KS3 SCIENCE · BIOLOGY

Skeleton and muscles revision sheet

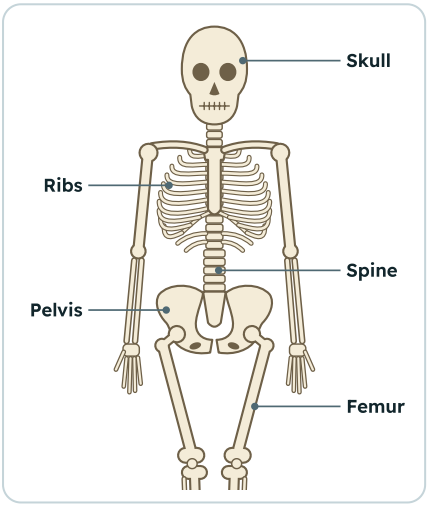
Name _____



1. What your skeleton does

- **Support:** the skeleton holds the body upright and gives it its shape.
- **Protection:** hard bones shield soft organs. The skull protects the brain. The ribs protect the heart and lungs.
- **Movement:** bones meet at joints, and muscles pull on the bones to move them.
- **Making blood cells:** new blood cells are made in **bone marrow**, a soft tissue inside some bones.

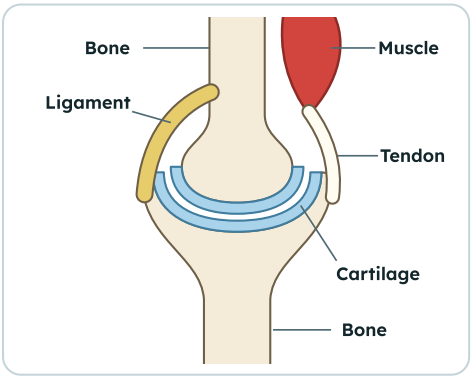
2. Bones of the body



BONE	WHAT IT DOES
Skull	A hard case of bone. It protects the brain.
Ribs	Twelve pairs of curved bones that make a cage. They protect the heart and lungs.
Spine (backbone)	A column of small bones called vertebrae. It holds the body upright and protects the spinal cord.
Pelvis	A bowl of bone at the hips. It supports the weight of the upper body and joins the legs to the spine.
Femur (thigh bone)	The longest bone in the body. It supports your weight when you stand, walk and run.

- An adult skeleton has 206 bones.
- Bone is living tissue. It is hard and strong, but light enough for muscles to move.

3. Joints



A **joint** is a place where bones meet. Most joints let the skeleton bend.

KIND OF JOINT	HOW IT MOVES	WHERE
Hinge	Bends and straightens only, like a door on its hinge	Elbow, knee
Ball and socket	In almost every direction, like a joystick	Shoulder, hip

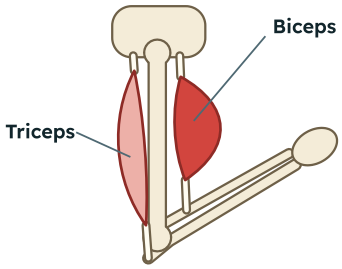
- **Cartilage** is smooth tissue on the ends of the bones. It reduces friction between them.
- **Ligaments** join bone to bone. They hold the joint together.
- **Tendons** join muscle to bone.



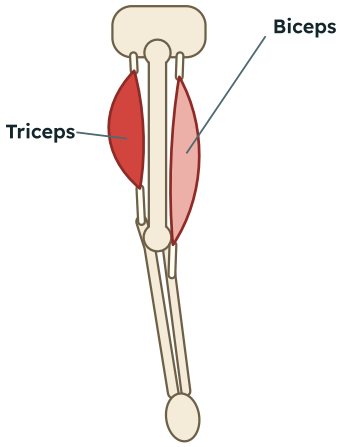
4. How muscles work

- A muscle moves a bone by pulling on it. A muscle can **pull**, but it cannot push.
- To pull, a muscle **contracts**: it gets shorter and fatter. Its tendon pulls on the bone.
- When a muscle **relaxes**, it stops pulling. It cannot push the bone back again.
- Some organs contain muscle too. The muscle in the heart contracts to pump blood.

5. Muscles in pairs



To bend the arm: the biceps contracts and the triceps relaxes



To straighten the arm: the triceps contracts and the biceps relaxes

- An **antagonistic pair** is two muscles that pull the same bone in opposite directions.
- A muscle cannot push, so each muscle needs a partner to pull the bone back the other way.
- The muscle that is contracting is drawn in darker red. It is the shorter, fatter one of the pair.



6. Measuring muscle force

- The force of a muscle is measured in **newtons (N)** with a force meter. You pull on some kinds, and push or squeeze others. Use all your strength, then read the scale.
- **Bigger muscles usually give bigger forces.** The thick muscles in the thigh pull harder than the small muscles that move a finger.
- Training can make a muscle bigger and stronger. A tired muscle gives less force.
- Repeat each measurement three times and work out the **mean**. A bar chart is a good way to compare the muscles.

Key words

Skeleton: all the bones of the body, joined together
Ribs: the bones that protect the heart and lungs
Pelvis: the hip bones, which join the legs to the spine
Bone marrow: tissue inside some bones where new blood cells are made
Hinge joint: a joint that bends and straightens, like the elbow
Cartilage: smooth tissue on the ends of bones that reduces friction
Tendon: joins a muscle to a bone
Relax: when a muscle stops pulling
Biceps: the muscle that bends the arm
Skull: the bones of the head, which protect the brain
Spine: the backbone, a column of small bones
Femur: the thigh bone, the longest bone in the body
Joint: a place where bones meet
Ball and socket joint: a joint that moves in almost every direction, like the hip
Ligament: joins bone to bone at a joint
Contract: when a muscle gets shorter and fatter, and pulls
Antagonistic pair: two muscles that pull a bone in opposite directions
Triceps: the muscle that straightens the arm

The pictures are illustrations made for this sheet, not real photographs.