

### **3.1-The Disease**

- Know how to use a microscope
- Know the difference between a sickled red blood cell and a normal red blood cell
- Know how to calculate hematocrit
- Total height of blood: \_\_\_\_\_  
Height of red blood cells: \_\_\_\_\_
- Hematocrit formula:  
$$\frac{(\text{Red Blood Cell Level})}{\text{(Total Blood Count)}} \times 100 = \text{Hematocrit-percentage of red blood cell level}$$
- Determine whether hematocrit level is low, normal, or high

Low Hematocrit (%)		Normal Hematocrit (%)		High Hematocrit (%)	
Male	Female	Male	Female	Male	Female
<42	<35	42-54	35-46	>54	>46

### **3.2 - Inheritance**

Protein synthesis is a very important process in the production of proteins. It involves the DNA producing a strand of volatile genetic information that has the instructions for producing the right amount of the right type of protein. The steps for protein synthesis are:

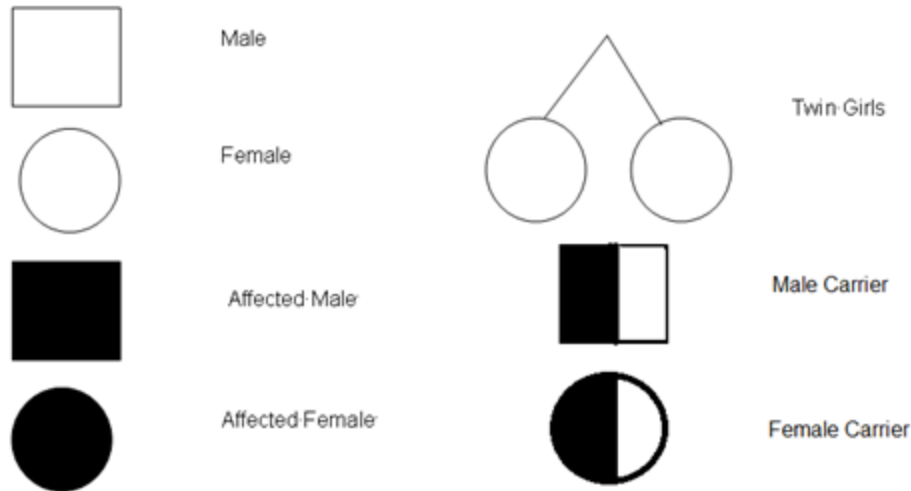
1. DNA produces a strand of mRNA
2. mRNA travels to a ribosome where it is read
3. tRNA helps the ribosome produce protein by finding and bringing amino acids
4. Amino acids begin sticking to each other and they produce a strand of proteins
5. After the protein strand has been completed the protein breaks off and a new protein is made from the same mRNA

Translating and transcribing DNA and RNA into proteins

1. Transcribing:
  - a. DNA is unzipped
  - b. mRNA is created by pairing the strand with the unzipped but with uracil substituted for thymine
2. Translating:
  - a. mRNA goes to the ribosome where it is read

- b. it is converted back to a dna strand before it reads the genes on the dna to get the protein blueprint
- c. proteins are created by trna who bring amino acid molecules which connect together to create a protein strand

### **3.4 - Inheritance**



1. Know how to read a pedigree chart
2. Know how to use, make, and read a punnett square
3. Know how to calculate probability  
 $(\# \text{ or square containing } \underline{\hspace{1cm}} / 4) \times 100$

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## **4.1 Heart Structure**

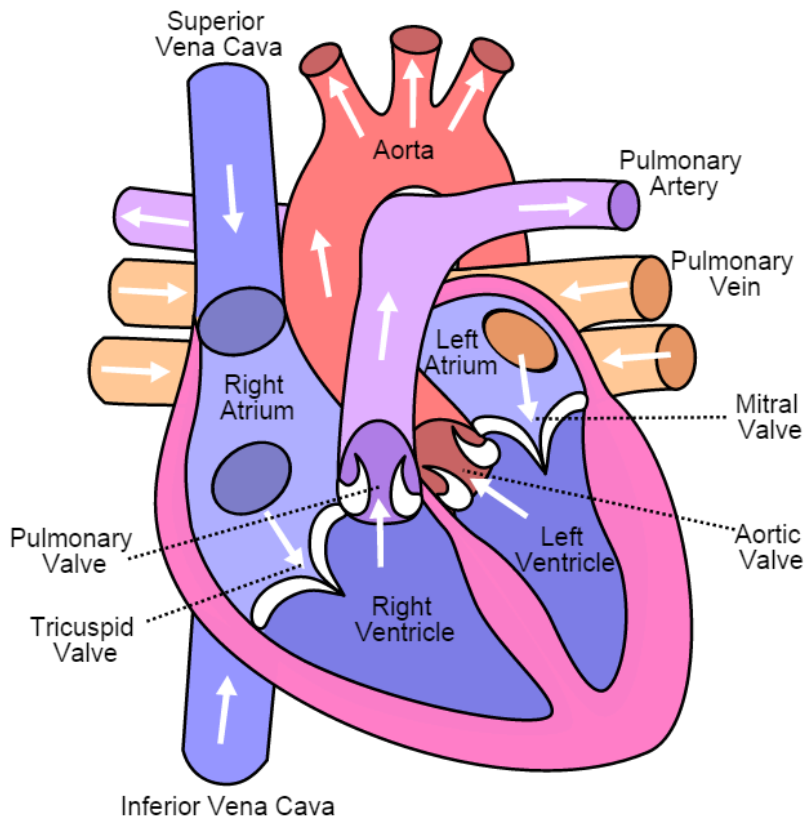
Skills Needed:

- Be able to identify structures of the heart and be able to outline the pathway of

blood through the heart.

### **Pathway of Blood throughout the heart:**

Blood from the body travels to the Superior Vena Cava and Inferior Vena Cava to the right atrium then through the tricuspid valve to the right ventricle then through the pulmonary valve through the pulmonary artery to the lungs then to the pulmonary veins to the left atrium through the mitral valve to the left ventricle then through the aortic valve then to the aorta.



## **4.2 The Heart at Work**

Skills Needed:

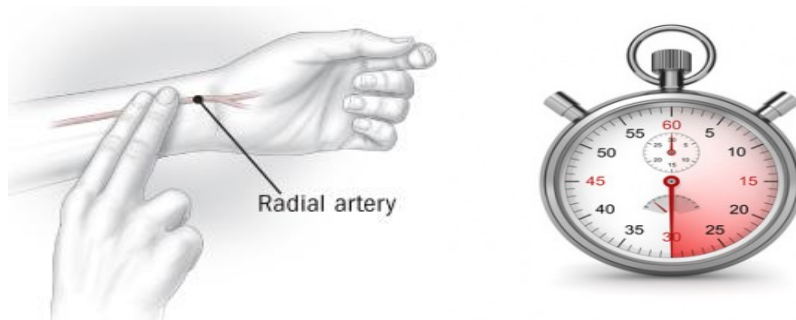
- Understand what heart rate is and how to measure it.
- Understand what blood pressure is and how to measure it.
- Understand what an EKG is and how to measure it.

Heart rate: speed of the heartbeats measured by beats per minute.

### **How to measure to Heart Rate ?**

To measure heart rate, you place your two fingers over your radial artery until you feel a

pulse. Once you feel a pulse, count the number of beats for thirty seconds. After thirty seconds, multiply the number of beats by two and the amount that you get is your Heart rate.



Blood pressure: Force of blood against the arterial wall

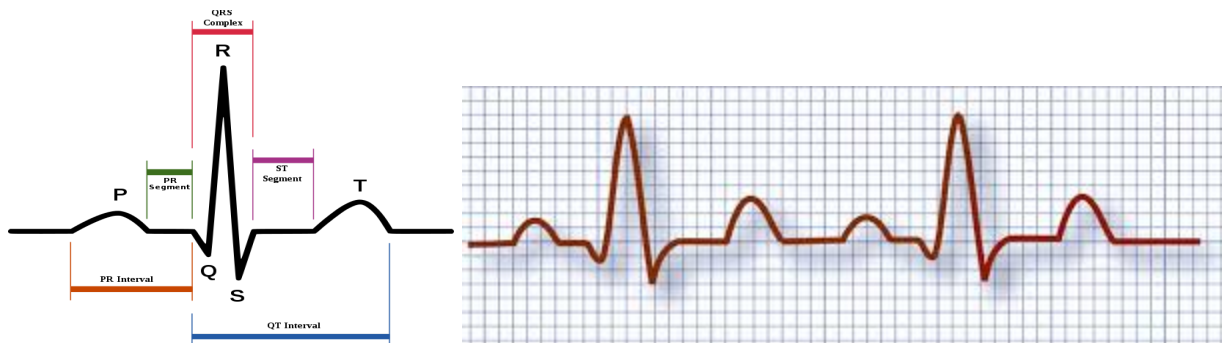


Blood Pressure Category	Systolic (mmHg)		Diastolic (mmHg)
Normal	less than 120	and	less than 80
Prehypertension	120 - 139	or	80 - 89
Stage 1 Hypertension	140 - 159	or	90 - 99
Stage 2 Hypertension	160 or higher	or	100 or higher

Systolic pressure: Top number in the reading that indicate the highest pressure reached when ventricles are contracting. Blood is moving out along the vessels.

Diastolic pressure: Blood pressure when the heart is relaxing and blood fills the heart.

EKG: Tests that check for problems with the electrical activity in the heart.



The spikes and dips are called waves.

P wave:atria contracting

QRS: ventricular depolarization and contraction

T: ventricular repolarization

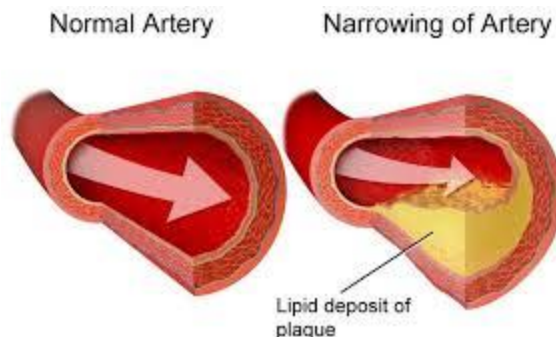
## 4.3 Heart Dysfunction

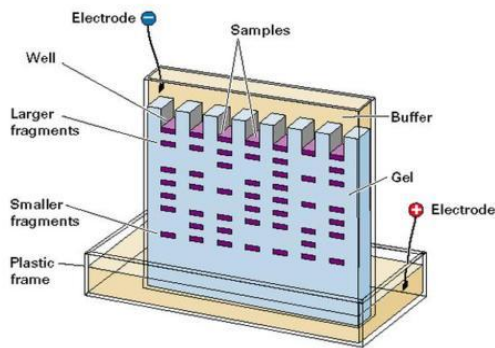
- Know what is cholesterol:
- Know what LDL and HDL do:
- Understand how to use gel electrophoresis and know how to identify hypercholesterolemia.

Cholesterol is a waxy fat-like substance that is found in all cells of the body. The body needs cholesterol to make, vitamin D, hormones, and substances that help digest food. It travels through your bloodstream called lipoproteins. The inside is made out of fat or lipids and the outside consists of protein. There is two different types of lipoprotein, LDL or low-density lipoprotein and HDL or high-density lipoprotein.

HDL or high-density lipoprotein and LDL low-density lipoprotein are a certain type of cholesterol. LDL is considered the “bad” cholesterol because if there is an excess amount of it, it will lead to a buildup of cholesterol in your arteries, and this can cause a heart attack. HDL is considered to be the “good” cholesterol because it carries cholesterol from parts of your body back to the liver and from there the liver will remove it from your body.

Hypercholesterolemia can be identified at birth when LDL levels are high and heart attacks occur at an early age. It is found in the 19th chromosome and Gel Electrophoresis can be used to identify if the parents or child is carrier or have it. DNA is put in the gel potholes and they are on the negative side, since DNA is negative it will be attracted to the positive charged side. The longer strands won't go as far as smaller strands. Doing this you usually have a control group that doesn't and has the trait and compare once finished.

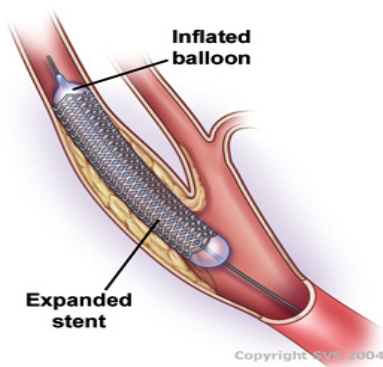




## 4.4 Heart Intervention

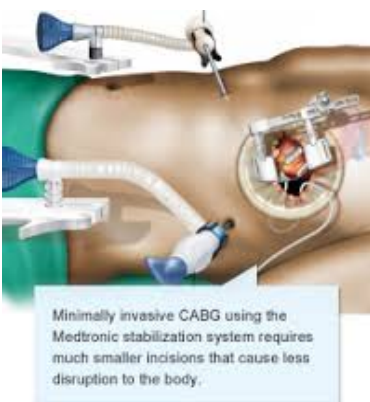
- Understand the function of an angiogram.
- Know what procedures can be used to treat a heart blockage. (Stent, Coronary Artery Graft, Angioplasty)

Angiograms are X-ray tests that use a dye and a camera to view the blood flow of an artery or a vein.



### Stents/Angioplasty

Stents help keep arteries open. If there are narrow or clogged arteries, stent is put in with a balloon catheter. When the balloon is inflated, the stent expands and allows more blood to flow through freely. Stents are made up of small mesh tubes.



### Coronary Artery Bypass Graft

In a coronary artery bypass graft, a blood vessel is removed from one part of the body, and is placed around the areas of the body that have narrowed blood flow. They are placed here to bypass the blockage and to allow blood to flow back to the heart. The removed blood vessels are usually taken from your legs or arms.

### Unit 5 UTI Practical Skills

Name of the UTI Test	Description / What is needed to be known
Urinalysis	A urine sample is taken from a patient. This sample is then used to diagnose if the patient has a disease or not with urine test strips or urine microscopy. <b>This test is the preliminary test to figure out if the patient has a UTI or not.</b>
Gross Examination of Colony Morphology (Bacterial Culture)	Bacterial culturing is a process where colonies of bacteria are isolated from each other on a Petri dish and streaking bacteria on the dish. <b>The purpose of the test is to learn about the characteristics of the specimen in order to properly identify it.</b> In the case of a UTI, the bacteria is extracted from a urine sample from the patient. The bacteria is then looked under the microscope for a rough idea of its shape, along with other characteristics such as the color, way it colonizes, etc.
Gram Stain and Morphology	<b>Gram staining allows us to see if a cell has a thick peptidoglycan and thin peptidoglycan walls. Knowing this, many bacteria can be eliminated and other minor properties can be known as well.</b> If the cell has thin peptidoglycan walls, then it will stain pink which means it is gram negative. If the cell has thick peptidoglycan walls, it will stain purple/blue which means it is gram positive.
Various Biochemical Tests	<b>Various biochemical tests are performed to examine the properties of bacteria,</b> such as whether it produces a specific hormone. Bacteria is added to a chemical indicator that tells whether bacteria has the specific property that correlates to the test by change of physical property, such as color.
Dichotomous Key	<b>A dichotomous key is used to find an answer using a series of yes or no questions.</b> In this case, we used the results of each biochemical test, and based on the result, we would perform a different test and get a final answer.