

St. Ninian's High School S2 Biology

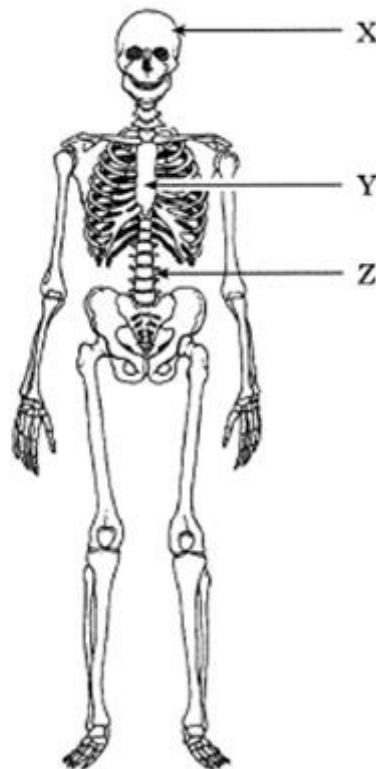
Physiology - Movement

Homework Booklet



Homework 1

1. The diagram below represents a human skeleton.



a) Name the parts of the body which are protected by the labelled parts of the skeleton.

X protects the _____

Y protects the _____ and the _____

Z protects the _____ (3)

b) The skeleton protects parts of the body. Name two other functions of the skeleton.

1. _____

2. _____ (2)

3. Bones are living tissue?

- ☐ True
- ☐ False (1)

4. Name the two minerals which make the bone hard.

1. _____

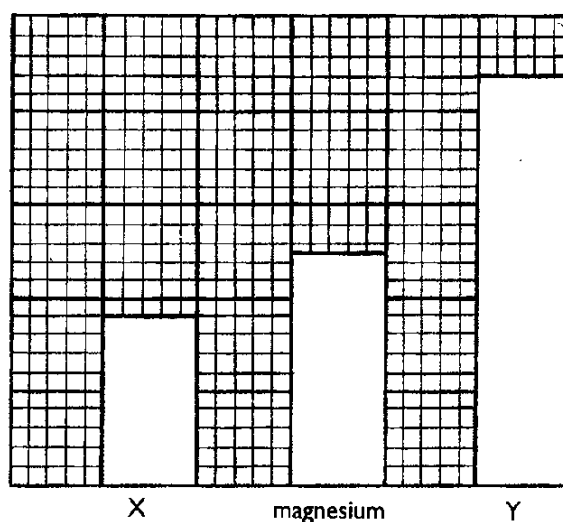
2. _____ (2)

5. The table shown below refers to several chemical substances present in bone. Use the data in the table to identify the substance represented by bars X and Y in the accompanying bar chart.

Chemical Substance	% of body's total mass of substance present in bone
Water	9
Sodium	36
Magnesium	50
Phosphorous	88
Calcium	99

X = _____

Y = _____



(2)

Total /10

Homework 2

1. A bone is soaked in dilute acid for several days. It becomes flexible because it still contains elastic fibres.

What part of the bone has been removed by the acid?

(1)

2. Following complete drying out, a bone was analysed and found to consist of 25% organic and 75% inorganic matter. 90% of its organic matter was made up of a structural protein called collagen. Present this information as a pie chart.

(2)

3.

(a) Copy and complete the table below by inserting a cross (x) to say whether each line refers to a **hinge joint**, a **ball and socket joint** or **both** types of joint.

	<i>Hinge</i>	<i>Ball and socket</i>
shoulder joint		
knee joint		
hip joint		
elbow joint		
can move in only one plane		
can move in many planes		
held together by ligaments		
cartilage protects the ends of the bones		

(5)

4. Copy and complete the table below

Structure	Function
Cartilage	
	Lubricates the joints and acts as a shock absorber

(2)

Total /10

Homework 3

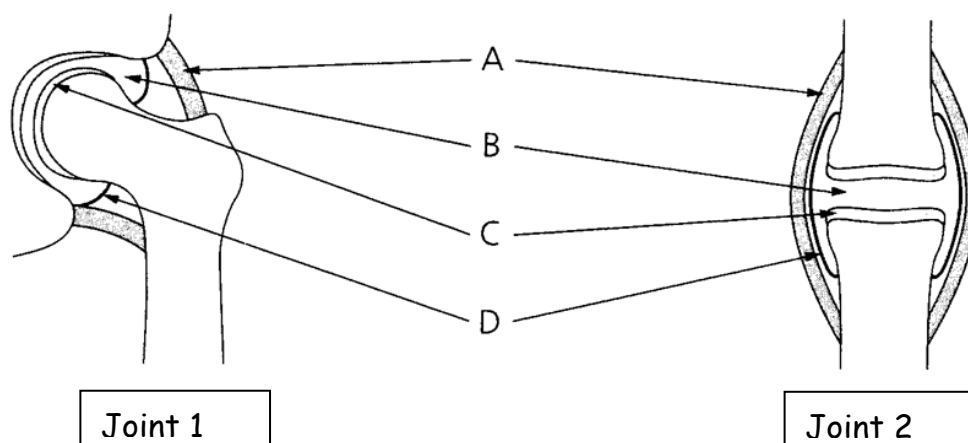
1. Decide if each of the following statements about joints is **TRUE** or **FALSE**. **Copy and complete the table.**

If you decide a statement is **FALSE** you must write the correct word or words to replace the word(s) underlined in the statement.

Statement	True	False	Correction
A hinge joint allows movement in <u>every</u> <u>direction</u>			
<u>Ligaments</u> attach muscles to bones			

(2)

2.



a) Use the diagram of the synovial joints, above, to copy and complete the table.

Letter	Structure	Function
D		
		Holds bones together
		Reduces friction
	Synovial fluid	

(4)

b) From the diagram copy and complete the table for joints 1 and 2

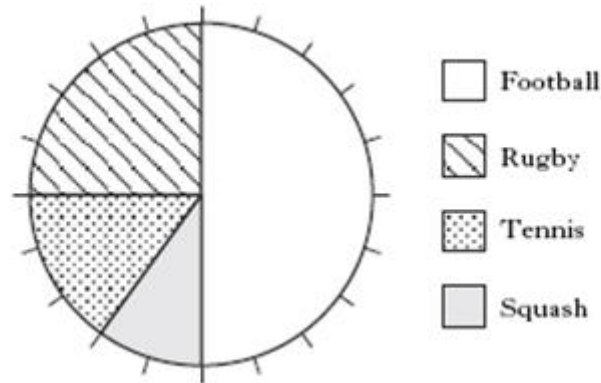
	Joint 1	Joint 2
Name of joint		
Example		
Plane(s) of movement		

(4)

Total /10

Homework 4

1. The pie chart shows the proportions of injuries resulting from different sports recorded at a sports injury clinic.



- a) Which one of the following statements is correct?

More people were injured playing squash than tennis

☐

More people were injured playing rugby than football

☐

Fewer people were injured playing squash than rugby

☐

Fewer people were injured playing football than tennis

☐

(1)

- b) Which sport resulted in 15% of the total injuries

(1)

- c) The number of injuries from playing squash was 32.
Use this information to calculate how many injuries resulted from playing rugby?

(1)

2. Match the term with the description.

Tendon	Tough slightly elastic fibrous material that hold bones together
Ligament	Smooth strong slippery material that reduces friction between bones
Cartilage	Tough inelastic material that attaches muscles to bones

(2)

3. Osteoporosis is a painful bone disorder which affects many women as they grow older. As many as one in four (25%) sixty year old women are affected. Their bones become weaker and more prone to breaking. The incidence of osteoporosis increases to one in two (50%) for seventy year old women. Bone is living tissue made up of flexible fibres and hard minerals and needs constant nourishment. Eating a healthy diet which is rich in the mineral calcium helps keep the bones in good order.

a) What part of the bone is affected by a lack of calcium?

_____ (1)

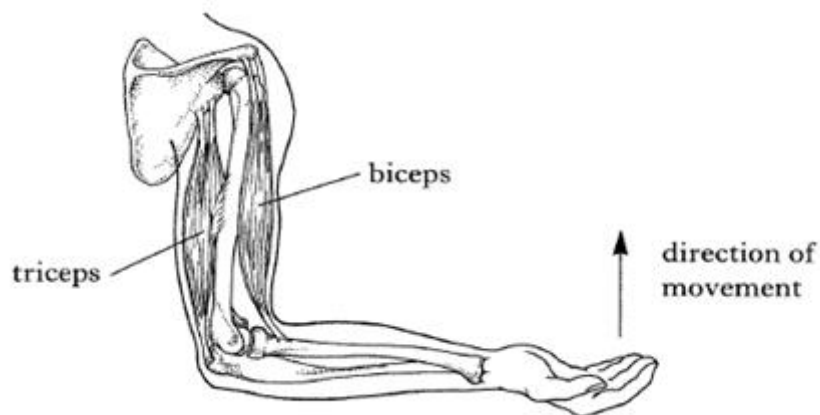
b) What is the ratio of sixty year olds to seventy years olds suffering from osteoporosis?

Express your answer as a whole number ratio

60 year olds _____ : 70 year olds _____ (1)

[Question 4 is on the next page]

4. The diagram below represents some of the bones and muscles of a human arm.



What is the state of each muscle labelled in the diagram when the lower arm is moved in the direction shown?

a) Bicep _____ (1)

b) Tricep _____ (1)

c) What term is given to pairs of muscles which work in opposition to each other?

_____ (1)

Total /10

Extension Exercise

1. Read the following passage

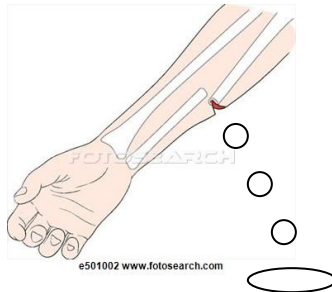
The long bones of a child are slightly pliable because they are still rich in cartilage; the long bones of older people contain little cartilage and are found to be more brittle. If a bone is put under stress it may become fractured. In a closed fracture, the skin surface remains unbroken; in an open fracture, the skin is pierced by broken bone and bleeding is seen to occur. If, in addition, the broken ends of the bone cause injury to neighbouring blood vessels, nerves or organs, the fracture is described as complicated.

For satisfactory mending of a bone to take place, the broken ends must be correctly reunited and then immobilised. Healing begins immediately following the fracture. A blood clot forms between the broken ends of the bone. Within a few days the sharp surface of the broken bone are reabsorbed into the bloodstream leaving the ends soft and rubbery. These are held together by a bridge of fibrous tissue that is replaced by new bone detectable within 2-3 weeks using X-rays. By 6-12 weeks the process is well enough advanced to allow reuse of the affected limb.

a) Which type of fracture carries the higher risk of infection? Explain why.

(2)

b) Which **two** details given in the passage would be used to describe what is happening as a result of the open fracture in the diagram below?



(2)

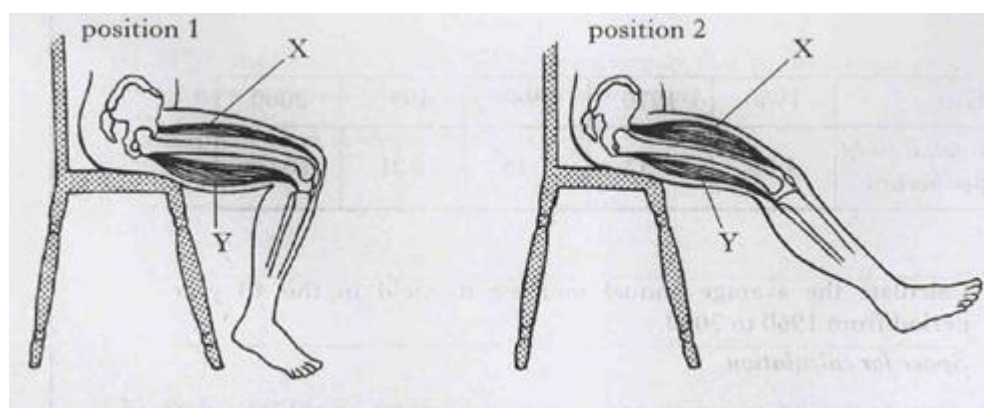
c) Which words in the passage mean '*having a broken bone set and the limb in plaster*' for several weeks?

(1)

d) Predict the result of a broken bone not being properly set.

(1)

2. The diagrams below show some of the muscles in the leg.



Describe the action of muscles X and Y as the leg moves from position 1 to position 2.

a) Muscle X _____ (1)

b) Muscle Y _____ (1)

3. A dry bone mass of 50g was placed in a metal dish of mass 20g. After being heated for several hours to constant mass, the dish and contents were found to weigh 58g. Calculate the percentage content of organic matter in the bone.

(2)

Total /10