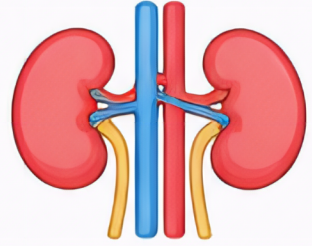




# BUILDING A MODEL OF THE KIDNEYS AND FILTRATION SYSTEM



*Explore how the kidneys filter waste from the blood.*

## BACKGROUND

Your kidneys are bean-shaped organs that act like filters. They remove waste and extra water from your blood, and the waste leaves your body as urine. In this activity, you will build a model that shows how the kidneys filter out waste while keeping the important parts in the blood.

## MATERIALS

- 2 clean plastic cups
- 1 coffee filter
- 1 rubber band
- 1 funnel
- Measuring cup
- Water
- 2 tablespoons sand (represents waste)
- 1 tablespoon rice (represents proteins and cells)
- Red food coloring (represents blood)
- Clear cup or container (to collect filtrate)

## PROCEDURE

1. Place the funnel inside the bottom cup.
2. Place the coffee filter inside the funnel and secure it with a rubber band.
3. In the top cup, mix 1 cup of water, red food coloring, sand, and rice. Stir well.
4. Slowly pour the mixture into the coffee filter.
5. Watch what happens as the liquid passes through the filter into the bottom cup.
6. Check the contents left in the filter and the liquid in the bottom cup.

## MODEL DIAGRAM



**Coffee filter**  
(the kidney filter)

**Sand (waste)**  
and rice (proteins  
and cells)

**Top cup**  
(blood entering  
the kidney)

**Filtrate**  
(urine leaving  
the kidney)

The coffee filter acts like the kidney's filter. Small particles (waste and extra water) pass through. Larger particles (proteins and cells) stay behind.

## OBSERVATIONS

What stayed in the coffee filter? \_\_\_\_\_

What passed through into the bottom cup? \_\_\_\_\_

What does the liquid in the bottom cup represent? \_\_\_\_\_

## ANALYSIS QUESTIONS

1. Why do you think the sand did not pass through the coffee filter? \_\_\_\_\_
2. Why do you think the rice stayed in the filter? \_\_\_\_\_
3. What part of the kidney does the coffee filter in your model represent? \_\_\_\_\_
4. What part of the kidney does the liquid that passed through represent? \_\_\_\_\_
5. How does this model help you understand how your kidneys work? \_\_\_\_\_



**FUN FACT:** Your kidneys filter about 180 liters (about 48 gallons) of fluid every day!