare with class.

**EQUIPMENT:**

* None needed.

**PROCEDURE:**

1. (In pairs) Record resting Heart Rate in the following positions:– *Get partner to take pulse while you time* (15sec X 4)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Laying** | bpm | **Sitting** | bpm | **Standing** | bpm |

|  |  |
| --- | --- |
| **CLASS RESULTS (Laying)** | |
| **Name** | **Heart Rate (bpm)** |
|  |  |
|  |  |
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|  |  |

1. Record Class Results for Laying in the table *(to the right)*
2. What is the Class Average? Bpm
3. What occured to your HR over the 3 positions?\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What are some factors that can affect Heart Rate?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What factors may have affected your Heart Rate?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Elite cyclists e.g (tour de France riders) can have a resting Heart Rate of 32 bpm. What does this indicate in terms of Heart Size, Cardiac Output? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Is your resting HR an accurate predictor of your VO2  max?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**LABORATORY – Maximal O2 Uptake** Date: \_\_\_\_

**INTRODUCTION:**

Maximal oxygen uptake ( VO2 max. ) is the maximum rate at which oxygen can be consumed per minute, per kilogram of body weight.

**\* VO2 max. = Cardiac output X arteriovenous oxygen (a-vO2) difference.**

Maximal oxygen uptake is used as the most accurate measure of a person's aerobic power or fitness.

A higher VO2 max reflects an increased ability of the:

- heart to pump blood.

- lungs to ventilate large volumes of air.

- blood to transport oxygen.

- muscles to take up oxygen.

The most accurate tests to measure an individual's VO2 max. are conducted in the laboratory but a number of field tests have been developed for predicting VO2 max levels such as Cooper’s Twelve Minute Run

**AIM:**

To predict students' maximal oxygen uptake and compare results.

**EQUIPMENT:**

* Stop watches
* Cones
* Tape measure

**PROCEDURE:**

Cooper's Twelve Minute Run -

1. Measure a course by placing cones at ten metre intervals.
2. Each subject runs as far as they can in twelve minutes.
3. Record: (i) Distance covered.

(ii) VO2 max. ( ml/kg/min ) using the table supplied below.

**Record Results in Table Below**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cooper’s 12 Minute Run (Class Results)** | | | | | |
| Name | Distance (m) | VO2 Max | Name | Distance (m) | VO2 Max |
| 1 |  |  | 12 |  |  |
| 2 |  |  | 13 |  |  |
| 3 |  |  | 14 |  |  |
| 4 |  |  | 15 |  |  |
| 5 |  |  | 16 |  |  |
| 6 |  |  | 17 |  |  |
| 7 |  |  | 18 |  |  |
| 8 |  |  | 19 |  |  |
| 9 |  |  | 20 |  |  |
| 10 |  |  | 21 |  |  |
| 11 |  |  | 22 |  |  |

**QUESTIONS:**

1. Graph the VO2 max scores for each subject below
2. Did you perform / score as well as you thought you would ? Why / why not ? .
3. From your general knowledge of each subject, did the expected fittest individuals score the highest VO2 max?Why / why not ?
4. Discuss other factors that could have influenced the scores gained in the test.
5. Discuss the advantages and disadvantages of the test.
6. Within the limits of the test situation, do you think it gave an accurate measure of VO2 max. ?

**CONCLUSION :**

1. Which athletes would you expect to have a high maximal oxygen uptake ?

2. Based on the results you obtained, which sport / event would each subject be best suited to in terms of aerobic

fitness and why ?

3. Outline a method which would provide a more accurate measure of VO2 max. Why is this test more accurate ?

**(Chapter 2) Extension Questions:**

1. **Why do trained athletes generally have a lower heart rate than untrained athletes?**
2. **What are the major differences between e cardiovascular systems of males and females?**
3. **Precapillary Sphinchters can save lives! - Discuss how.....**
4. **Which side of the heart is more muscluar and why?**
5. **What is ‘by-pass’ surgery in relation to the circulatory system?**
6. **In an emergency situation, what is the first substance to be replaced into the body and why?**
7. **What is a simple reason to explain why trained athletes generally have lower Heart Rates than untrained athletes?**

**GLOSSARY & NOTES:**