Chapter 11: The Urinary System

Throughout the chapter, refer back to the building blocks of the body by asking students questions such as *What's a molecule? What's a cell? What's an organ? What's a tissue?*

Anatomy of the kidney
It is very important for students to see and understand the placement of the nephron in the kidney and the structures of the nephron.

Make overhead transparencies of figures 11.3 and 11.4. Explain how the figures relate to each other. For example, *This part of the renal medulla looks like this when it's enlarged. It has all of these parts.*

Students should be able to identify the following structures on a diagram. Provide them with the following outline:

I. Cortex
   a. Made of Nephrons. Each nephron contains:
      i. Glomerulus
      ii. Afferent arteriole
      iii. Efferent arteriole
      iv. Bowman's capsule
      v. Renal tubule
         1. Proximal convoluted tubule (PCT)
         2. Loop of Henle
         3. Distal convoluted tubule (DCT)

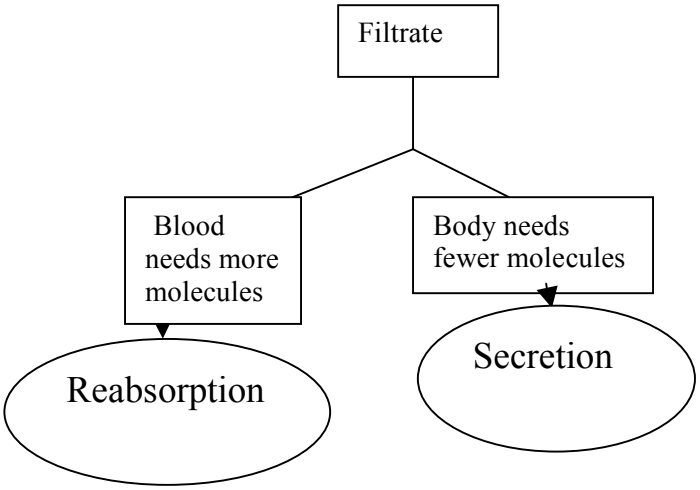
Physiology of the kidney

To illustrate filtration, draw a picture of a tube on the board with holes in it. Tell the students that this is a little piece of the glomerulus. Show dots exiting the holes. These dots signify water, sugar, salts and other dissolved molecules. These molecules (dots) are filtered out of the blood. Tell students that this is called filtrate. More filtration occurs when the blood pressure in the glomerulus is high. Less filtration occurs when blood pressure in the glomerulus is low.

To explain the concept of reabsorption and secretion, go back to your picture. Point to the dots. Tell them that sometimes the body needs to have these molecules returned to the blood. That is called reabsorption. Sometimes, however, the body needs to take more molecules out of the blood. (Add additional dots on the board) This is called secretion.

Another idea to introduce the concept of filtration would be to use a sieve or colander to filter out macaroni that's been cooked. The macaroni could represent the cells & proteins, the water could represent the filtrate. You could even do it into a bowl and the bowl would be the Bowman's capsule.

Making a concept map like this might help students with the concept of secretion and reabsoption:



Maintaining Blood Volume

Make an overhead transparency of the figure on page 239. Place it side by side the figures from pages 232. You can point to the places in the nephron where the processes occur while explaining the homeostasis of blood volume.

Hand out strips of paper, each strip explains one step of what happens when blood volume is too low or too high. (see page 239). Have students put the steps in order. They will have to decide which strips belong together in terms of if blood volume is too high or too low.