

Kidney Filtration Lab

Teacher Instruction Page

Objectives: At the end of this lab, students will be able to:

- Determine how the kidneys function
- Identify components of the blood that should be removed by the kidneys
- Identify components of the blood that should not be present in urine

Materials

- 1 cup per group
- 1 piece of mesh per group (fishnet stockings cut works well)
- Rubber bands
- Water
- 1 spoon per group
- Ziploc bags (one per group)
- 2 large cups and one small cup per group
- Beads
 - Large sized (pony beads)
 - Red
 - Green
 - White
 - Small sized (large seed beads)
 - White
 - Green
 - Blue
 - Yellow

Pre-lab

Sort out the beads based on colors and combine beads(in a random assortment) into bags labeled components of blood. (ensure there are at least 5 white beads per bag)

Information for note packet and PowerPoint

- What do Kidneys do?
 - Maintain homeostasis
 - Remove urea and other waste
 - Regulate the amount of water in the blood
 - Adjust the concentration of other substances in the blood
 - Send filtered blood back throughout the body
- Blood components
 - Water
 - Red blood cells

- o White blood cells
- o Glucose
- o Protein
- o Amino Acids
- o Salt
- o Urea
- As blood goes through the kidneys, some components of the blood are:
 - o Kept: because they are essential for life
 - o Removed: and excreted in the urine because they are toxic
 - o Balanced so they are present in the correct amount in the blood
 - o They can be:
 - Completely reabsorbed (keep them all)
 - Selectively reabsorbed (keep the amount needed)
- How kidneys work
 - o Blood enters the kidney through the renal artery
 - Blood branches out to small capillaries called Glomerulus
 - Big particles stay in the blood
 - Red blood cells
 - White blood cells
 - Proteins
 - Small particles go to a holding area called Nephrons
 - o The material in the nephron is called Filtrate
 - o The body reabsorbes some (selectively) or all (completely) of the materials required for homeostasis
 - o The remaining filtrate is sent to the bladder as urine

This activity has been modified from part of a Kidney Crisis lesson module developed by the NY State Biology – Chemistry Professional Development Network in conjunction with the University of Rochester Life Sciences Learning Center.