|  |
| --- |
| **Aim:**  **5.1** |
| **Objective:** |
| **Real world connection:** |
| **Vocabulary:** kidneys, ureters, bladder, sphincter, urethra, renal artery, renal vein, pelvis, medulla, cortex, nephron, urea, dialysis |

**Urinary System aka Excretory System**

***For today’s lesson, to get an overview of the excretory system you are going to do a Webquest:***

This means you will go online to the various websites provided on our class website and fill out the notes in your packet that correspond with those websites. We will go over some of this afterwards.

|  |  |
| --- | --- |
|  | **5.1 Class Notes** |

A. **Go to the following website**: <http://www.ask.com/question/what-are-the-seven-functions-of-the-human-urinary-system>

Answer the following:

**What Are the Seven Functions of the Human Urinary System?**

1.

2.

3.

4.

5.

6.

7.

B. **Go to the following website:** <http://kidney.niddk.nih.gov/kudiseases/pubs/yoururinary/>

Click on How does the urinary system work? Answer the following questions:

**How are the lungs, skin, and intestines similar to the urinary system?**

**BONUS: What type of waste is excreted by the lungs, skin, and intestines?**

1. Lungs: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Skin: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Intestines: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
|  | **5.1 Class Notes** |

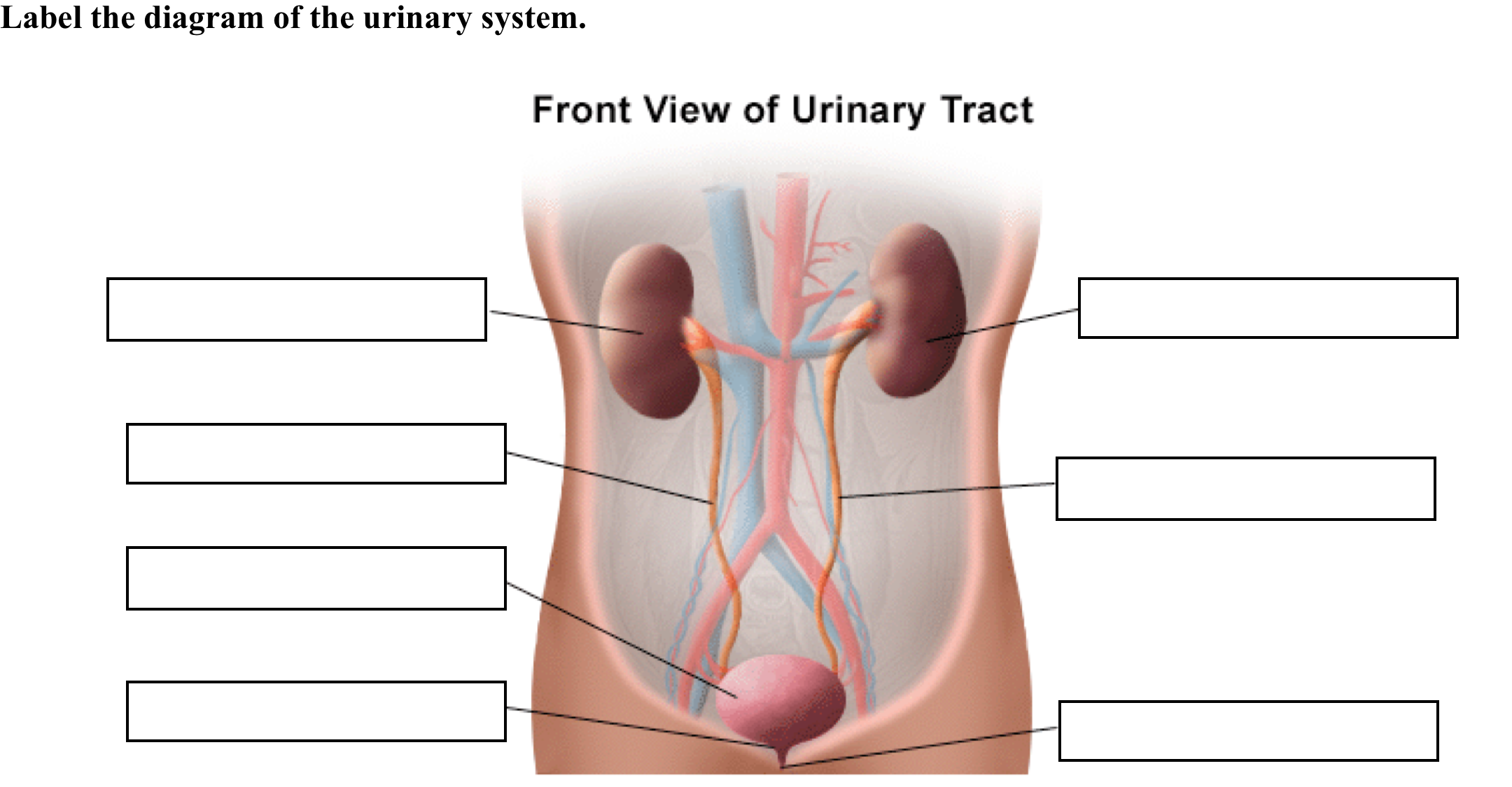
**What factors affect the amount of fluid excreted by the urinary system?**

**What is *urea* and where does it come from?**

**How does it get to the kidneys?**

**Go to the following website:** <http://medicalcenter.osu.edu/patientcare/healthcare_services/urinary_bladder_kidney/anatomy_urinary_system/pages/index.aspx>

**Label the following diagram:**



|  |  |
| --- | --- |
|  | **5.1 Class Notes** |

**Continuing from this website:** <http://medicalcenter.osu.edu/patientcare/healthcare_services/urinary_bladder_kidney/anatomy_urinary_system/pages/index.aspx>

**Summarize the function of the following:**

Kidneys - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ureters - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Bladder - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sphincters - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Nerves in bladder - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Urethra - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
|  | **5.1 Class Notes** |

**Go to the following website:** http://www.biologymad.com/resources/kidney.swf

Use the mouse to scroll over and locate each part listed below and record its function

**Summarize the function of the following:**

Renal artery - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Renal vein - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Pelvis - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

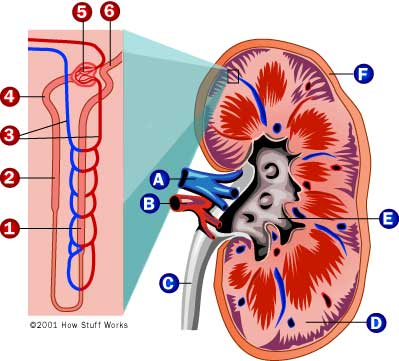
Medulla- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cortex- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
|  | **5.1 Class Notes** |

**Go to the following website:** [**http://www.medindia.net/animation/anatomy\_urinary.asp**](http://www.medindia.net/animation/anatomy_urinary.asp)

1. Each kidney is about the size of a human \_\_\_\_\_\_\_\_\_\_\_\_.
2. Label the diagram.



1. The specialized unit of the kidney is called the nephron, and its function is to produce *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by filtering waste and extra fluid from the blood.*
2. *Blood enters the kidney through the renal \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and passes into the nephron.*
3. *The bulk of the filtering takes place in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.*
4. *The filtered wastes then travel through the tubule where the excess fluid is converted to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.*
5. *The urine reaches the renal pelvis and passes into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.*
6. *Next, it enters the urinary \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to be stored until it is released via the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.*
7. *Finally, the filtered blood leaves the kidney through the renal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.*

|  |  |
| --- | --- |
|  | **5.1 Class Notes** |

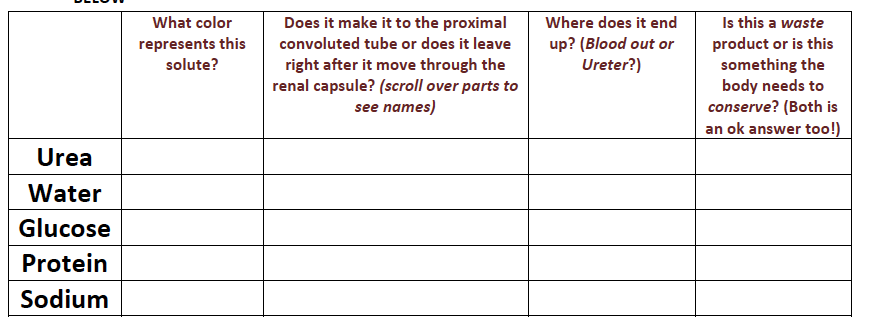
**Go to the following website:** <http://www.tutorvista.com/content/biology/biology-iv/excretion/nephron-structure.php>

Label the 4 primary regions of the nephron:



**Go to the following website:** <http://www.biologymad.com/resources/kidney.swf>

Now click on CONTINUE at the bottom of the page so you can see HOW THE NEPHRON WORKS. **Click on each of the five substances,** THEN click Start to find out what happens to each in the nephron. **FILL IN THE TABLE BELOW**

****

|  |  |
| --- | --- |
|  | **5.1 Class Notes** |

**Continue on this website:** <http://www.biologymad.com/resources/kidney.swf>

**Bonus**: How do all these substances get into and out of the blood stream?

Now click on **Capsule, Proximal, Loop and Duct** at the top of the page in the drop down menu. Watch each simulation and see if you can figure out what parts you are looking at. Then answer the questions below:

a. Which molecule is the largest urea, water, glucose, protein or sodium?

b. **On the proximal simulation:** What do the following represent?

i. Red circles at the bottom

ii. Yellow tic-tacs with lines inside them

iii. Small pink dots

**Go to the following website:** http://kidshealth.org/parent/general/body\_basics/kidneys\_urinary.html

**Identify four different wastes produced by your body?**

a.

b.

c.

d.

**Out of these wastes produced by your body, which waste product is produced by the kidney?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |
| --- | --- |
|  | **5.1 Class Notes** |

**DIALYSIS**

**Go to this website:** <http://www.davita.com/articles/dialysis/>

Click on Animated learning module about dialysis

1. What is dialysis?

2. What are some benefits of dialysis?

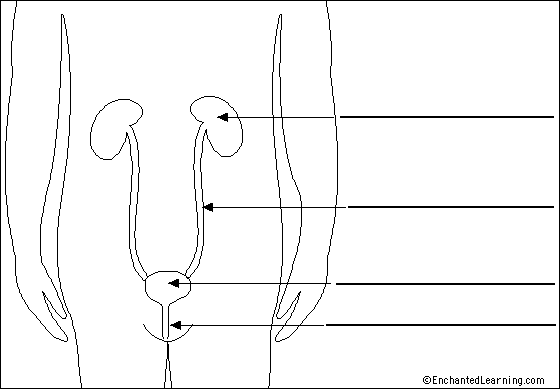
**Go to this website:** <http://www.kidney.org/atoz/content/dialysisinfo.cfm>

1. When is dialysis needed?
2. What does dialysis do?

|  |  |
| --- | --- |
|  | **5.1 Class Work** |

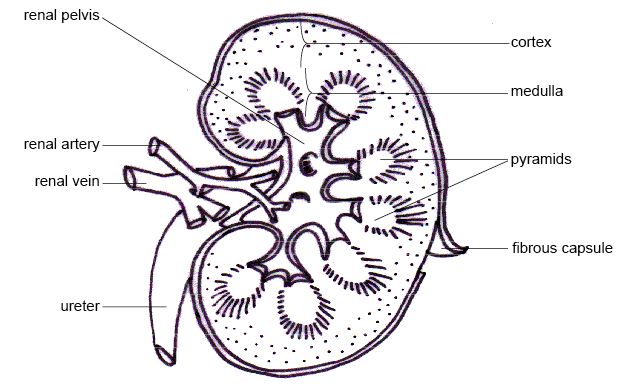
**LABELING URINARY SYSTEM**

**Label using the following: bladder, ureter, kidney, and urethra**



**Label using the following:**

**Pyramids, ureter, renal pelvis, renal vein, renal artery, medulla, cortex, fibrous capsule**



|  |  |
| --- | --- |
|  | **5.1 Class Work** |

**Answer the following multiple-choice questions:**

1. What is the source of the waste products that are excreted by the urinary system?
2. Pollutants in the water and food
3. Undigested fiber
4. Metabolic processes
5. Excess food

2. What is the function of the urinary bladder?

1. Store urine
2. Filter the blood
3. Aid defecation
4. Contain bacteria to fight infection
5. The ureter connects which part of the kidney to the bladder?
6. renal cortex
7. urethra
8. renal medulla
9. renal pelvis
10. Which of the follow is not a function of the urinary system?
11. removal of waste products from the bloodstream
12. storage and excretion of urine
13. regulation of leukocyte and platelet production
14. regulation of blood volume and, indirectly, blood pressure
15. All of the following structures are components of the urinary system except
16. kidneys
17. ureters
18. urethra
19. gallbladder

6. The outer layer of the kidney, just internal to the fibrous capsule, is the renal

a. medulla

b. column

c. pelvis

d. cortex

|  |  |
| --- | --- |
|  | **5.1 Class Work** |

**LINES OF LEARNING (LOL):** In a TIEDIEDC**,** explain how the structures of the urinary system helps carry out its function (Chose two structures to analyze a function). Be sure to cite two pieces of evidence.

|  |  |
| --- | --- |
| **T** | **Topic Sentence of Paragraph** |
| **I** | **Introduce how one part of bone helps with a function** |
| **E** | **Cite evidence from reading** |
| **D** | **Explain the example/evidence** |
| **I** | **Introduce how another part of bone helps with a different function** |
| **E** | **Cite evidence from reading** |
| **D** | **Explain the example/evidence** |
| **C** | **Conclusion** |

|  |
| --- |
| **Aim:**  **5.2** |
| **Objective:** |
| **Real world connection:** |
| **Vocabulary:** urea, Bladder, Collecting duct, Minor calyx, Major calyx, Pelvis, Ureters, Distal tube, Proximal tube, Loop of Henle, nephron, filtration, secretion, reabsorption, passive transport, active transport |

**All Things Urine**

**THINK INK: Why is releasing urine from the body important?**

|  |
| --- |
|  |

**ACTUAL ANSWER:**

|  |
| --- |
|  |

**WATCH VIDEO:**

<http://www.pennmedicine.org/encyclopedia/em_DisplayAnimation.aspx?gcid=000136&ptid=17>

|  |
| --- |
| **4.5 Class Notes** |

**Components of Urine**

**Physical Characteristics of Normal Urine**

**Go the following website:** [**http://www.ivy-rose.co.uk/HumanBody/Urinary/Urinary\_System\_Composition\_Urine.php**](http://www.ivy-rose.co.uk/HumanBody/Urinary/Urinary_System_Composition_Urine.php)

Quantity/Normal Volume - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Color - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Specific Gravity/Density - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Odor- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Reaction/Acidity- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| **5.2 Class Notes** |

**Chemical Composition of Normal Urine**

**Go the following website:** [**http://www.ivy-rose.co.uk/HumanBody/Urinary/Urinary\_System\_Composition\_Urine.php**](http://www.ivy-rose.co.uk/HumanBody/Urinary/Urinary_System_Composition_Urine.php)

* Urine is 95% \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The other 5% is made up of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Organic Molecules:**

a. Urea - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. Creatinine - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. Uric acid - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d. Other substances- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Ions:**

Individual elements include (list them out)- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Small groups formed from a few different elements (list them out)-

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| **5.2 Class Notes** |

**Formation and Elimination of Urine**

**Go on this website:** [**http://lyceum.algonquincollege.com/lts/aandpresources/interactive/14-6\_UrineComposition/index.html**](http://lyceum.algonquincollege.com/lts/aandpresources/interactive/14-6_UrineComposition/index.html)

**Use this website to go through step-by-step to answer questions. Make sure to complete the entire activity online.**

Urine formation has three main stages:

NOTE: Click start, place arrow over the name of each stage to find out which structures are involved

|  |  |  |
| --- | --- | --- |
| **Stage** | **Description** | **Structures Involved** |
| Filtration |  |  |
| Reabsorption |  |  |
| Secretion |  |  |

|  |
| --- |
| **5.2 Class Notes** |

**Step 1: Filtration**

**Filtrate = liquid passed through a filter**

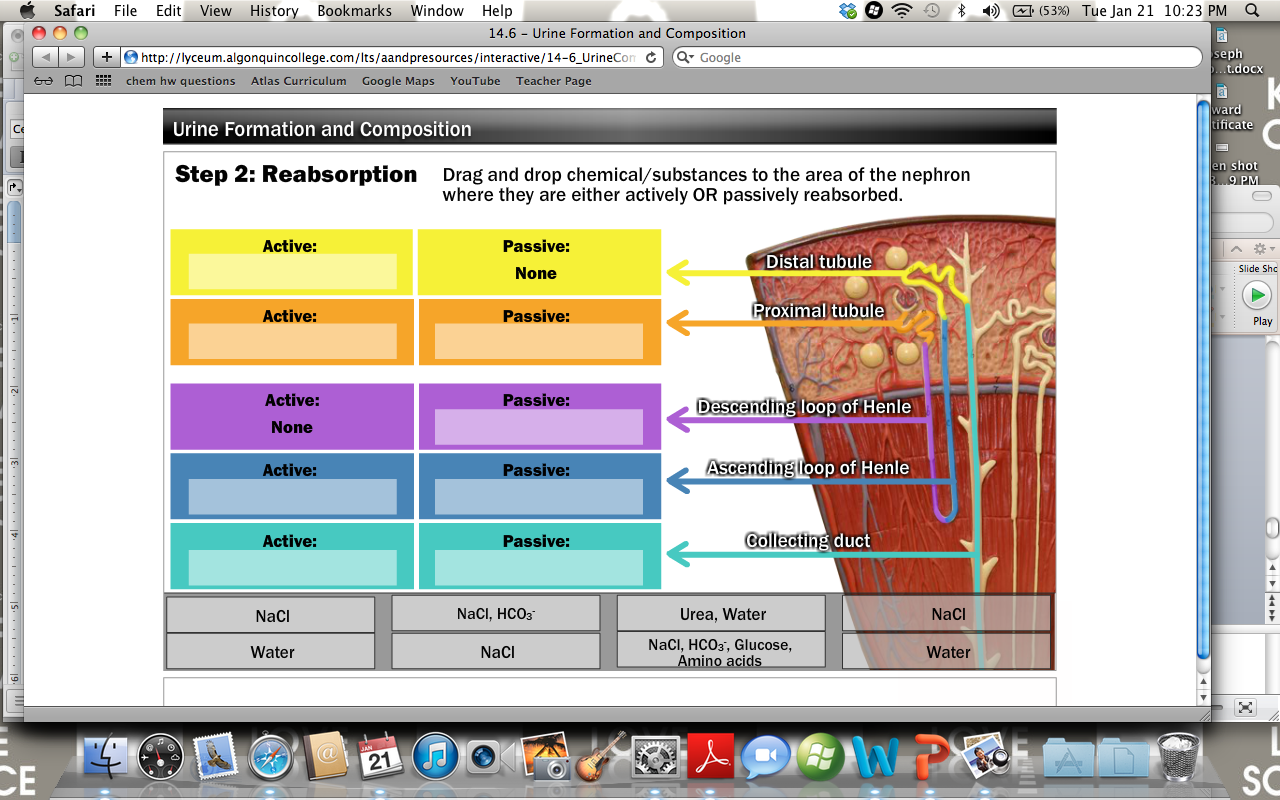
|  |  |
| --- | --- |
| **In filtrate** | **Not in filtrate** |
|  |  |

* Filtration is occurring in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |
| --- |
| **5.2 Class Notes** |

**Step 2: Reabsorption**

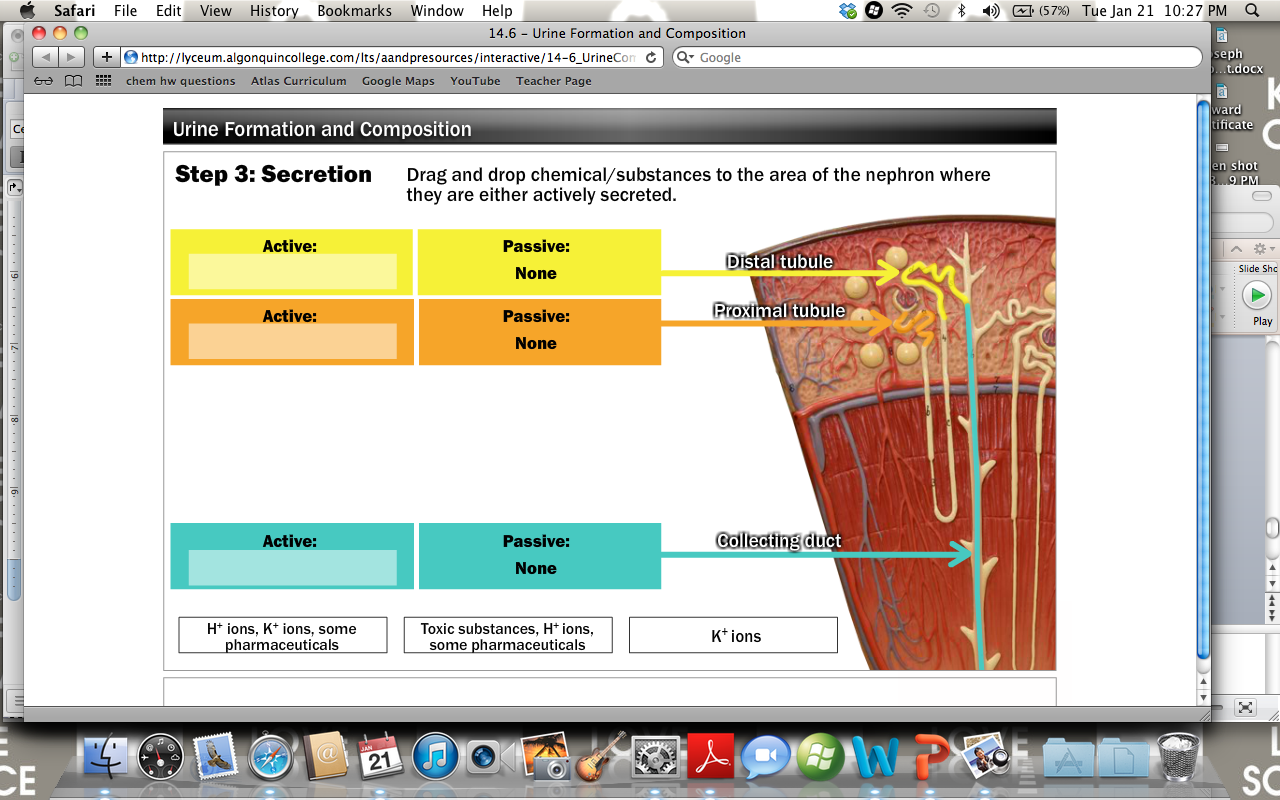
|  |  |
| --- | --- |
| **Passive Transport** | **Active Transport** |
|  |  |

****

|  |
| --- |
| **5.2 Class Notes** |

**Step 3: Secretion**

|  |
| --- |
| **Active Transport** |
|  |



**What distinguishes filtration, reabsorption, and secretion?**

|  |
| --- |
| **5.2 Class Notes** |

**Pathway of Urinary Tract**

Go to this website: <http://kidshealth.org/kid/htbw/pee.html>

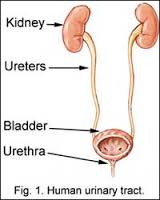
1.

2.

3.

4.

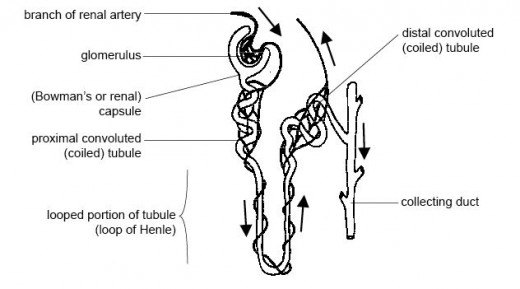
**Label the diagram below**

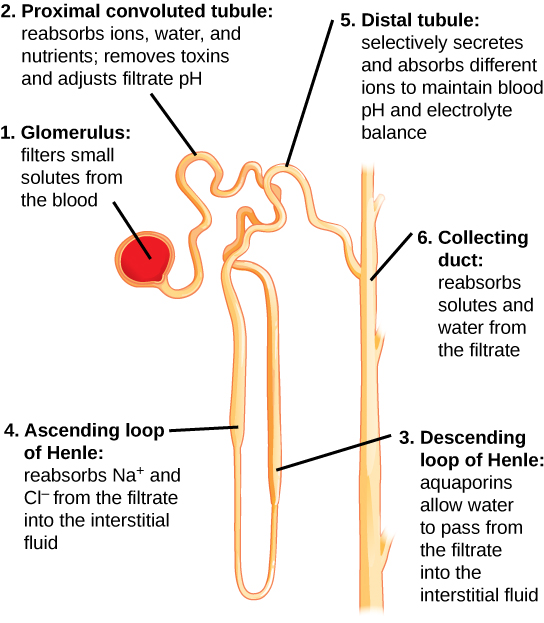


|  |
| --- |
| **5.2 Class Notes** |

**Pathway of Urine Formation in the Nephrons**

Using the images above, list step-by-step the pathway of urine in the nephrons from the Bowman’s capsule to the collecting duct





**List Steps of Urine Formation**

**1.**

**2.**

**3.**

**4.**

**5.**

**6.**

|  |
| --- |
| **5.2 Class Notes** |

**How urination is controlled?**

**Go to this website:** <http://www.aviva.co.uk/health-insurance/home-of-health/medical-centre/medical-encyclopedia/entry/function-urine-formation-and-excretion/>

What happens when the bladder is full?

What causes urine to be released?

What does it mean to expel?

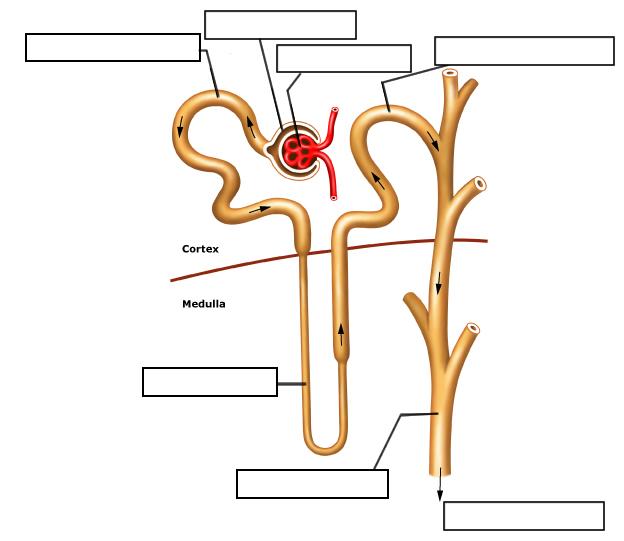
How is urine timing controlled in older children and adults?

What happens in young children?

How is the bladder emptied out?

|  |  |
| --- | --- |
|  | **5.2 Class Work** |

**LABELING URINARY SYSTEM**



**Summarize the pathway of urine in a nephron starting with the Bowman’s capsule.**

|  |  |
| --- | --- |
|  | **5.2 Class Work** |

**Answer the following questions:**

1. The three interrelated processes of urine formation are
2. filtration, secretion, and excretion
3. secretion, reabsorption, and micturition
4. excretion, storage, and micturition
5. filtration, reabsorption, and secretion
6. Arrange the following to trace the path of filtration through a renal tubule (1) proximal convoluted tubule, (2) distal convoluted tubule, (3) ascending limb of nephron loop, (4) descending limb of nephron loop
7. 1, 2, 3, 4
8. 2, 3, 4, 1
9. 1, 4, 3, 2
10. 3, 2, 1, 4
11. Urination is controlled by \_\_\_\_\_\_\_\_\_\_\_\_\_
12. hormones
13. both voluntary and involuntary actions
14. the internal urethral sphincter
15. impulses from the prostate gland
16. Which of the following is the largest component of urine?
17. glucose
18. sodium
19. urea
20. water
21. Which of the following is not a characteristic of normal urine?
22. pH is very basic
23. specific gravity is above 1.00
24. it is yellow in color
25. it is slightly aromatic
26. Which of the following terms includes all of the others?
27. proximal tubule
28. Bowman’s capsule
29. Loop of Henle
30. nephron

|  |
| --- |
| **Aim:**  **5.3** |
| **Objective:** |
| **Real world connection:** |
| **Vocabulary:** dilute, concentrated, ADH, pituitary gland |

**Water and Electrolyte Balance**

**THINK INK: What happens when you eat too many salty potato chips?**

**How does your body try to maintain homeostasis?**

|  |
| --- |
|  |

**PAIR SHARE:**

|  |
| --- |
|  |

|  |
| --- |
| **5.3 Class Notes** |

**Water balance webquest continued…**

Use this website to fill in the following notes: <http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_pre_2011/homeostasis/waterbalrev1.shtml>

**Page 1:**

**The kidneys maintain our body's water balance by:**

1. controlling \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of blood plasma.
2. control \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ levels and the excretion of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How do we take in water?

How do we lose water?

What does it mean when our body has water balance?

What organ of our body helps with water balance? How does it do that?

|  |
| --- |
| **5.3 Class Notes** |

**Water balance webquest continued…**

Use this website to fill in the following notes: <http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_pre_2011/homeostasis/waterbalrev1.shtml>

**Page 2:**

**How is the water balance maintained?**

* The kidneys maintain our water balance by producing \_\_\_\_\_\_\_\_\_\_\_\_ of different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Example:

* When the water level is low, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** water is reabsorbed back into the blood and the urine becomes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ concentrated.
* When the water level is high, \_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_** water is reabsorbed back into the blood and our urine is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ concentrated (also known as **dilute**)

**Level of water depends on**

* External temperature - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Amount of exercise - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Fluid intake - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Salt intake- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| **5.3 Class Work** |

**Water balance webquest continued….**

Use this website to fill in the following notes (Page 2): <http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_pre_2011/homeostasis/waterbalrev1.shtml>

**Drugs that affect water balance**

* Alcohol - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Ecstasy - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Page 3:**

**How the kidneys are controlled?**

Which hormone controls the concentration of urine?

Which gland produces the hormone? Explain the role of the gland in controlling the levels of this hormone.

**ADH Is short for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

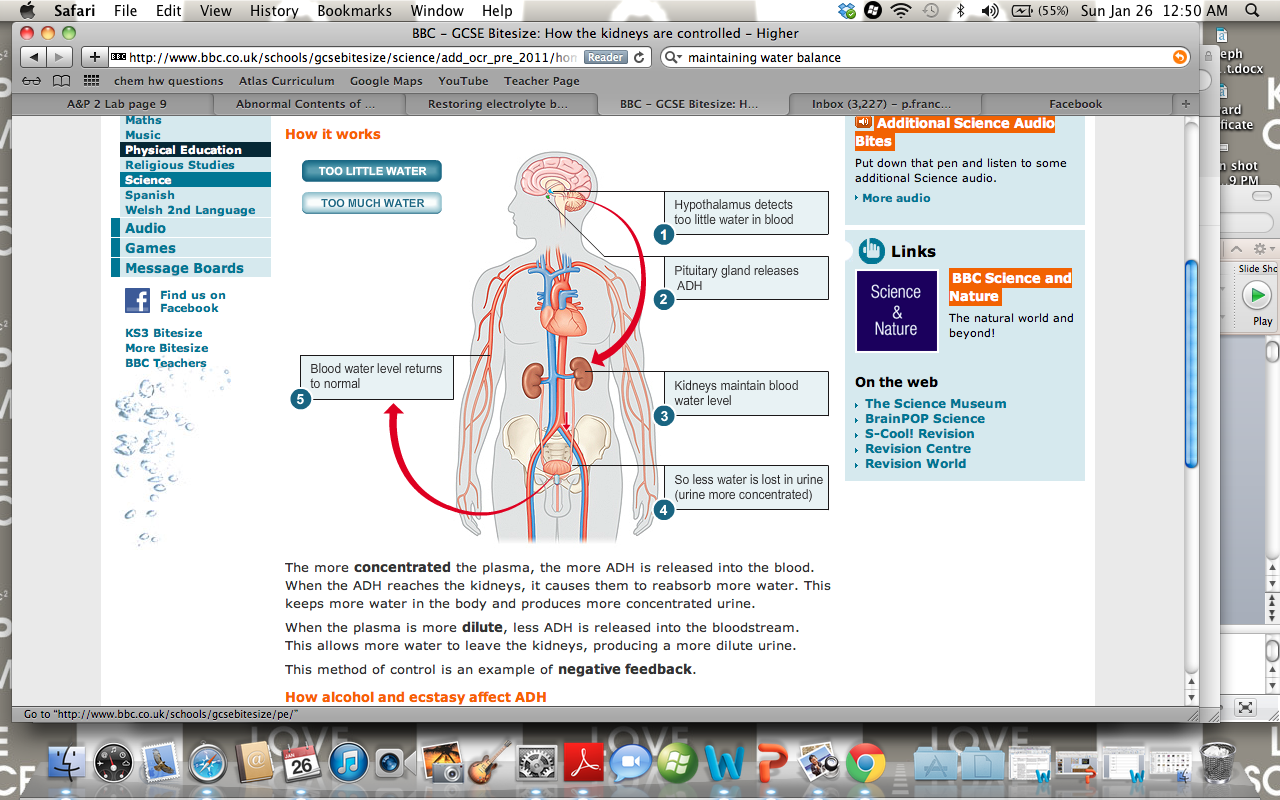
(Google it)

|  |
| --- |
| **5.3 Class Notes** |

**Examples of Negative Feedback Mechanisms**

Use this website to fill in the following notes (Page 3): <http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_pre_2011/homeostasis/waterbalrev1.shtml>

**TOO LITTLE WATER:**

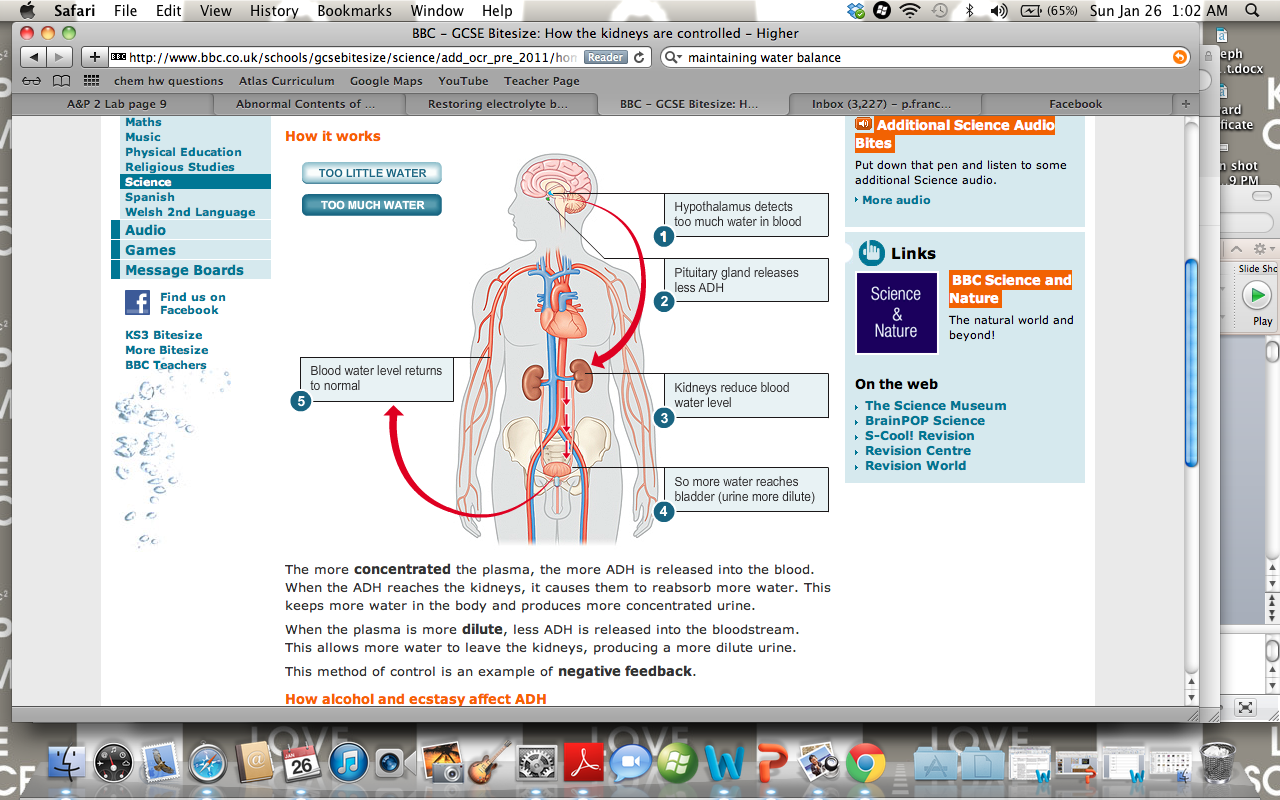
****

|  |
| --- |
| **5.3 Class Notes** |

**Examples of Negative Feedback Mechanisms**

Use this website to fill in the following notes (Page 3): <http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_pre_2011/homeostasis/waterbalrev1.shtml>

**TOO MUCH WATER:**

****

|  |
| --- |
| **5.3 Class Notes** |

**Effect of Alcohol & Ecstasy**

Use this website to fill in the following notes (Page 3): <http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_pre_2011/homeostasis/waterbalrev1.shtml>

**Effect of alcohol & ecstasy on ADH:**

* Alcohol - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Ecstasy - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**THINK ABOUT IT:**

|  |
| --- |
| Alcohol and ecstasy both affect water balance. Which substance do you think poses a worst effect on the body, especially to water balance? Explain your answer in a TIEDC paragraph. |

|  |
| --- |
| **5.3 Class Notes** |

**Effect of Sodium on Water Balance**

Use this website to fill in the following notes:

<http://www.modernmedicine.com/modern-medicine/news/restoring-electrolyte-balance>

* Water follows \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the body, so a gain or loss in sodium results in a gain or loss in water.

What happens when you eat too much salt? Does that cause you to lose water or gain water?

What happens when you eat too little salt? Does that cause you to lose water or gain water?

**HOMEOSTATIC IMBALANCES**

**Hypernatremia**

Definition:

Symptoms:

Treatment:

Prognosis:

**Hyponatremia**

Definition:

Symptoms:

Treatment:

Prognosis:

|  |
| --- |
| **5.3 Class Work** |

**Answer the following questions:**

1. ADH is secreted from the \_\_\_\_\_.

a. hypothalamus

b. pituitary gland

c. kidneys

d. stomach

2. Which of the following would have a diuretic effect?

a. eating salty pretzels

b. drinking alcohol

c. sleeping

d. most drugs

3. ADH has a direct effect on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a. blood pressure

b. water reabsorption

c. blood concentration

d. all of these

4. The hormones aldosterone and ADH both have an important function in:

A) fluid balance in the body

B) the regulation of acid concentration in the body

C) stimulation of a conscious desire for water

D) the activity of buffer systems

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 5. Hyposecretion (very low secretion) of ADH has this effect on urine volume and concentration. | | | | |
|  |  | A) | increased volume and decreased concentration |
|  |  | B) | increased volume and increased concentration |
|  |  | C) | decreased volume and increased concentration |
|  |  | D) | decreased volume and decreased concentration |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 6. When the body has to get rid of excess water, the mechanism that is used is | | | | |
|  |  | A) | sweating |
|  |  | B) | diarrhea |
|  |  | C) | increased respiratory rate and depth |
|  |  | D) | increased urine production |