



# Science Prims Term 2

By  
**GEHAN**

Abo sheaashaa

A force that exists تنشأ between two surfaces and هو القوة التي تقلل من حركة الأجسام المتحركة وتؤثر في الاتجاه المعاكس فتقف في النهاية. slows down the moving object and has its effect in the opposite direction of the object's movement .

### The properties of friction: خصائص الاحتكاك

- ① Between two surfaces. تنشأ بين سطحين
- ② Always in the opposite direction of the movement. دائماً في اتجاه معاكس للحركة.
- ③ Slows down the moving objects. وتقلل من حركة الجسم.

**Give reason :** when you roll a marble بلية on the floor , it slows down gradually.

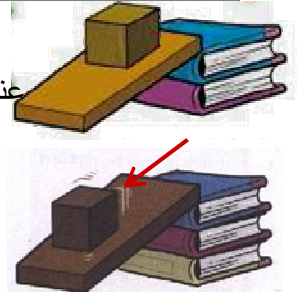
Because of the friction force that exists between the marble and the floor, and affects in the opposite direction.

**Give reason :** when you lift your feet from the pedal during the movement of the bike, the bike's speed decreases.

Because of the friction force that exists between the ground and affects in the opposite direction, so the bike slows down.

- ④ When the friction force increase the objects speed decreases and vice versa. عندما تزداد قوة الاحتكاك ، تقل سرعة الجسم والعكس صحيح.

When the cube is stationary on a sloping surface the friction force is greater than when we put more book to get the cube move the friction force decrease.



More book to get more speed

### Types of friction force أنواع قوى الاحتكاك

Air resistance مقاومة الهواء



It is a type of friction force resulting from object movement on air.

water resistance مقاومة الماء

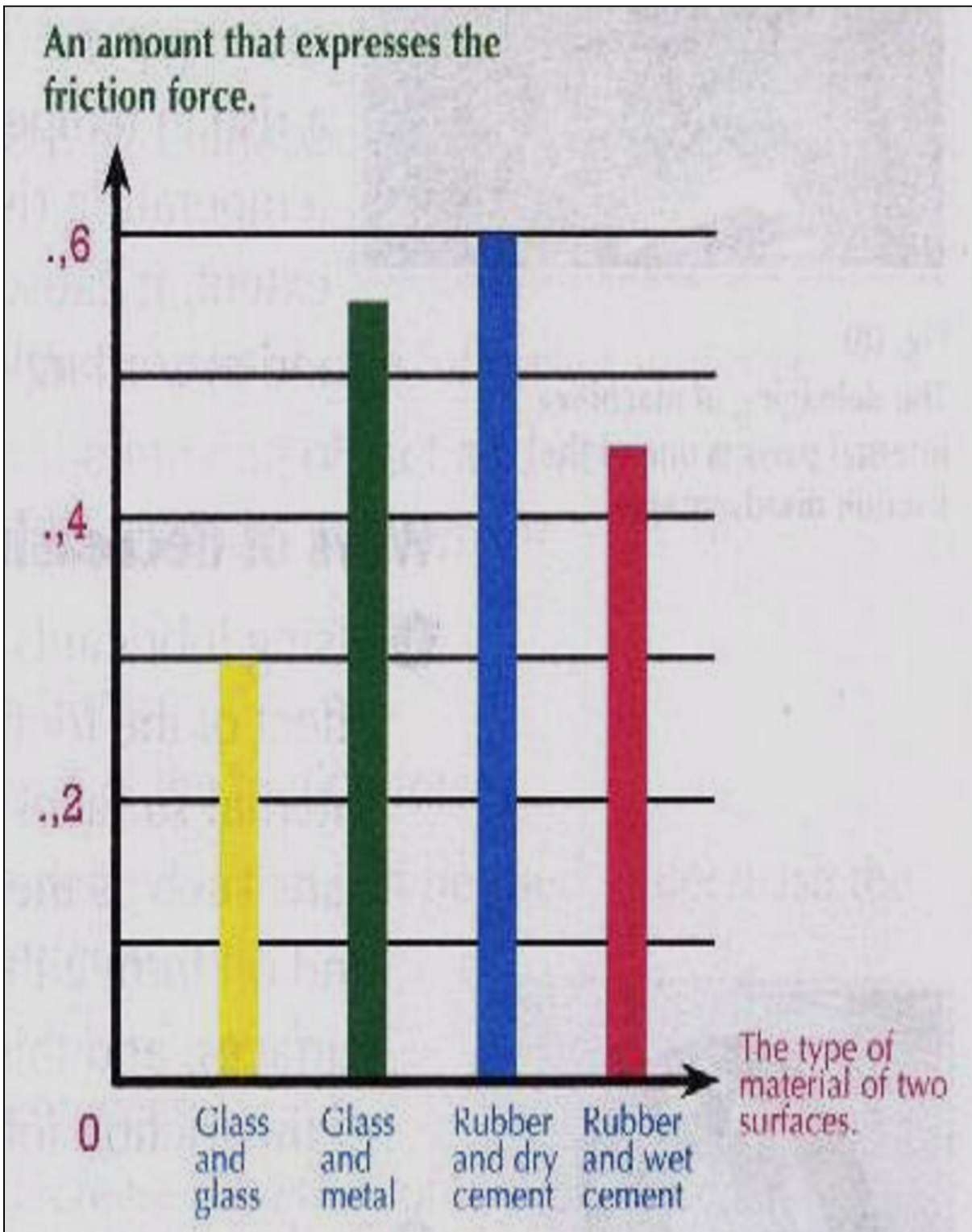


It is a type of friction force resulting from object movement on water.

**Q.** What is the force originated from the motion of a plane in air ?

It is called air resistance.

**Study this chart.**



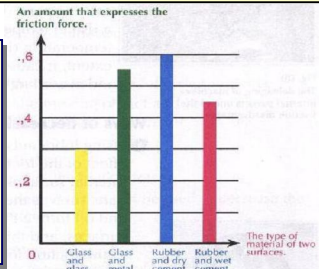
1 The friction force depends on the type of the surface of the two touching objects. تعتمد قوة الاحتكاك على نوعي السطحين المتلامسين.

**Give reason** : when you roll a ball on the rough surface سطح خشن like wooden floor the ball will stop before you roll it on the smooth surface .

Because of the friction force between the ball and the rough surface is greater than the friction force between the ball and the smooth surface.

**Give reason** : the road partitions are made of cement . Because the cement has a great amount of friction force.

**Give reason** : a ball moves on glass faster than on cement . Because the friction force between the ball and the glass is lesser than the friction between the ball and the cement.



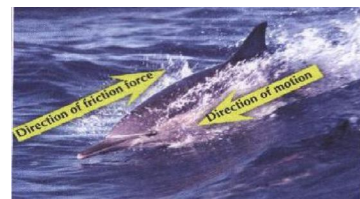
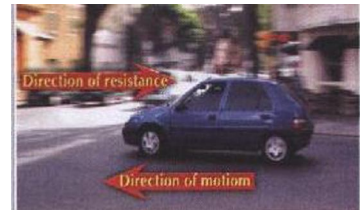
2 The speed السرعة

Air resistance and water resistance of objects motion can only be observed on things that move so fast .

**Example:** The effect of air resistance is great and clear in the opposite direction when the car moves so fast and it decreases when the car moves slowly.

- When the amount of both the force of air resistance and the force that moves the car are the same , the elective forces on the car is equivalent متكافئة , so the car moves at a constant velocity سرعة ثابتة.

**Example:** when a ship or a fish moves so fast in the water , the movement of a fish in water is opposite to the force resulting from friction with water.



**Give reason** : The increase of the fuel combustion استهلاك الوقود by increasing the speed of a car .

Because the air resistance increase by increasing the speed of the car, to overcome this resistance more power is needed that uses more fuel.

**Give reason** : drivers should not increase the car speed up to a certain limit . To decrease fuel combustion.

3 The object surface exposed to air. مساحة سطح الجسم المعرضة للهواء.

The more area of the surface exposed to the air increases , the more amount of the air resistance increases.

**Give reason** : the streamline shape in the design of the modern cars increase . To decrease the exposed area so that reduce the air resistance.

**Q.** Why does the front part of a train have a streamline shape ?

**Q.** Why does the body of the bird have a streamline shape?

**Give reason** : the parachutist land safely on ground.

When he opens his parachute the area exposed to air increases so the air resistance increase (decreases the falling speed) so he lands safely.



**Q.** Why does the bird stretch its wings on landing ?

When it stretch its wings the area exposed to air increases so the air resistance increase (decreases the falling speed) so it lands safely.

## Advantages of friction

- 1 friction enable you to control the car speed.
- 2 you can't walk without friction as it prevents your shoes from slipping on the ground.
- 3 friction is essential to light a match.



## Disadvantages of friction

- 1 the internal parts of machines are often damaged as a result of a friction force between their moving parts.
- 2 the friction between the parts of machine gets its temperature high and it causes the damage of machines and wasting money .



**Q. Why does the temperature of an electrical saw get high ?**

As a result of the friction between the saw and the object..

## Ways to decrease the friction force

- 1 By using lubricants الشحم and oils. They decrease the friction force between the objects so it is used in engines.
- 2 By using ball bearings رومان بلي. Because ball bearing decrease the friction area , so the friction force decrease . يقلل مساحة الاحتكاك ، فتقل قوة الاحتكاك.



**Q. What is meant by ball bearings ?**

They are formed of a group of small balls with smooth surface and put between internal parts of engines.

**Give reason :** ball bearing decrease the friction between machines internal moving parts:

Because ball bearing decrease the friction area , so the friction force decrease.



## Friction applications . تطبيقات على الاحتكاك

**Give reason :** Drivers lose control of the vehicles on wet roads:

Because water on roads decrease the friction force between the road and the car tires .

**Give reason :** cars tires have grooves ( channels) along its perimeter:

To prevent water from staying between tires and roads .

**Give reason :** oil used to lubricant التشحيم the moving parts of machine:

To decrease the friction force between its parts.

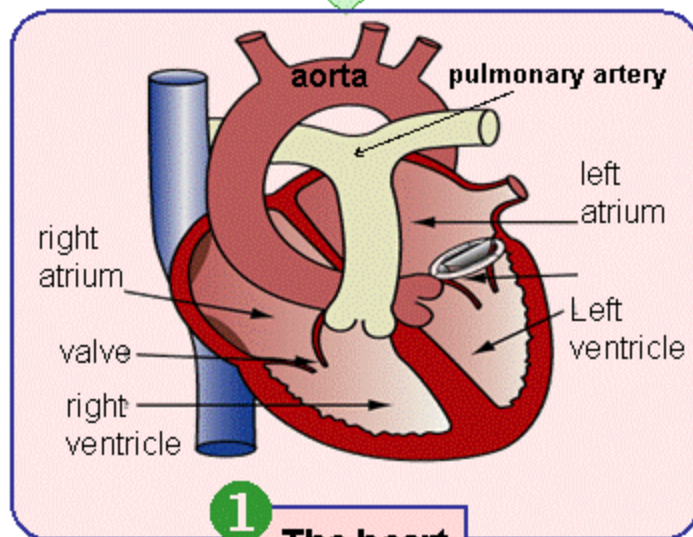
**Give reason :** bearing balls are put between the moving parts in a machine:

To decrease the friction force between its parts.

# Circulatory system

# الجهاز الدوري

Consists of



1

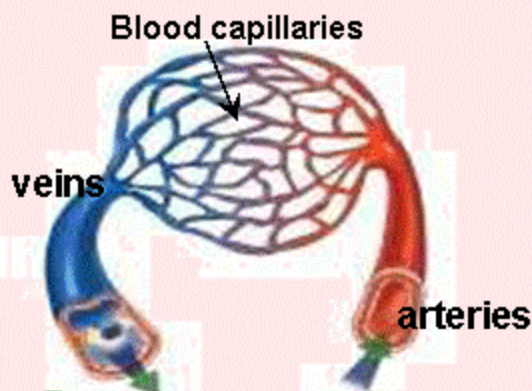
The heart

## Heart beats:

Heart pumps the blood to all body parts and it is called heart pulses.

There is a valve between each atrium and ventricle allows blood to pass from the atrium to the ventricle and prevents it from returning back.

Atria	Ventricles
In the upper part of heart	in the lower part of heart
have thin walls	have thicker walls



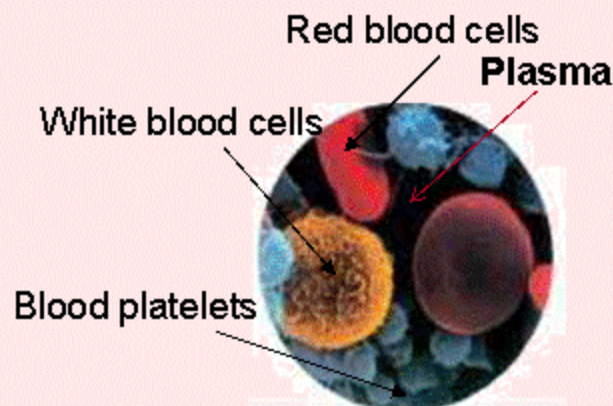
2

Blood vessels

The blood capillaries spread in all body cells and tissues.

The blood capillaries join between ends of arteries and veins.

Artery	Vein
Carries blood from heart to body parts	Carries blood from body parts to heart



3

The blood

The RBC's , WBC's and blood platelets float in the plasma.

## Circulatory system

## الجهاز الدوري

Consists of

Its functions : وظائفه

- 1- transports the digested food , oxygen and water to all your body cells.
- 2- transports what is formed inside the cell to special organs in the body to get rid of it .
- 3- helps to maintaining the body healthy.

1	heart	<ul style="list-style-type: none"> <li>• It is a muscular pump, about your fist in size .</li> <li>• It is located within the chest cavity between the lungs.</li> <li>• It is consists of four chambers which are always full of blood . and connected with blood vessels</li> <li>• It has two sides ( right hand side – left hand side ) . and a wall separating them to prevent mixing the blood found in both sides .</li> <li>• There is a valve between the atrium and the ventricle of each side allows blood to pass from the atrium to the ventricle and prevents it from returning back.</li> </ul>		
		2	Blood vessels	<p>الأوعية الدموية</p> <p>The arteries الشرايين</p> <ul style="list-style-type: none"> <li>• Arteries are blood vessels which emerge from the two ventricles. ⇒ And transport blood to all parts of the body.</li> <li>• They are large and wide at the beginning but become smaller and make a network of blood capillaries near the cells.</li> <li>• All arteries carry oxygen –rich blood except the pulmonary artery which carries blood containing plenty of carbon dioxide.</li> </ul>
				<p>Veins الأوردة</p> <ul style="list-style-type: none"> <li>• Veins are blood vessels that carry blood from different body parts to the heart. They open in the 2 atria.</li> <li>• Veins begin in the form of capillaries at the cells and collect together to become larger and larger until reaching the heart.</li> </ul>
<p>Blood capillaries الشعيرات الدموية</p> <ul style="list-style-type: none"> <li>• Blood capillaries are a network of thin walled vessels located within the tissues and around the cells. ⇒ Their thin wall allows blood to deliver food and oxygen to the cells, and then carries carbon dioxide and waste products.</li> </ul>				
3	Blood	Blood is red liquid that transfers oxygen and digested food to all body parts.	<p>Red blood cells ( RBC's)</p> <ul style="list-style-type: none"> <li>• They are red cells without nuclei. ⇒ They function to ① carry oxygen from lungs to all body cells. And ② carry carbon dioxide from the cells to the lungs.</li> </ul>	
			<p>White blood cells ( WBC's)</p> <ul style="list-style-type: none"> <li>• They are white cells with nuclei of different forms . ⇒ They function to defend the body against microbes that causes diseases to human.</li> </ul>	
			<p>Blood platelets الصفائح الدموية</p> <ul style="list-style-type: none"> <li>• They are small sized cell fragments. ⇒ They function is to coagulate يجلط blood ( forming blood clot جلطة ) .</li> <li>• When the body is wounded and the blood exposed to the air , this preventing bleeding and infection of the human body.</li> </ul>	
			<p>plasma</p> <ul style="list-style-type: none"> <li>• It is a yellow watery fluid سائل containing the food that cells need and the harmful waste products formed in the cells .</li> <li>• The RBC's , WBC's and blood platelets float in the plasma.</li> </ul>	

### Functions of blood:

- 1- transfer and delivery the materials to the cells of all body parts.
- 2- the defense and protection of the body.

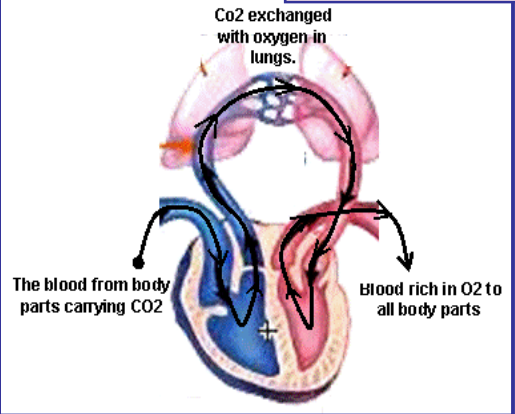
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# Blood circulation الدورة الدموية

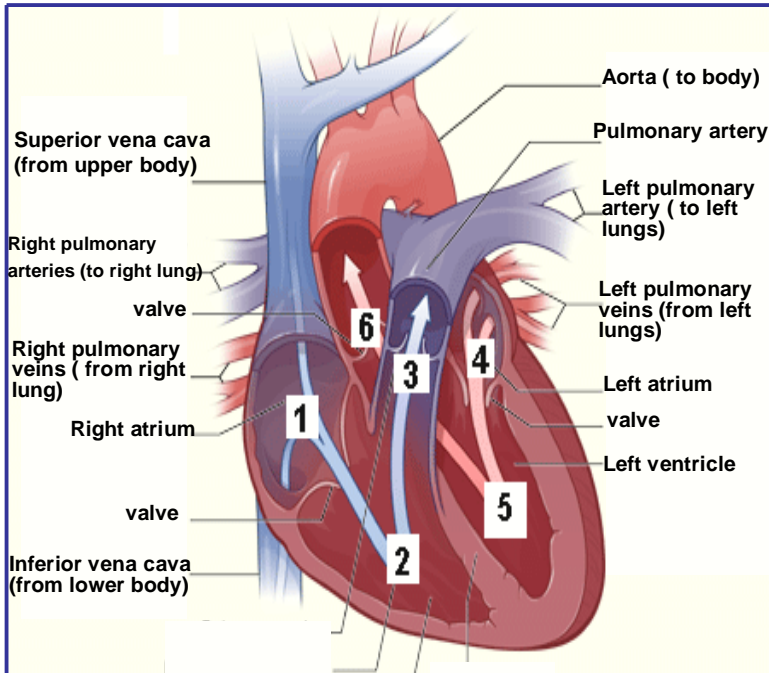
هو الطريق الذي يسير فيه الدم خلال الجسم. It's a path of blood through the body.

Each atrium **أذين** receives blood out of the veins **الأوردة**.  
Each ventricle **بطين** pumps blood out of the heart.

## The summary of blood circulation



- The right ventricle pumps blood to lungs at the same time the left ventricle pumps blood to all body parts.

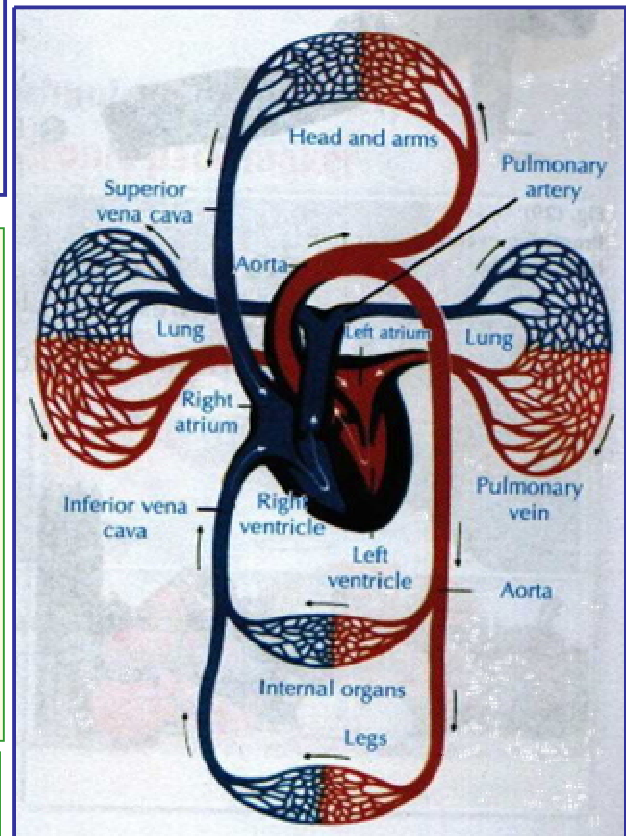


The path of the blood through the heart

## The minor (pulmonary) blood circulation:

الدورة الدموية الصغرى

- ① The right atrium receives the blood carrying carbon dioxide from all body parts by 2 large veins (Superior vena cava and inferior vena cava) .
- ② Blood flows into the right ventricle ,
- ③ Right ventricle contracts pumping blood into the large artery ( pulmonary artery) that carries blood to the lungs where carbon dioxide exchanged with oxygen.



## The major (systemic) blood circulation:

الدورة الدموية الكبرى

- ④ The blood rich in oxygen **الدم الغنى بالأكسجين** returns from lungs to the left atrium by the pulmonary veins **الأوردة الرئوية** . The left atrium pumps blood to the left ventricle.
- ⑤ The left ventricle contracts pumping blood rich in oxygen into a large artery **شريان ضخم** ( aorta) .
- ⑥ Aorta carries blood to all body parts.

## The minor (pulmonary) blood circulation:

It is the blood circulation between the heart and the lungs.

## The major (systemic) blood circulation:

It is the circulation between the heart and the other parts of the body.

### **What is the minor blood circulation? What is its function?**

It is the blood circulation between the heart and the lungs.  
And its function is exchanged the CO<sub>2</sub> with O<sub>2</sub> in lungs.

### **The major ( systemic) blood circulation? what is its function?**

It is the circulation between the heart and the other parts of the body.  
And its function is to reach the blood rich in oxygen to all body parts.

### **How to maintain the circulatory system:**

- 1) Keep exercising to activate the blood circulation.
- 2) Eat healthy and balanced food (lowing fat and salt).
- 3) Drink suitable amount of water daily.
- 4) Avoid accidents and wound.
- 5) Avoid smoking and smokers.
- 6) Eat more fruit and vegetables fresh and clean.



### **Give reason:**

- **The two sides of heart are separated.**  
To separate the blood rich in oxygen from the blood carrying CO<sub>2</sub>.  
Or to prevent mixing the blood found in both sides.
- **Heart contains valves.**  
To make blood move from atrium to ventricle only.
- **Blood flows in one direction only inside the heart.**  
Because of valves allow blood to pass only from the atriums to ventricles.
- **The wall of left ventricle is more thicker than that of the right one.**  
Because the right ventricle pumps the blood to the lungs (short way),  
While the left ventricle pumps the blood to all body parts (long way).
- **Blood capillaries have a thin wall.**  
Their thin wall allows blood to deliver food and oxygen to the cells . and  
allows to get rid of wastes materials.
- **It is necessary to keep exercising.**  
to maintain the circulatory system and the blood.
- **Smoking must be avoided.**  
to maintain the circulatory system and the blood.
- **It is necessary to avoid exposure to infection and accidents.**  
to maintain the circulatory system and the blood.
- **Ventricles have thicker walls.**  
Because it pushes the blood for distance more than atrium.

## Excretion and urinary system

### الإخراج والجهاز البولي

مقدمة:

- إن العضو الذي خلقه الله في جسم الإنسان أو الحيوان يمكن أن يقوم بأكثر من وظيفة واحدة ، وهذا يعني أيضاً أن العضو الواحد قد يشترك في أكثر من جهاز ؟؟؟ !!!
- نعم ، فالجهاز في جسم الكائن الحي لا يعنى مجسم محدد يختص بمهمة معينة بل المقصود به نظام معين يتم بشكل دورى ومتكرر داخل الجسم لأداء مهمة محددة . ويشترك في هذا النظام مجموعة من الأعضاء ( التي قد تشترك مع نظام آخر) .
- ولهذا فكلية system في الإنجليزية أدق بكثير من كلمة ( جهاز ) المستخدمة في العربية.
- والآن ، عليك أن تعرف أن الجهاز الإخراجى : يقوم بالتخلص من الفضلات الزائدة داخل الجسم.
- والجهاز البولى : يقوم بالتخلص من نوع واحد من هذه الفضلات وهى الفضلات النيتروجينية ( Nitrogen wastes )
- إذن الجهاز البولى (urinary system) هو جزءاً من الجهاز الإخراجى (Excretory system).

### Excretory ( waste) materials are different from solid wastes البراز

**Solid wastes :** are the materials from food that your body cannot digest.

They are stored in large intestines before passing out of the body.

**Excretory ( waste) materials:** are the wastes materials are produced when the cell burn the digested food.

الفرق بين الفضلات الإخراجية والبراز:

البراز هو المادة الغذائية غير المهضومة التي يتخلص منها الجسم .  
الفضلات الإخراجية هو النواتج الضارة لعملية الهدم ( التمثيل الغذائي) للغذاء المهضوم .

**Give reason:** Body should get rid of waste materials.

because the body can't use them and most of them are dangerous or poisonous.

### The waste (excretory) materials

### How the body get rid of them يتخلص من

1) Carbon dioxide and water vapour

get rid by lungs.

2) Excess salts الأملح الزائدة

by sweat from skin.

3) Nitrogen wastes الفضلات النيتروجينية  
(urea and uric acid البولينا وحمض البوليك).

by the kidneys in the urinary system.

**Excretion الإخراج** The system that clarifies blood from excess salts, urea and uric acid.

**Excretory system الجهاز الإخراجى** هو مجموعة الأعضاء التي تخلص الجسم من الفضلات الناتجة عن هدم المواد الغذائية داخل الخلايا.  
The group of organs that clarifies the body from the wastes and harmful substances.  
( lungs , skin and urinary system )

**Give reason:** Skin has a role in excretion. (Skin is one of the excretory organs.)

Because it helps in getting rid of excess salts.

**Give reason:** The sweat has a salty taste .

Because it contains excess salts from body.

**Define the excretory materials .**

they are the wastes materials are produced when the cell burn the digested food.

**Define the nitrogen wastes .**

they are The wastes that include urea and uric acid. .

**Define the sweat glands .**

they are The gland that filters sweat from blood.

**Get the scientific term:**

the organ that gets rid of carbon dioxide and water vapour.

the two lungs.

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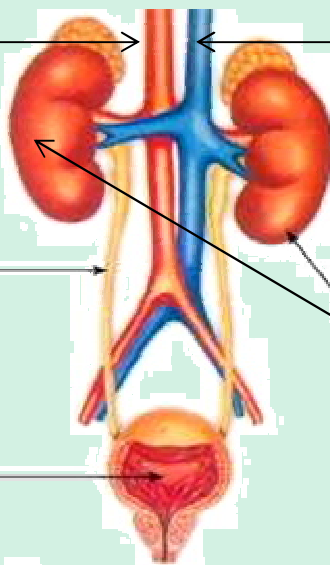
## urinary system

Located in abdominal cavity near the back bone.

**A vein** وريد transports pure blood which is filtered تم تنقيته by the kidney. This blood returned to the heart which pumps it to the other body parts.

**The ureter** الحالب transfers excretory materials from the kidney to the bladder المثانة البولية

Urine passes slowly from the kidney to the **bladder** المثانة البولية where it stored temporarily until it is released to the out side.



**An artery** شريان carries blood to the kidney to filter it from the wastes .

**Two Kidneys** remove wastes from blood . Each kidney contains about one million minute tubules مليون أنبوية دقيقة that filter تنقي wastes from the blood.

### The Urinary system consists of:

#### ① The kidneys:

- They are the most important organs in the urinary system
- They are Bean shaped organs located on the either sides of the backbone.
- The main function of them is to filter the blood from urea, uric acid, excess salts and other waste materials and get rid of them dissolved in water in the form of urine.

#### ② The ureters: الحالبين

- The Ureters are two narrow tubes that carry urine from the kidneys to the urinary bladder.

#### ③ The urinary bladder: المثانة البولية

- It is a balloon like a sac that receives urine from the Ureters.
- It temporarily stores urine until it is released from the body through urethra.

### How to maintain the urinary system healthy:

- 1) Drink appropriate amounts of water daily especially in summer.
- 2) Eat healthy and balanced food.
- 3) Avoid schistosomiasis disease (bloody urine).
- 4) Don't keep urine for long periods inside your body.

**Give reason:** If the 2 kidneys are damaged, the person will die.

Because the body cannot get rid of the urea ,uric acid and excess salts.

**Give reason:** We should avoid spicy food.

To keep the urinary system healthy.

### Give the scientific term:

• Two glands of bean shaped exist inside cavity of abdomen near the backbone.

( **Two kidneys** )

• The fluid سائل which the kidneys produces and contains harmful substances. ( **Urine** )

• The narrow tube which connects with the kidney and urine passes through it.

( **The ureters** )

**Give reason:** We shouldn't keep urine in our body for long time.

Because it is dangerous substance that harms the body.

**Give reason:** Two kidneys are the most important organ in urinary system.

Because they filter the urine from blood.

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