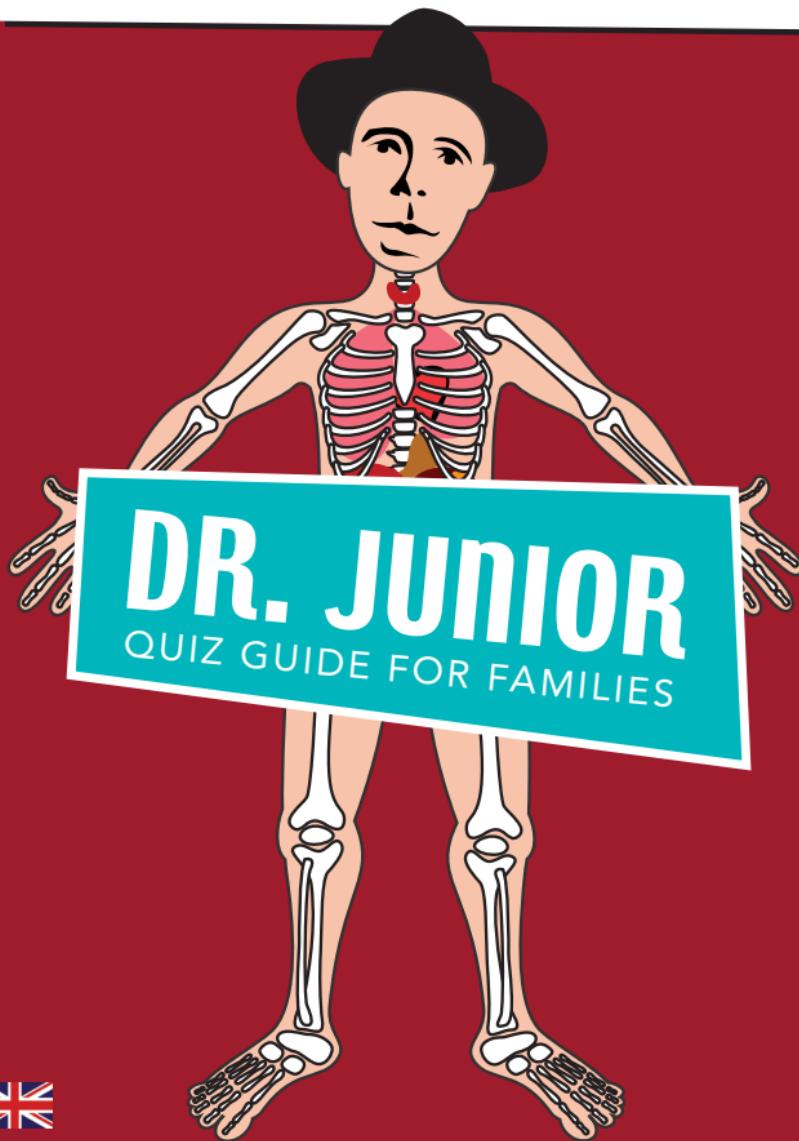


# PLASTINARIUM



## DR. JUNIOR

QUIZ GUIDE FOR FAMILIES

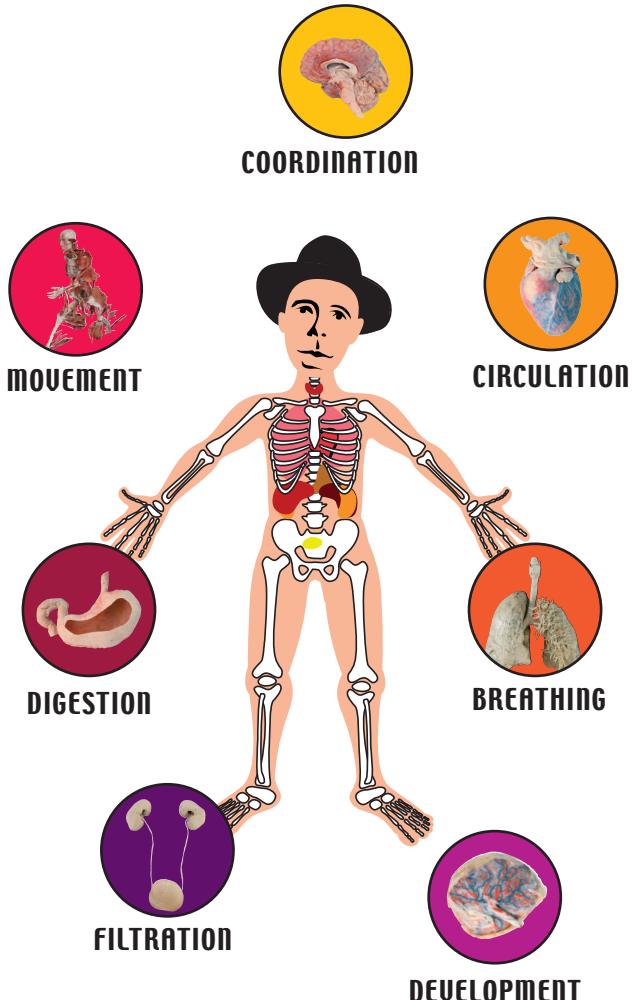


# ENJOY THE QUIZ!

Your body has many organs that work together in a perfect way. You probably know most of them. They have a certain shape and a particular place in your body. For example, the heart, the lungs, the brain and the kidneys, are commonly known organs, but our skin and blood vessels are organs too.

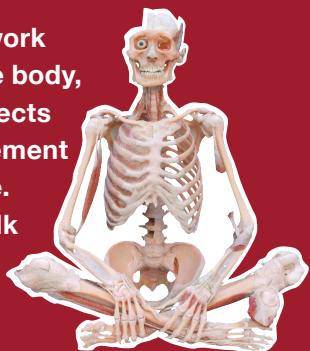
When organs work together in a certain way, it is called a 'system'. All of those individual systems are dependent of each other and allow your body to function smoothly. If something in one of the systems breaks down, an illness may be the result and can then affect different organs.

DR. JUNIOR guides you through all of the important body systems. You will learn a lot about the functionality, particularities and illnesses related to the systems of your body.



# MOVEMENT

Our skeleton is the framework of the body, it supports the body, carries its weight and protects the organs. The central element of the skeleton is the spine. It ensures that you can walk upright.



The human hand has the same number of bones and muscles.



a  true

b  false

Where is the tiniest bone of your body located?

- a  in the nose  
b  in the fingers

- c  in the ear  
d  in the toes



How many vertebrae does the spine have?



- a  13  
b  33  
c  24  
d  34

# MOVEMENT

For every movement of the body, we need muscles. The muscles also work when we do not move or move very little.

Otherwise we would not be able to stand or lift a finger, for example. Your heart is also a muscle and it works day and night.



What is the role of tendons?



- a  Tendons connect bones together.
- b  Tendons reduce friction and lubricate the joints.
- c  Tendons connect muscles with bones.

What kind of muscles exist?



- a  skeletal muscles
- b  cardiac muscles
- c  smooth muscles

Which of the following activities do not need the help of muscles?

- a  breathing
- b  seeing
- c  moving
- d  thinking



# COORDINATION

Our nervous system controls hundreds of activities simultaneously. From our head to our toes, our bodies contain an extraordinarily fine network of nerve fibres which monitor and regulate all of our body's functions.



The brain, spinal cord and nerves form the ...

- a  nervous system
- b  cardiovascular system
- c  respiratory system

What is controlled in the brain stem?



- a  heart rate and blood pressure
- b  respiration, digestion and sleep
- c  attention

Nerve signals can travel at up to ...

- a  8 km/h (5 mph)
- b  80 km/h (50 mph)
- c  400 km/h (250 mph)
- d  800 km/h (500 mph)



# BREATHING

Your body needs oxygen to function. When you breathe in, oxygen enters your lungs and is then released into the blood. The blood distributes the oxygen throughout the body. When exhaled, carbon dioxide is excreted from the body.



How much air reaches the lungs per breath?

- a  2 litres (4 pints)
- b  ½ litre (2-4 pints)
- c  5 litres (11 pints)
- d  10 litres (21 pints)



- When we breathe, oxygen is absorbed and carbon dioxide is released. Where does this gas exchange take place?
- a  in the small pulmonary alveoli
  - b  in the bronchi
  - c  in the air passages

What function do the mucous membranes have in the respiratory tract?

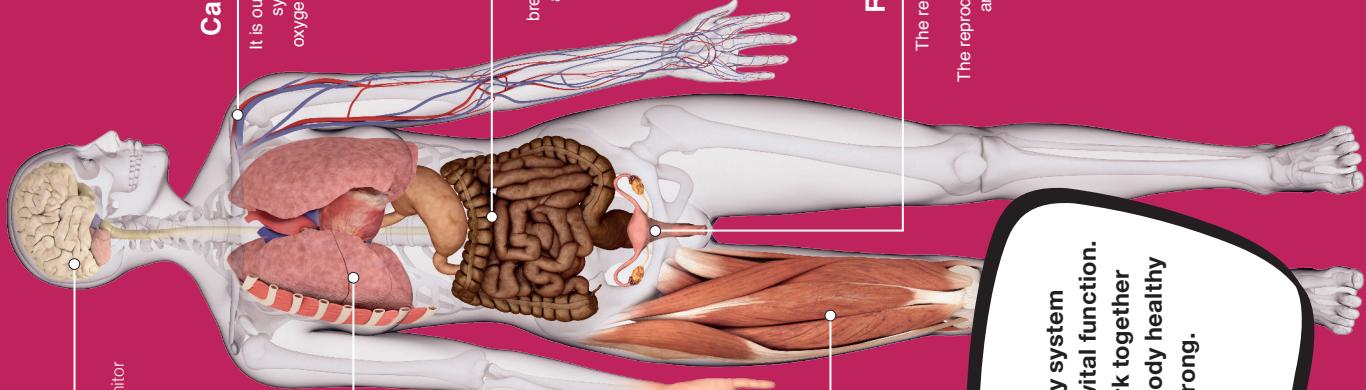


- a  they warm up the inhaled air
- b  they filter dust & bacteria from the air we breathe
- c  they dry out the inhaled air

# HUMAN BODY SYSTEMS

## Nervous System

From our head to our toes we have a very fine network of nerve fibres that monitor and regulate all body functions.



## Cardiovascular System

It is our most important internal transport system and distributes nutrients and oxygen to the different parts of the body. It also collects the substances which need to be eliminated.

## Respiratory Organs

They provide for the gas exchange in the lungs. Vital oxygen is absorbed from the air and carbon dioxide is released.

## Digestive Tract

The organs of the digestive tract break down food into its components and then convert them into energy for our body.

## Locomotive System

It consists of bones, muscles and joints. Its tasks include the mobility of the body, locomotion and the ability to keep the body upright.

## Reproductive Organs

The reproductive system is very different in men and women. The reproductive organs include the external and also the internal sexual organs.

**Every body system fulfills its own vital function.  
They all work together to keep the body healthy and strong.**

# CIRCULATION

The cardiovascular system consists of the heart and a network of blood vessels. This network of vessels provides the body with important nutrients and oxygen.



Your heart is about as big as your fist and weighs around ...

- a  60 grams (2 ounces)
- b  150 grams (5 ounces)
- c  300 grams (11 ounces)
- d  600 grams (21 ounces)



How long would your blood vessels be if they were laid out one after the other?



- a  approx. 96,500 cm (0.6 miles)
- b  approx. 96,500 metres (60 miles)
- c  approx. 96,500 km (60,000 miles)

Which of the statements about the heart is incorrect?

- a  it beats about 70 times per minute.
- b  it is the largest organ in our body.
- c  it pumps around 75 ml of blood with each beat.

# DIGESTION

In the digestive system, food is processed and converted into energy.

During digestion, nutrients and waste materials are separated from each other. The nutrients get into the blood and from there to everywhere.



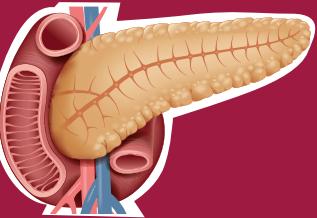
Our stomach can stretch a lot. It can hold at least ... litres of food.



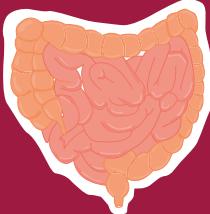
- a ■ 0.5 to 1 litre (1 to 2 pints)
- b ■ 1.5 litres (3 pints)
- c ■ more than 5 litres (more than 11 pints)

What is produced by the pancreas?

- a ■ glandular juices
- b ■ saliva secretions
- c ■ pancreatic juices



How large would the area of the inner small intestine be if it were spread out flat on the floor?



- a ■ About the size of a Ping-Pong table ( $4 \text{ m}^2 / 43 \text{ ft}^2$ ).
- b ■ About the size of a half badminton court ( $30\text{--}40 \text{ m}^2 / 323\text{--}430 \text{ ft}^2$ ).
- c ■ About the size of a football table ( $1 \text{ m}^2 / 11 \text{ ft}^2$ ).

# FILTRATION

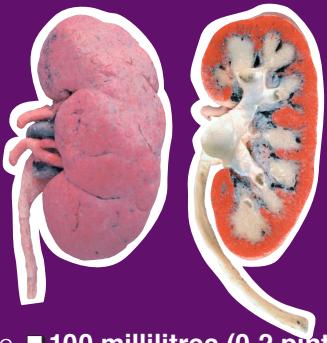
Water accounts for almost three quarters of our body. Water serves as a means of transport for all the substances the body needs: minerals, hormones and food components. You need about 1-2 litres of fluid a day to replace the water that the body loses every day, for example through sweating, breathing out and going to the toilet.



Which organs comprise the urinary system?

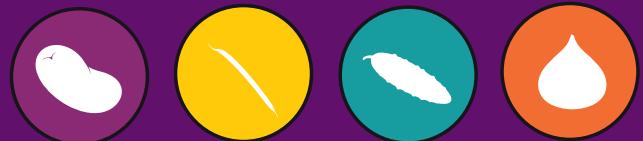
- a ■ only the kidneys
- b ■ heart, kidney and lungs
- c ■ kidneys, ureters and the bladder

How many litres of blood do the kidneys filter per minute?



- a ■ 1 litre (2 pints)
- b ■ 10 litres (21 pints)
- c ■ 100 millilitres (0.2 pints)
- d ■ 100 litres (211 pints)

Kidneys have the shape of a ...



- a ■ bean
- b ■ pea
- c ■ cucumber
- d ■ onion

# DEVELOPMENT

The first period of a person's life takes place hidden away in the mother's womb.

Everything begins with a tiny little cell from the mother, the egg, and the sperm of the father.



Twins can ...

- a  only be girls
- b  be both girls, both boys, or girl and boy
- c  only be boys.



From when can the mother feel the movements of the growing child in her tummy?

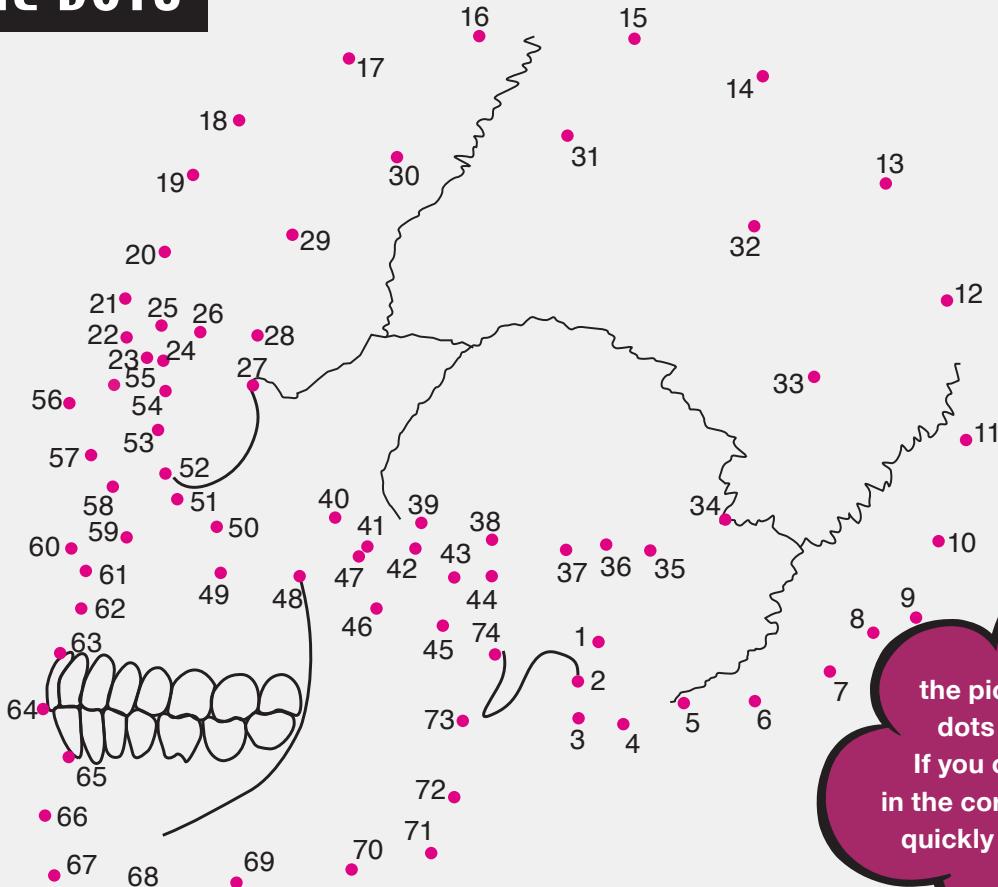
- a  right from the start
- b  only at the end at birth
- c  from approx. the 5<sup>th</sup> month of pregnancy

What does the growing child get from its mother through the umbilical cord?

- a  nutrients
- b  milk
- c  oxygen



# JOIN THE DOTS



What is  
the picture behind the  
dots and numbers?  
If you connect the dots  
in the correct order, you will  
quickly solve this puzzle.

# MOVEMENT

## Where is the tiniest bone of your body located?

 **c: in the ear**

The hammer, anvil and stirrup are the three ossicles in our ears. All 3 bones are only a few millimetres long. At only 3 millimetres and with a weight of about 2–4 milligrams, however, the stirrup is the smallest of them. The three bones get their names from their shapes, which look like objects—a hammer, anvil and stirrup.

## The human hand has the same number of bones and muscles.

 **b: false**

The hand is a complicated structure consisting of a total of 27 individual bones: 8 carpal bones, 5 metacarpals and 14 phalanges are connected by joints and ligaments. The majority of the 33 muscles are located in the forearm.

## How many vertebrae does the spine have?

 **c: 24 vertebrae**

The spine keeps the head and torso upright and allows our body to turn and bend. The spine is the main support of the body and also protects your spinal cord.

# MOVEMENT

## What kind of muscles exist?

 **a, b and c**

There are three types of muscle in the body: skeletal muscles, cardiac muscles and smooth muscles. The cardiac muscles only occur in the heart. The smooth muscles are found in the hollow organs, for example the bladder. The skeletal muscles are responsible for body movements, such as moving the arms and legs.

## What is the role of tendons?

 **c: Tendons connect muscles with bones.**

The skeletal muscles are firmly anchored to the bones by tendons. Muscles and bones work together and give the body the strength it needs. A human has more than 700 muscles and they all look very different. The shape of the muscle shows its strength.

## Which of the following activities do not need the help of muscles?

 **d: thinking**

When you breathe, you use the muscles that let you breathe in and out. You need the muscles of the eye to see. You also need lots of muscles for sports. It's only for thinking that you don't need any. But the brain gives the muscles the commands to work. Each muscle fibre is connected to the brain via nerve pathways. This allows the brain to always know how the individual muscles are doing. Whether they are tired or rested, whether they are relaxed or tense.

## COORDINATION

The brain, spinal cord and nerves form ...

 **a: the nervous system**

Nerves constantly collect information about the sensory organs and transmit it to the spinal cord, which then passes it on to the brain.

**What is controlled in the brain stem?**

-  **a: heart rate and blood pressure**
- b: respiration, digestion and sleep**
- c: attention**

The brain is the body's control centre. It consists of three main parts: the cerebrum, the cerebellum and the brain stem. They have different tasks, but they also work together. The cerebrum controls thinking and doing and brings all information into a meaningful context. The cerebellum is responsible for balance and the coordination of movements. The brain stem controls vital functions such as breathing, digestion and other vital functions.

Nerve signals can travel at up to ...

 **c: 400 km/h (250 mph)**

Each nerve consists of thousands of nerve cells, which can have „arms“ up to 1 metre long. Information is sent to the brain as if through a power cable, telling it what is going on in each part of the body.

## BREATHING

**How much air enters the lungs per breath?**

 **b: ½ litre**

With every normal breath, about half a litre of air is taken in, and with exertion it can be as much as 10 times this amount. The body cannot store oxygen, so people need to breathe day and night. This all happens automatically. Your brain determines how much you breathe.

**When we breathe, oxygen is absorbed and carbon dioxide is released. Where does this gas exchange take place?**

 **a: in the small pulmonary alveoli**

The exchange of gases, the absorption of inhaled air and the release of used air, takes place in the lungs in the walls of the small alveoli. This process is also called „external breathing“.

**What function do the mucous membranes have in the respiratory tract?**

-  **a: they warm the inhaled air**
- b: they filter dust and bacteria from the air we breathe**

The mucus-like coating of the airways humidifies the air flowing past. Impurities such as dust particles or pathogens also stick to it. The inhaled air is also warmed up. There is a dense network of tiny blood vessels in the nasal mucosa. The colder the inhaled air is, the more the mucous membrane is supplied with blood, which warms the air.

## CIRCULATION

Your heart is about as big as your fist and weighs around ...

 **c: 300 grams (11 ounces)**

A human heart weighs a little more than a packet of butter (250 grams). Every day it beats over 100,000 times, pumping the approximately 5 litres of blood that each person has 1,500 times around in a circle.

**How long would your blood vessels be if they were laid out one after the other?**

 **c: approx. 96,500 km (60,000 miles)**

Your blood vessels could be wrapped around the earth an incredible 2.5 times if they were laid out one after the other. Some of your blood vessels are as thick as a felt-tip pen, while others are as thin as a hair.

**Which of the statements about the heart is incorrect?**

 **b: It is the largest organ in our body.**

It's not the heart, but rather the skin that is our largest organ. It weighs more than any other organ, it grows with us, it can grow hair, it cools and warms us, and it can even feel.

In humans, the skin is about 8 millimetres thick at its thickest point. On the eyelid, however, our skin is only as thick as a sheet of paper.

## DIGESTION

**Our stomach can stretch a lot.  
It can hold at least ... litres of food.**

 **b: 1,5 litres (3 pints)**

At least 1.5 litres of food can fit into our stomach. There the food is mixed into a mash for about 3 hours. Hydrochloric acid kills bacteria, while acids and enzymes help dissolve the food. In small portions, the food mash (chyme) is then pushed into the small intestine, where it is broken down into nutrients that the body can absorb.

**What is produced by the pancreas?**

 **c: pancreatic juices**

The pancreas lies next to the stomach. It produces a digestive juice called pancreatic juice. This digestive juice contains many substances that digest food.

**How large would the area of the inner small intestine be if it were spread out flat on the floor?**

 **b: About the size of a half badminton court  
(30–40 m<sup>2</sup> / 323–430 ft<sup>2</sup>).**

In the small intestine, the nutrients are broken down into very small components which can then enter the bloodstream. The small intestine needs a very large area to absorb as many nutrients as possible into the blood, therefore it is folded over several times on the inside.

# FILTRATION

## Which organs comprise the urinary system?

 **c: Kidneys, ureters and bladder.**

The kidneys filter the blood, which means they take waste products out of the blood, collect them and mix them with water. Urine comes from this filtration process. The urine flows through the ureters into the bladder. The bladder expands and stores urine. When your body tells you that your bladder is full, you have to go to the toilet.

## How many litres of blood do the kidneys filter per minute?

 **a: 1 litre (2 pints)**

Every minute the kidneys filter about 1 litre of blood. But only 1 per cent of this is excreted as urine. The rest is returned to the bloodstream. Without this vital work of the kidneys, the body would be poisoned from within.

## Kidneys have the shape of a ...

 **a: bean**

Every human normally has two kidneys. They are located under the lowest ribs to the left and right of the spine. The kidney is 10–12 centimetres long and about 3 centimetres wide. Its colour is reddish-brown. Overall it has the shape of a large, reddish-brown bean.

# DEVELOPMENT

## Twins can ...

 **b: be both girls, both boys, or girl and boy.**

A distinction is made between identical and non-identical twins. Identical twins are formed when the egg cell divides after it has been fertilised. They look so similar because they are made from only one fertilised egg. In non-identical twins, two eggs are fertilised by two spermatozoa, so twins can also be boys or girls.

## From when can the mother feel the movements of the growing child in her tummy?

 **c: from approx. the 5<sup>th</sup> month of pregnancy**

Most mothers feel the baby's first movements from the 5th month onwards. But that does not mean that the baby does not move before then. On the contrary, even from the 8th week of life, the baby is a real acrobat, but at this point it is still too small to be felt kicking the abdominal wall.

## What does the growing child get from its mother via the umbilical cord?

 **a: nutrients, c: oxygen**

The umbilical cord is approx. 55 centimetres long and 2 centimetres thick. It provides the baby with all the essential nutrients it needs to grow. The baby also receives oxygen from its mother via the umbilical cord.

# DID YOU KNOW?

Laughing involves 15 facial muscles but frowning uses 43!

The muscles of the oesophagus make sure that the food gets to your stomach even if you are standing on your head.

The vessels that lead the blood away from the heart are called arteries. The vessels that lead the blood towards the heart are called veins.

The brain is soft like butter and needs the hard skull for protection.

Your eye muscles are the most active muscles because they are constantly needed to see.

Teeth are harder than bones!

On each hair there is a small muscle that can be straightened up when you are cold or scared. This is known as „goose bumps“.

Indigestible food residues spend approx. 6–20 hours in the colon!

There are parts of the body through which no blood flows: hair and nails, the cornea of the eye and enamel of the teeth.

An arm that has „gone to sleep“ is caused from pinched nerves, not because there is no blood flowing through it.

Muscles are red because they are so well supplied with blood.

You can survive about 40 days without food but only 6 days at most without water!

The hand is the part of the body with the most joints.

The body cannot store oxygen, therefore humans need to breathe day and night. This all happens automatically.

The heart is not heart-shaped, but rather roundish.

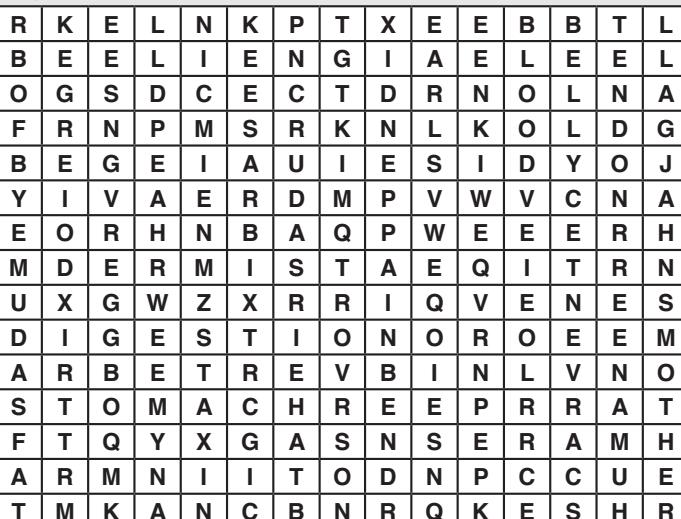
Urine flows into your bladder even when you do a handstand.

The heart of an embryo starts to beat between the 18<sup>th</sup> and 24<sup>th</sup> day after conception.

Humans and horses have the same number of bones.

# WORDSEARCH

All the words listed below are hidden in the jumble of letters, either horizontally, vertically, diagonally or backwards. Can you find them?

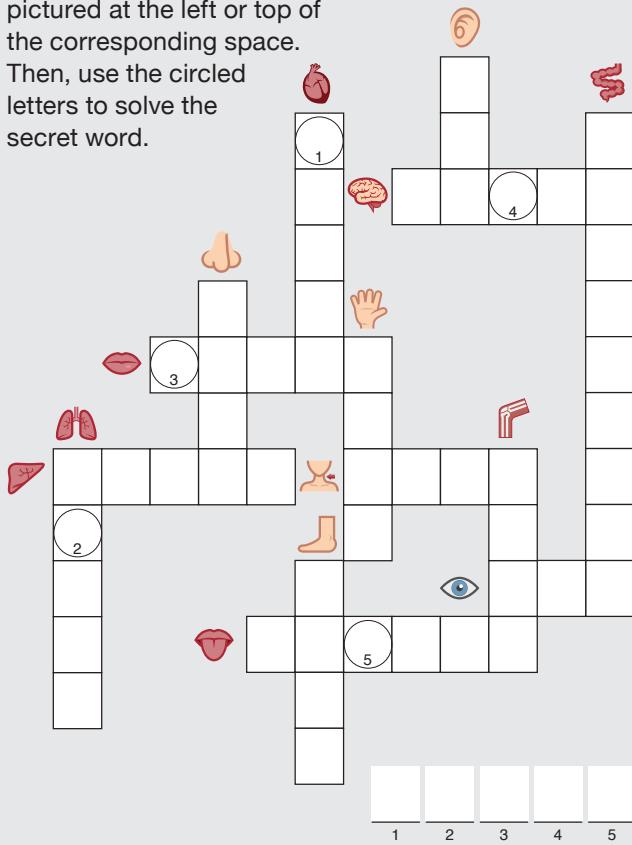


Appendix	Brain	Human	Movement	Scar
Arm	Dermis	Kidney	Muscle	Spleen
Arteries	Digestion	Knee	Nerves	Stomach
Belly	Ear	Leg	Organ	Tendon
Blood	Gall	Liver	Respiration	Throat
Bone	Heart	Mother	Rib	Vein
				Vertebra

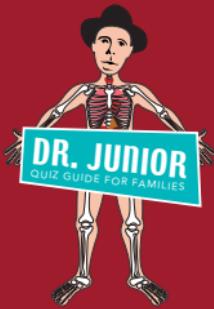
# CROSSWORD PUZZLE

Write the name of the body part pictured at the left or top of the corresponding space.

Then, use the circled letters to solve the secret word.



[www.PLASTINARIUM.de](http://www.PLASTINARIUM.de)



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