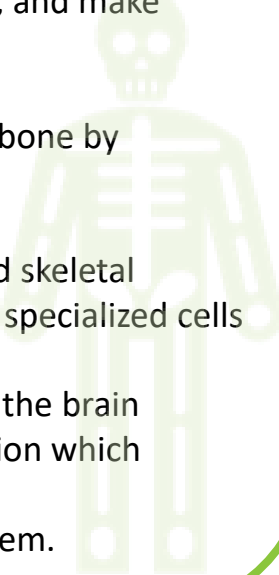


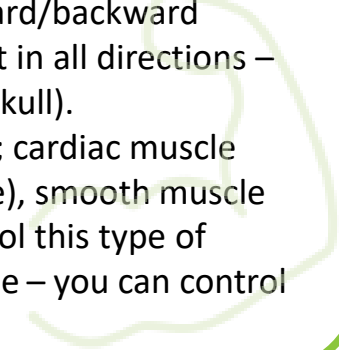
### Must Remember

- Multicellular organisms are made of many cells. They are organized into layers: cells → tissues → organs → organ systems → organisms.
- The skeleton is made up of bones. It has four important functions – support the body, protects the organs, allow movement, and make blood.
- Joints occur when two or more bones join together.
- Bones are held together by ligaments; muscle is held to bone by tendons.
- Muscles work in pairs called antagonistic muscles.
- The nervous system controls the movement of joints and skeletal muscle as the brain is able to send signals to muscles by specialized cells called neurons
- Reflexes are actions that do not require coordination by the brain
- Muscles require oxygen and glucose for aerobic respiration which transfer energy.
- Oxygen and glucose are delivered by the circulatory system.



### Nice to know that...

- Joints occur between two or more bones; they allow your skeleton to bend. There are four types of joint; hinge joints (forward/backward movement – knees), ball-and-socket joints (movement in all directions – shoulders), and fixed joints (no movement allowed – skull).
- Muscles are a type of tissue, there are 3 muscle types; cardiac muscle (heart muscle – you cannot control this type of muscle), smooth muscle (found in the lining of the stomach – you cannot control this type of muscle), and skeletal muscle (muscles attaches to bone – you can control these muscles).



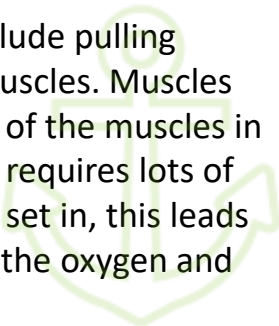
### Key Terms:

- **Antagonistic Muscles** - A pair of muscles that work together to control movement at a joint - as one muscle contracts, the other relaxes.
- **Bone** - A tissue that forms a hard structure, used to protect organs and for movement.
- **Bone Marrow** - The soft, spongy tissue that has many blood vessels and is found in the center of most bones.
- **Cartilage** - The strong, smooth tissue that covers the end of bones to prevent them rubbing together.
- **Cell** - The smallest functional units in an organism – the building blocks of life.
- **Joint** - A part of the skeleton where two bones join together.
- **Ligament** - Joins two bones together.
- **Multicellular Organism** - An organism made up of many cells.
- **Organ** - A group of tissues working together to perform a function.
- **Organ System** - A group of organs working together to perform a function.
- **Reflex** - An action performed without conscious thought.
- **Skeleton** - All the bones in an organism.
- **Tendon** - Joins a muscle to a bone.
- **Tissue** - A group of similar cells working together to perform a function.



### Maritime Futures – Fitness and Maritime

Sailing requires huge amounts of physical activity. This can include pulling ropes and maneuvering the rudder. These activities require muscles. Muscles work in pairs termed antagonistic muscles, to pull a rope, one of the muscles in the pair contracts while the other relaxes. Muscle contraction requires lots of energy. When muscle continue to contract muscle fatigue can set in, this leads to a decrease in performance. The circulatory system delivers the oxygen and glucose to muscles for aerobic respiration.



### Further Study

[BBC Bitesize – Skeletal and muscular systems](#)