B1 Chapter 2: Structure and function of body systems

Knowledge organiser

Multicellular organisms are made up of many cells and have five levels of organisation:

cell – the smallest building block of an organism

tissue – a group of specialised cells working together

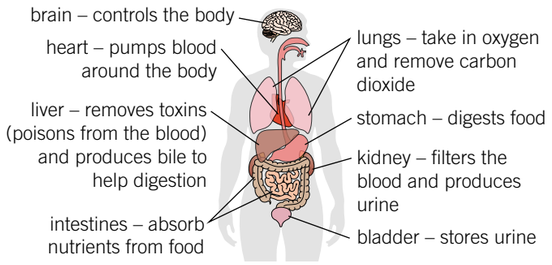
organ – a group of tissues working together

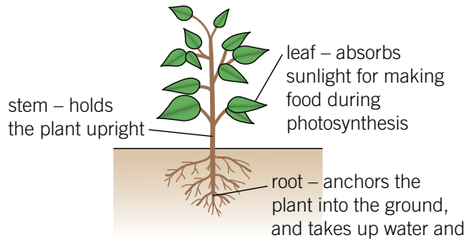
organ system – a group of organs working together

multicellular organism – a group of systems working together

increasing complexity

Plant and animal organs

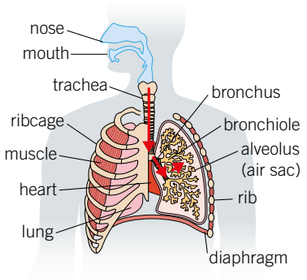


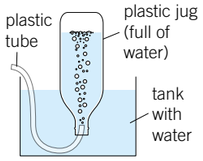


Respiratory system

The respiratory system is involved in:

- breathing in oxygen (for **respiration**)
- breathing out waste carbon dioxide.





Measuring lung volume

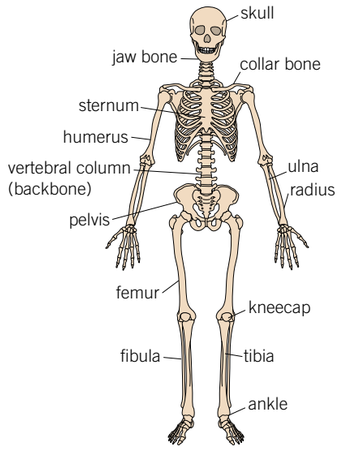
When you breathe out fully into the plastic tube, air from your lungs pushes water out of the bottle.

volume of air in the plastic bottle

=

lung volume

Skeleton



All the bones in your body make up your skeleton.

The four main functions of the **skeleton** are to:

- support the body
- protect vital organs
- help the body move
- make blood cells (in the **bone marrow**).

Joints occur between two or more bones. They allow the skeleton to bend.

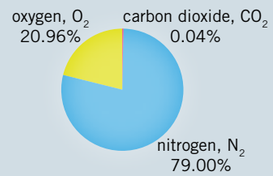
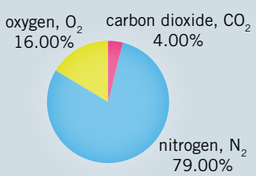
Three types of joint are:

1. **Hinge joints**
   forwards/backwards movements only, e.g., knees
2. **Ball-and-socket joints**
   movement in all directions, e.g., shoulders
3. **Fixed joints**
   no movement allowed, e.g., the skull

In a joint:

- your bone is protected with **cartilage**
- the two bones are held together by **ligaments**.

What happens when we breathe?

When you breathe in (inhale)	• muscles between ribs contract • ribs are pulled up and out • diaphragm contracts and flattens • volume of the chest increases • pressure inside the chest decreases • air rushes into the lungs	composition of inhaled air: 
When you breathe out (exhale)	• muscles between ribs relax • ribs are pulled in and down • diaphragm relaxes and moves up • volume in the chest decreases • pressure inside the chest increases • air is forced out of the lungs	composition of exhaled air: 

Muscles

Muscles are a type of tissue – lots of muscle cells work together to cause movement.

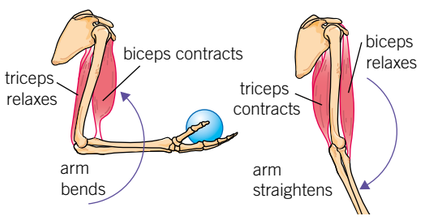
Types of muscle include:

- **cardiac (heart) muscle**
- **smooth muscle**
- **skeletal muscle**

Muscles are attached to bones by **tendons**.

Muscles produce movement by **contracting** (getting shorter).

If a muscle contracts it pulls the bone, causing it to move.



Antagonistic muscles

Pairs of muscles that work together are called **antagonistic** muscles.
When one contracts the other relaxes.

For example, biceps and triceps work together to bend and straighten the forearm.

Key words

Make sure you can write a definition for these key terms.

alveolus *antagonistic* *bone* *bone marrow* *cell* *contract* *cartilage* *diaphragm* *exhale* *inhale* *joint* *ligament* *lung* *multicellular* *organ* *organ system* *respiration* *respiratory system* *ribcage* *skeleton* *tendon* *tissue* *trachea* *volume*