Urinary/Excretory System Activity – Kidney Model

Name: _____ Date: _____ Core: _____

LT1: I can create a simple kidney model to filter waste from simulated "blood".
LT2: I can determine the functions of each urinary organ and analyze waste products removed.

Source: Zaher, Melissa, and Gretchen Vikingson. "Urinary System." *Teachers Pay Teachers*, Getting Nerdy, LLC, 2014, www.teacherspayteachers.com/Product/Urinary-System-1243075.

Background information:
The urinary system is also called the "excretory system" because it excretes or removes excess materials from the body in order to keep the body in balance. Other organ systems that are involved with removing excess waste include the respiratory system (which removes carbon dioxide and water), the integumentary system (which removes water, salt and small amounts of urea in the form or sweat) and the digestive system (which removes solid waste and some water). All of these organ systems are important in keeping the body from becoming unbalanced due to an accumulation of waste products.

The main organs for removing waste in the excretory system are the kidneys. Kidneys contain more than a million nephrons which act as filters. Blood vessels carry the blood the be filtered to the kidneys. The nephrons within the kidneys strain the blood of needed materials which go back into the bloodstream and waste to be removed. The cleaned blood re-enters the bloodstream. The waste is urine which collects in the nephrons of the kidneys and travels down the ureters (which are small tubes) to the urinary bladder. The urine then exits the body through another organ called the urethra.

Materials:
- 1 large plastic cup
- 1 small plastic cup
- 1 plastic funnel
- 5 drops iodine solution
- ½ teaspoon cornstarch
- 50 mL water
- 3 drops yellow food coloring
- 1 paper coffee filter
- 1 plastic spoon for mixing

Procedure:
1. Set up a model of a functioning kidney as follows:
   a. Place the large plastic cup on a stable surface.
   b. Place the funnel inside the cup resting on the lip.
   c. Place the coffee filter inside the funnel.
   d. Set this cup off to the side.
2. Mix up the simulated "blood" by adding the following to the small plastic up in this order:
   a. 50 mL water
   b. 3 drops of yellow food coloring
   c. ½ teaspoon cornstarch
   d. 5 drops of iodine solution
3. Carefully stir the "blood" solution until fully mixed. Record the color and consistency of the solution in the table below.
4. Slow pour the "blood" solution through the filter paper and funnel so that the solution collects in the large plastic cup. Wait until all of the solution has filtered through the paper.
5. Record your observations in the data table.

Urinary System Observations

Urinary Model	Contents of "Urinary Organ"	Observation of Contents Before Filtration	Observations of Contents After Filtration	Urinary Organ Represented
Large Cup	Empty			
Funnel/Filter Paper	Filter paper			
Small Cup	Water, cornstarch, iodine, yellow food coloring			

Conclusions:

1. What do the contents of the large cup represent?

   _____

   _____

2. What do the contents of the small cup represent?

   _____

   _____

3. What do the contents remaining behind in the filter represent?

   _____

   _____

4. If the model you built were a real excretory system, what would happen to the residue that was left behind in the coffee filter?

   _____

   _____

   _____

5. How does this model simulate the role of the kidneys? How does this activity relate to our study of the excretory system?

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6. What would happen to your body if the kidneys stopped working?

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