

## Grade 11 pool 2 Work sheet

### Kidneys

In this lesson you should be able to :

- 1) relate the structures of the kidney to their function;  
i.e (Internal structure of the kidney (diagram required), structure and function of the nephron (diagram required); selective reabsorption of substances; composition of urine; mention renal dialysis. )

**Instruction :**

1. Read and make notes from the content below and answer the questions at the end.
2. Send answers to [kcirreds@yahoo.com](mailto:kcirreds@yahoo.com) . be sure to put your **name** , **grade** and **the topic** in the subject bar.
3. Check the WhatsApp group for explanations, videos and links to videos. If you are not in the group by now please send a request to 1-876-388-7594. **or** ask Taguean Thomas to add your number to the group.

### Homeostasis and Excretion

**Homeostasis** - is ability of the body to keep conditions constant in spite of changes in the surroundings.

Body temperature

Body fluids (remain constant Eg . water- through excretion And osmoregulation.)

Blood sugar level

**Excretion** - This is the release of waste products of metabolism ie urea, carbon dioxide and water. It removes toxins from the body that may damage tissue. The kidney is one organ which is responsible for both.

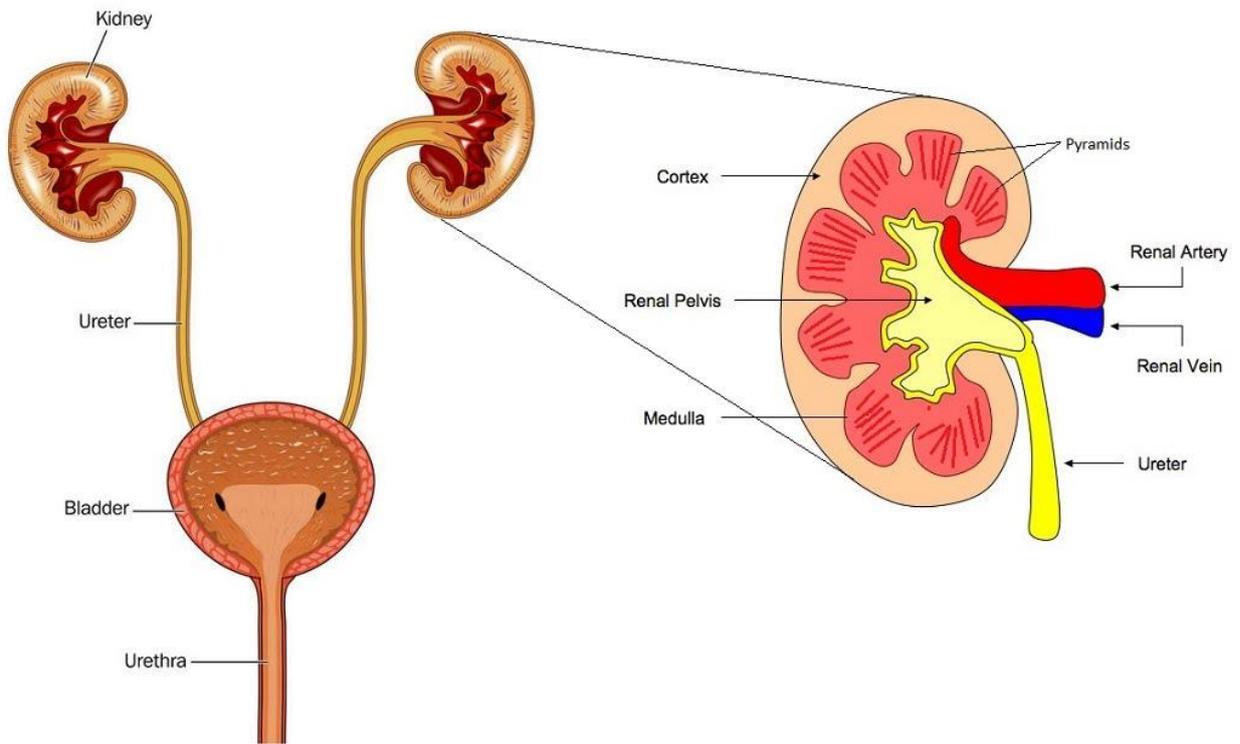
### Function and Structure of the Kidney

The kidney gets rid of toxins, excess water by osmoregulation and help control the composition of blood.

Structures of the kidney

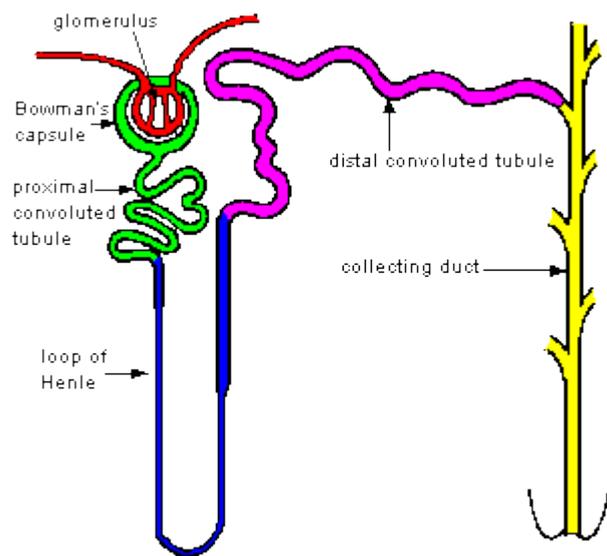
**The kidney has these major parts:**

- |                  |                  |                   |
|------------------|------------------|-------------------|
| (1) the cortex   | (ii) the medulla | (iii) the pyramid |
| (iv) the pelvis  | (v) the ureter   | (vi) renal artery |
| (vii) renal vein |                  |                   |



### The minor part parts of the kidney

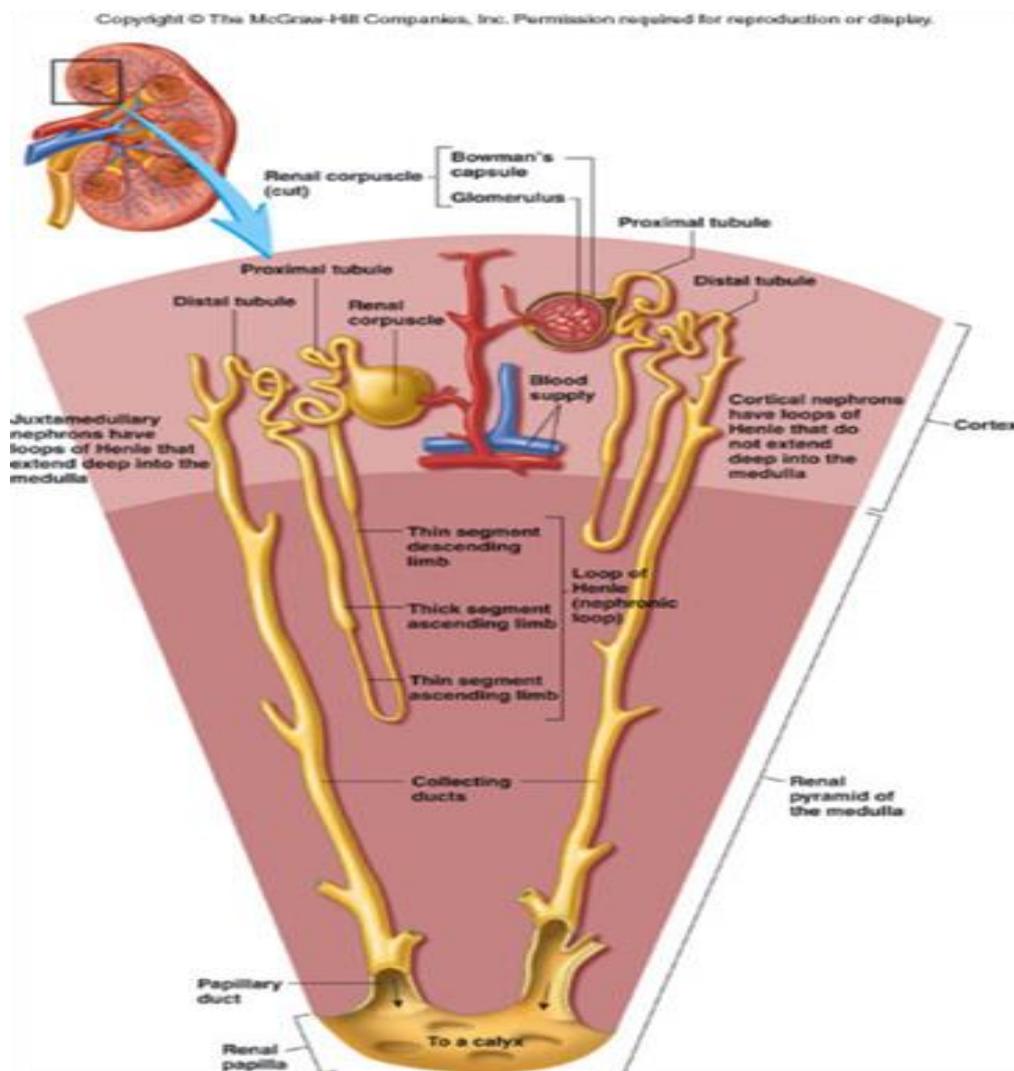
- (i) The Bowman's capsule
- (ii) The Glomerulus
- (ii) The proximal convoluted tubule
  - (i) Loop of Henle
  - (ii) Distal convoluted tubule
  - (iii) Collecting duct



Although solid the kidney is made up of many tubes called **NEPHRONS** which all connect to the collecting duct which connects to the ureter. The kidney is a bean shape organ which is responsible for excretion and the production of urine.

Blood is brought to the kidney by the renal artery and is taken away by the renal vein. The arteries branch into the arterioles and then capillaries. The capillaries form a tangle called the **GLOMERULUS**. It is located at the top of the nephron in a cup shaped part called the Bowman's capsule. Substances with small molecule get squeezed out of the Glomerulus into the Bowman's capsule due to the high pressure created by the tangle and the smaller size of the capillaries. This process is called ultra – filtration. The molecules of glucose, water salt and urea are squeezed out of the blood during this process.

### Re-absorption in the kidney



Not all the waste in the glomerular fluid is waste. Some substances are useful and are reabsorbed i.e. glucose, water and salt. At the first convoluted all the glucose is reabsorbed around the loop of Henele water is reabsorbed by osmosis. The amount of water reabsorb depends on the amount of water needed by the body. At the distal convoluted tubule some

salts are reabsorbed by active transport the urea remains in the tubule with some water and salt and is sent to the collecting duct as urine which is stored in the bladder.

### **Selective Reabsorption of Water**

If the body needs more water the hormone ADH (**ANTI-DURETIC HORMONE**) is released, this makes the walls of the collecting duct and the loop of Henle more permeable allowing water to leave the filtrate making the urine more concentrated. Water is also lost from the body when breathing, sweating and in faeces excess water loss can lead to dehydration.

### **Questions**

What is a nephron?

Which blood vessel brings blood to the kidney?

What is the Glomerulus?

How is a high blood pressure built up in the Glomerulus?

Why is this high blood pressure needed?

Name two substances found in the blood

List three substances which are reabsorbed from the nephron into the blood.

What is urine?

Where are (a) ureter and (b) urethra found?