

# 4

## The Renal System

You've got to be Kidney!



Get a good night's sleep before this adventure because when you fall into **Ancient Assyria in Northern Iraq...** you will need to be on your toes. **The year is 810 BCE** and the renal system is under inspection.

# Hello Adventurer!

## Welcome to Adventure 4 - The Renal System.

In this workbook, you will learn about Ancient Assyria and your body's Renal System. There will be information to read, activities to complete, and quizzes to take when you are ready to challenge yourself! Take your time along the way - spend as much or as little time as you like on each activity.

**Good luck, and have fun!**

*Destination:  
Ancient Assyria!*



**Get ready  
to clean things up!**



**LEARN ABOUT**  
**The Renal System**

The process by which your body takes out the trash

**VISIT**  
**Ancient Assyria**

A shortage of clean water threatens to drive people against one another

**MEET**  
**Queen Sammu-Ramat**

and the court of Babylon



**Join us along the Euphrates.\***

The Euphrates was an important water source for the people of ancient Assyria.

**\*Say it like this: "you-FRAY-tees"**

The strongest syllable is shown in **CAPITALS** and **red**.

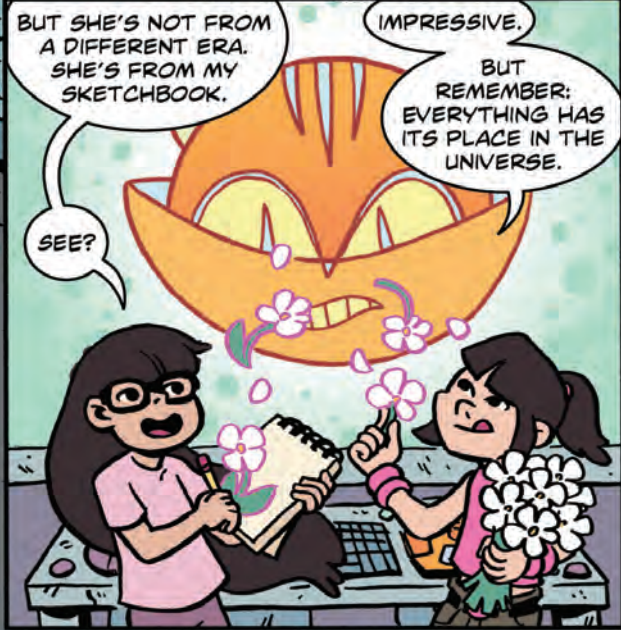
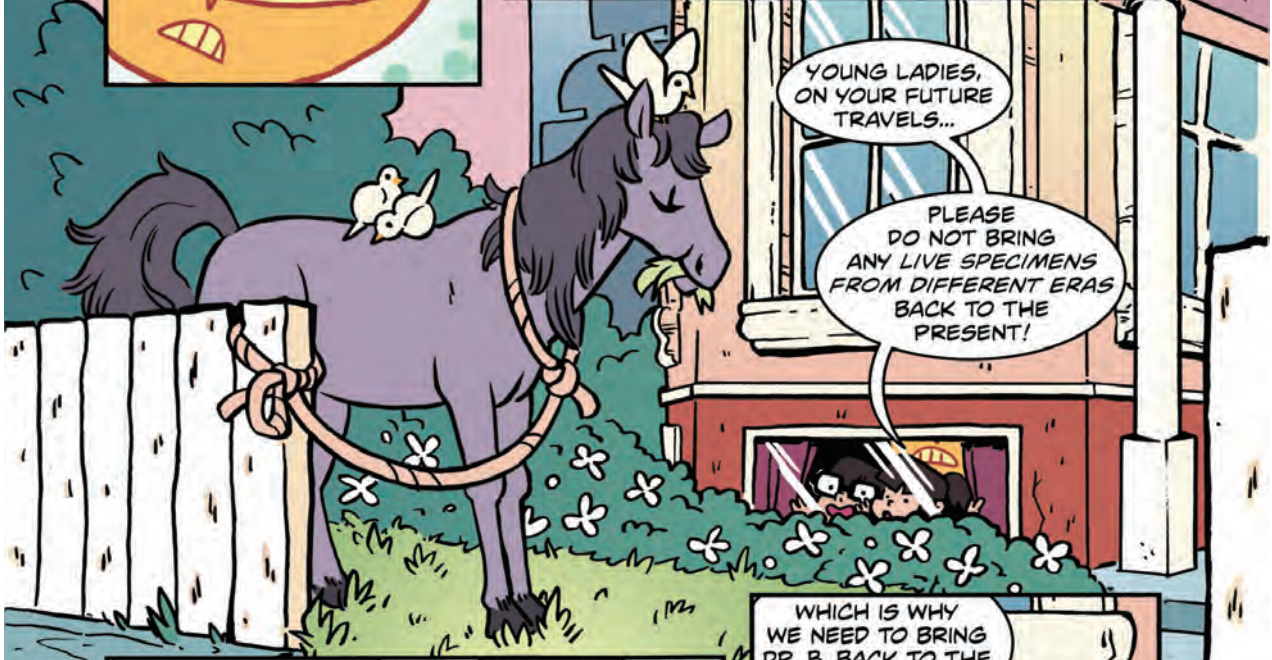


**Let's enter this portal for...**

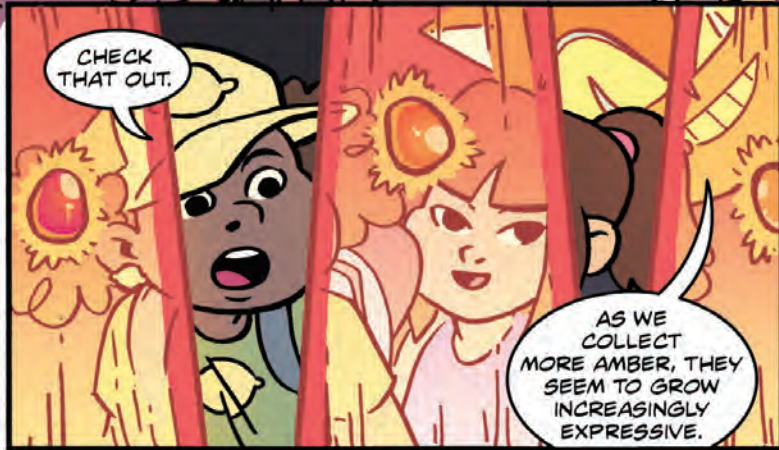
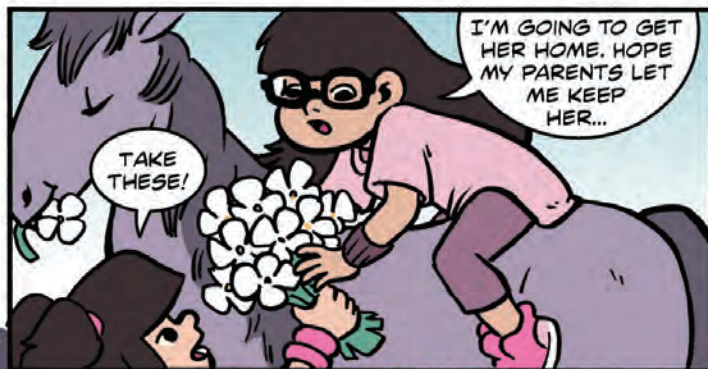
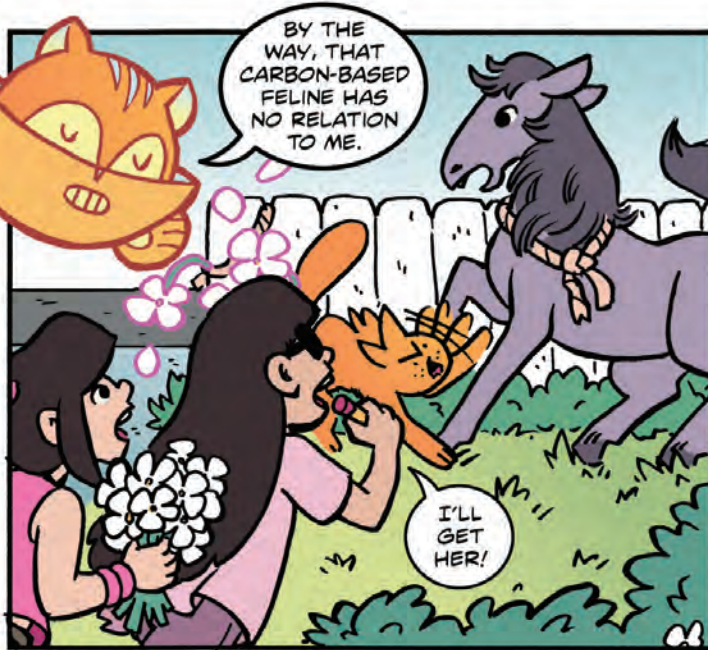


# **Time Skaters Adventure 4: You've Got to be Kidney!**

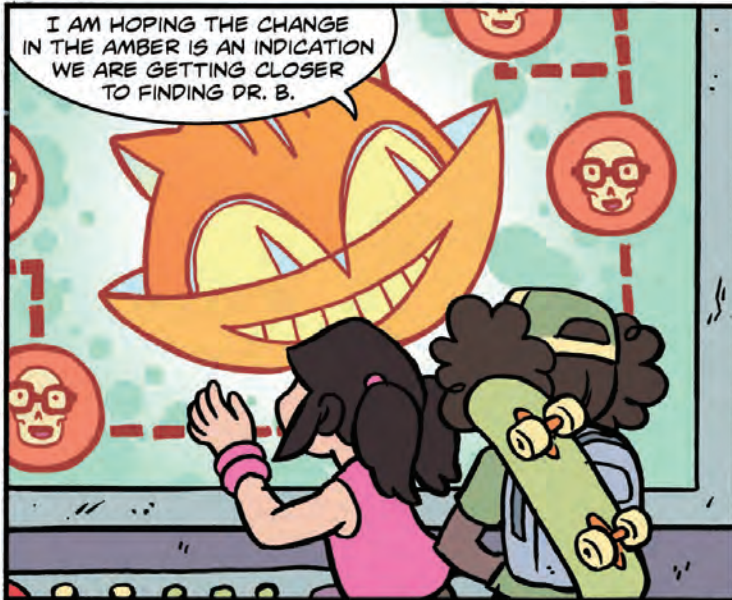














# Learning Calendar

Part **1**  
**Know  
Your  
History**



**Locate** Ancient Assyria on the map on page 1.

**Read** the comic **Time Skaters Adventure 4: You've Got to be Kidney!** Find it at the beginning of this Adventure Guide!

**Gather** the adventure equipment you'll need from around the house - find the checklist on pages 24-27!

**Enlighten** yourself in *Know Your History*.

**Decipher** ancient languages in *Know Your Script*.

**Make** *Your Mark* in Ancient Assyrian Script.

**Discover** the *Mystery of the Hanging Gardens of Babylon*.

**Create** *Your Creature* and show the world what lurks within.

**Crack** the *Ancient Assyria Crossword*.

**Don't** *Make a Mess(opotamia)* - put your knowledge to the test!

Part **2**  
**Know  
Your  
Renal  
System**

**Examine** purification in *Know Your Renal System*.

**Confront** *Separation Anxiety*.

**Turn** the old into new while in *Need of Nephrons*.





**Filter** with friends as a *Potent Processor*.

**Solve** the *Renal Rumble*.

**Uncover** the *Kidneys' Claim to Fame!*

Part **3**  
**Know  
Your  
Appetite**



**Feast** your eyes on *Know Your Appetite*.

**Review** the recipes. Make a Shopping List.  
Get your Kitchen Ready.

**Fix up** some *Tahini Hummus*  
and *Walnut Butter Cookies*.

**Share** your dishes with your family. Discuss  
*Thoughts for Young Chefs* around the table!

Part **4**  
**Show What  
You Know!**



**Take** some time to  
*Babble On* about *Babylon*.

**Check out** *Further Reading*  
for more opportunities  
to learn.



*Great job  
on all your  
hard work!*



# Mystery of the Hanging

## Gardens of Babylon

Wondering what's up with the **"Hanging" Gardens of Babylon?** If so, you're not alone! Researchers have long tried to unravel the mysteries of this ancient wonder.


Studies of ancient text may be the reason for the mixup. One point of confusion is the geographical location of Babylon itself. Researchers now believe they have pinpointed this seventh wonder of the world to Ninevah — a city located in Northern Assyria. Arabic sources note that this northern Assyrian city was widely known as "Old Babylon," while Diodorus Siculus writings describe Babylonian palaces in detail that resemble those that contemporaneously existed in Ninevah.





Another of the Hanging Gardens of Babylon's many mysteries is what the garden actually looked like. Based on the English translation of the word **"hanging"**, one may think of plants or foliage dangling from the ceiling. However, the true Greek translation of the word for hanging is "Kremastos", which means to create an upward, raised slope. By that definition, the dirt piling on the plant root system to create a mound could be what the Ancient Assyrians were actually referring to!

Not lost in translation is the decorative beauty and spectacular utility of the Gardens. Plants, shrubs, and trees provided shade from the sun, and supplied fruit and herbal medicines.



The Gardens were irrigated through a complex canal system made of copper and bronze. This infrastructural masterpiece helped to carry water from mountain rivers into Babylon.



# Mystery of the Hanging Gardens of Babylon

The Hanging Gardens of Babylon were created in the image of the Northwestern Assyrian Mountains.



*What plants  
are native  
to your area?*

Try making your version of the Hanging Gardens of Babylon using a native plant and the gardening directions on the next page - have fun!





## Materials:

- **Newspaper**
- **A small pot, jar, or recycled container**  
(clean pasta sauce jars work great!)
- **Dirt**
- **Plant seeds or a seedling**

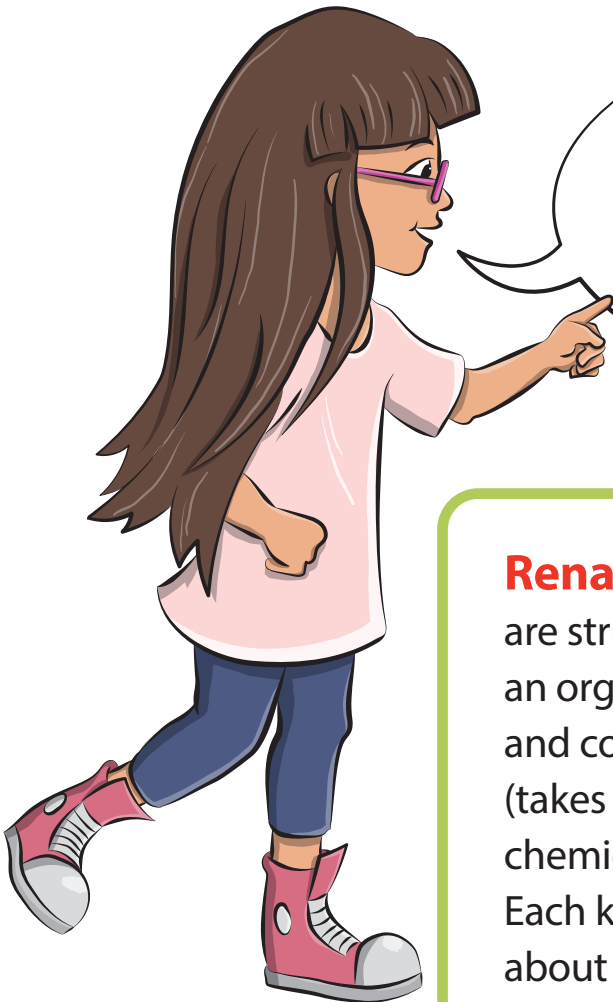
## Directions:

1. Lay out a few sheets of newspaper as your work area.
2. Take out your small pot, jar, or container.
3. Measure how much area you will need for your seedling inside the container (skip this step if you are using seeds).
4. Add enough dirt to fill the space between the seedling and bottom of the jar, or fill the pot with dirt completely if you have seeds (leave an inch from the top for watering later on).
5. Place your seedling into the jar and fill the gaps on the sides with dirt. If you have seeds, you'll want to plant them at a depth two times the height of the seed itself.
6. Follow the directions located on your seed packet or seedling to find out how much sunlight and water your new plant needs to grow big and strong. Enjoy!



## Your Filtration Station

Each kidney has large blood vessels that move blood into and out of it, and a ureter that carries the final waste — urine — out to the urinary bladder. The kidneys also have a lot of small blood vessels traveling through them because they filter wastes out of the blood (while keeping the good stuff like your blood cells). Your kidneys are always busy cleaning your blood.



*They can cleanse all the blood in your body in about 50 minutes.*

### **Renal Pyramids**

are structures in the kidney medulla (the center of an organ) that contain millions of tubes that form and collect urine. This is where the kidney reabsorbs (takes back into the bloodstream) nutrients, certain chemicals, and water that the body wants to keep. Each kidney contains 5 to 11 renal pyramids, and about 1 million tube units.



## Renal Cortex

is the outer part of the kidney (cortex means "shell"). Most of the blood entering the kidney travels through the renal cortex, where it gets filtered to remove wastes.

## Renal Artery

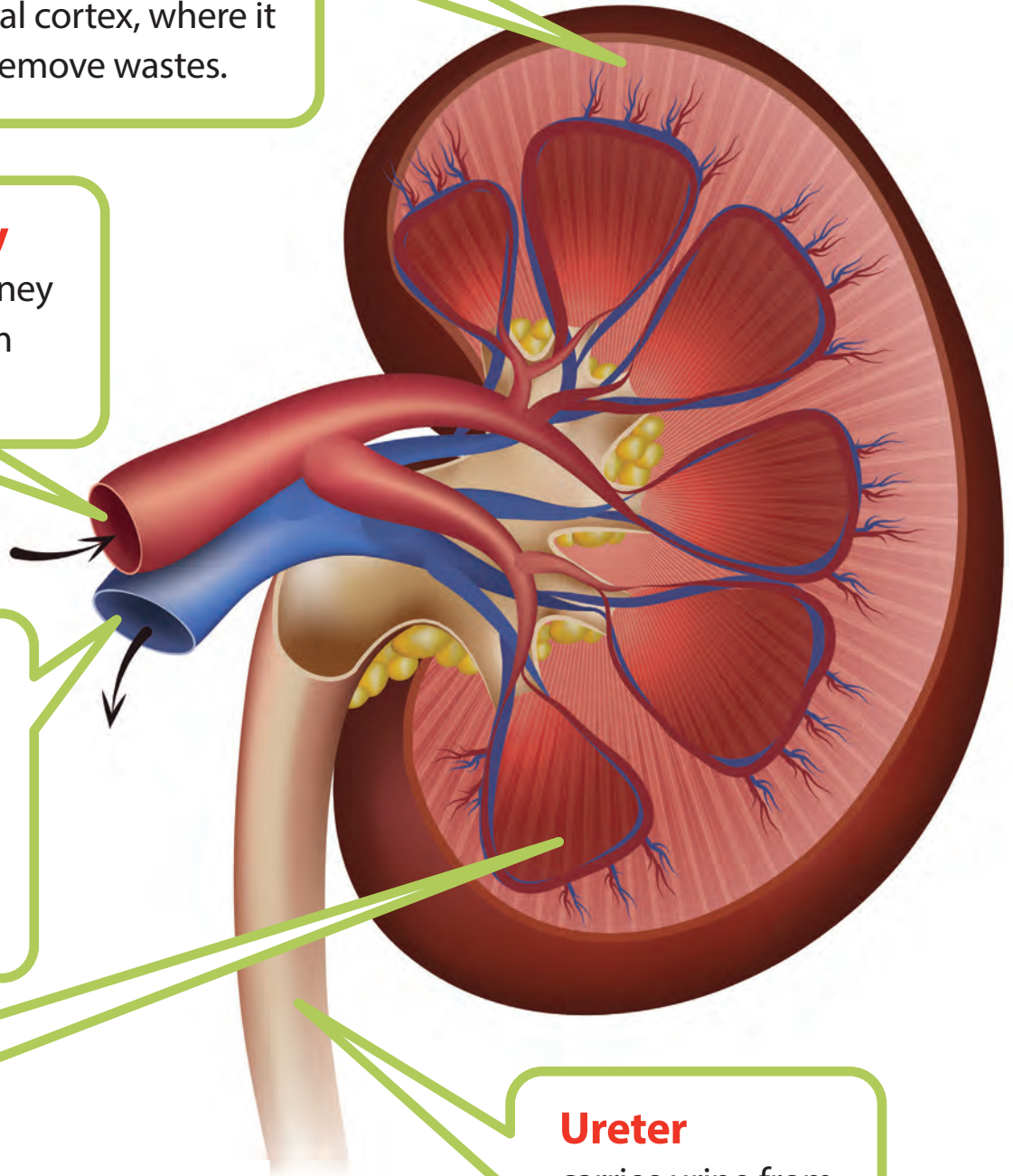
supplies the kidney with blood from the heart.

## Renal Vein

takes cleansed blood out of the kidney and back towards the heart.

## Ureter

carries urine from the kidney to the urinary bladder.

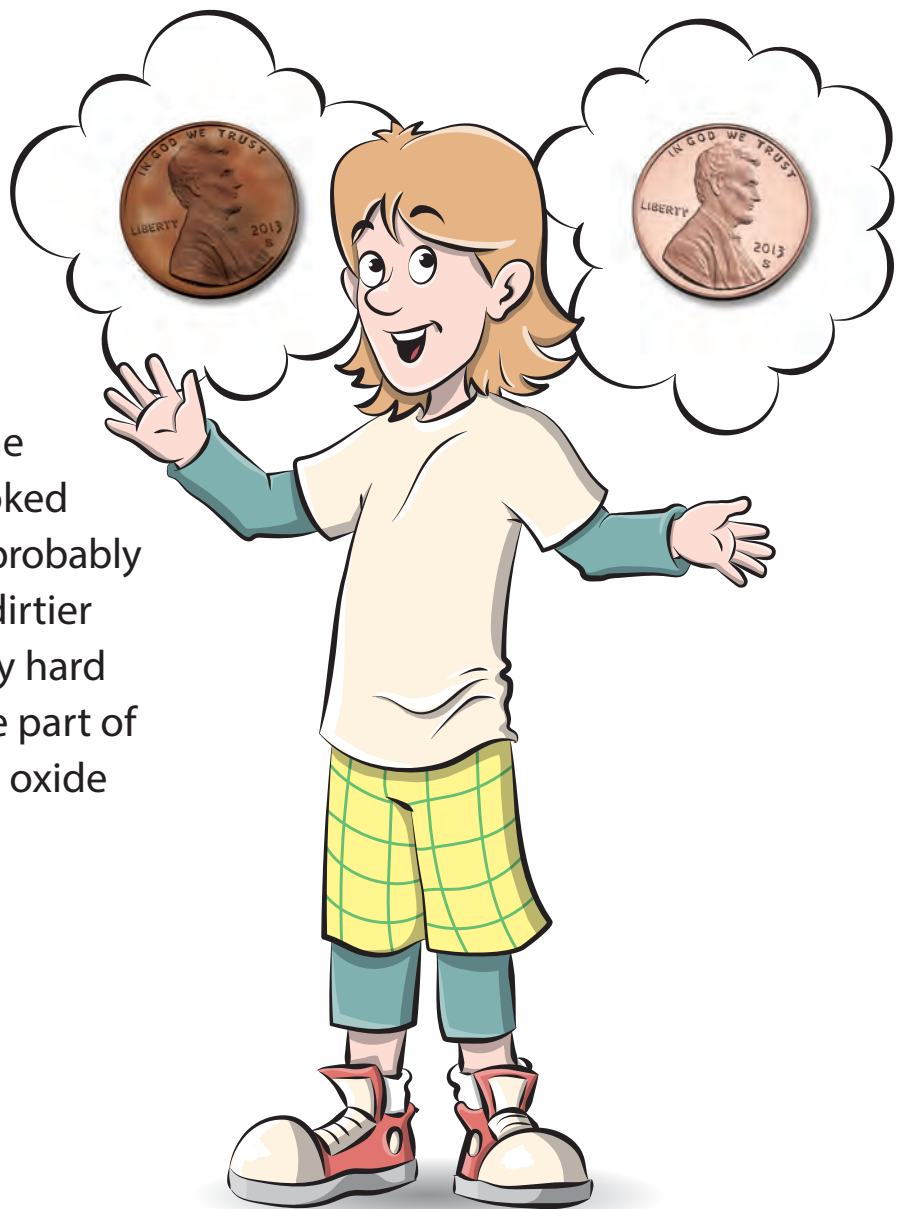


# In Need of Nephrons

Your nephrons are the cleaning and filtration units in your blood. With the aid of millions of them, the things your body needs are reabsorbed and the things it does not need are kicked out into your bladder to get expelled.

You might not think of blood as something that can get “cleaned,” but without your kidneys, you’d get very sick very quickly (it’s a good thing you have two in case something goes wrong)!

Just as blood circulates through your body, currency (money) circulates through the economy. If you have ever looked at a pile of pennies, you have probably noticed that some are much dirtier than others. It would be pretty hard to wash them with soap, since part of what ages them is the copper oxide that builds up on the surface. With a bit of vinegar you can make them look as shiny as when they were new!





## Materials:

- **Some dirty or dull pennies**
- **A cup or small bowl**
- **Paper towels**
- **Water**
- **Vinegar**



## Directions:

1. Put the dirty pennies in your bowl
2. Pour just enough vinegar to cover the pennies
3. Wait for at least 10 minutes.
4. Take the pennies out and rinse them off with water, then rub them with the paper towel until they are dried off.
5. Great job - you've just acted as a kidney for your coins!

# Tahini Hummus

The name “hummus” comes from the Arabic word for chickpeas, which were a staple food of ancient Assyria. Chickpeas have a high concentration of iron, a mineral that your body needs to make red blood cells.

A good meal could consist of lentils, boiled millet, barley prepared as we prepare rice, and possibly maize. Common vegetables and fruit used by the Assyrians were pumpkins, cucumbers, and melons. Fish was a popular source of protein, and was readily available in the rivers flowing through Assyria.



**Prep time:**  
**10 minutes**

## Ingredients:

- 1 can (15 ounces) of chickpeas (garbanzo beans), drained
- 1/4 cup tahini (sesame paste)
- 1 clove of garlic, smashed
- 1 lemon, juiced
- 1/4 teaspoon salt
- 1/2 cup olive oil





**CREATED WITH LOVE  
BY THE  
KNOW YOURSELF TEAM**

