

**Puzzle 1- bones**

Listed below are the names of some of the bones that make up your skeletal system. But the names have been encrypted using a secret code. Can you decipher this code to find out what they are? The first has been given to help you out.

1.	α λ χ Ω λ β Ξ	C	R	A	N	I	U	M
2.	Ξ χ Ω + λ η Σ Δ	_	_	_	_	_	_	_
3.	Γ ψ Δ λ Ω β Ξ	_	_	_	_	_	_	_
4.	λ λ η Γ	_	_	_	_	_	_	_
5.	§ β Ξ Δ λ β Γ	_	_	_	_	_	_	_
6.	λ χ + λ β Γ	_	_	_	_	_	_	_
7.	β Σ Ω χ	_	_	_	_	_	_	_
8.	Φ Δ Ξ β λ	_	_	_	_	_	_	_
9.	¶ χ ψ Δ Σ Σ χ	_	_	_	_	_	_	_
10.	ψ λ η λ χ	_	_	_	_	_	_	_
11.	Φ λ η β Σ χ	_	_	_	_	_	_	_
12.	κ Δ λ ψ Δ η λ χ Σ α π Σ β Ξ Ω	_	_	_	_	_	_	_

§	B	Γ	Δ	E	α	H	Θ	I	K	Λ	+	N
					C					I		
Ξ	O	Π	¶	Σ	λ	Υ	Φ	χ	ψ	Ω	↑	β
M					R			A		N		U

**Puzzle 2 - joints**

The aim of this game is to fill in the grid using the clues below. Each clue gives the first letter of the keyword and the number of letters it contains. The first letter of each answer has been given in the grid to help you out. But it's not as simple as it looks. Use a pencil and rubber to move the words around until they all fit. Good Luck!

The crossword puzzle grid is 11 columns wide and 11 rows high. The words and their starting letters are as follows:

- Across 1: A T
- Across 2: B P
- Across 3: K C
- Across 4: T N
- Across 5: S H
- Across 6: M B
- Across 7: R E
- Across 8: F
- Across 9: F
- Across 10: S
- Down 1: B
- Down 2: L
- Down 3: J
- Down 4: T
- Down 5: E
- Down 6: B
- Down 7: E
- Down 8: B
- Down 9: T

**Bones**

<input type="text"/>	<b>B-4</b> is the hard rigid tissue that your skeleton is made up of
<input type="text"/>	<b>J-6</b> are the places where two or more bones are linked
<input type="text"/>	<b>L-9</b> are the tough connective tissue that join two bones together
<input type="text"/>	Cartilage covers the <b>E-4</b> of bones (in joints) to stop them wearing away
<input type="text"/>	<b>C-9</b> is a tough smooth substance
<input type="text"/>	Cartilage is kept slippery by a liquid called synovial <b>F-5</b>

**Muscles**

<input type="text"/>	Bones need <b>M-6</b> tissue in order to move
<input type="text"/>	Muscles are connected to bone by <b>T-7</b>
<input type="text"/>	<b>B-12</b> is the study of how bones and muscles work together
<input type="text"/>	<b>T-3</b> muscles are used to bend your elbow
<input type="text"/>	The <b>B-6</b> is the muscle on the front of your upper arm
<input type="text"/>	The <b>T-7</b> is the muscle on the back of your upper arm
<input type="text"/>	When you bend your elbow your biceps will <b>C-8</b> (get shorter) and pull your forearm up
<input type="text"/>	Muscles can contract or <b>R-5</b>
<input type="text"/>	Your biceps and triceps are muscle <b>P-5</b>
<input type="text"/>	Your biceps and triceps are <b>A-12</b> muscle pairs because one muscle always does the opposite of the other

**Joints**

<input type="text"/>	<b>B-5</b> is the term for any animal with two feet
<input type="text"/>	The joints in your skull are said to be <b>F-5</b> together
<input type="text"/>	You have a pivot joint at the very top of your <b>N-4</b>
<input type="text"/>	The <b>P-5</b> joint in your neck allows you to turn your head
<input type="text"/>	A <b>B-4</b> and socket joint can move freely in any direction
<input type="text"/>	A ball and <b>S-6</b> joint can also rotate
<input type="text"/>	Your <b>S-8</b> is an example of a ball and socket joint
<input type="text"/>	A <b>H-5</b> joint opens and closes like a door
<input type="text"/>	Your <b>E-5</b> is an example of a hinge joint
<input type="text"/>	Your <b>K-4</b> is another example of a hinge joint

**Puzzle 3** - the skeletal muscular system

In this puzzle you can see that the numbered answers do not match the lettered clues. Can you sort them out? Use the grid provided to write the correct numbered answer under each lettered clue. The first has been done for you.

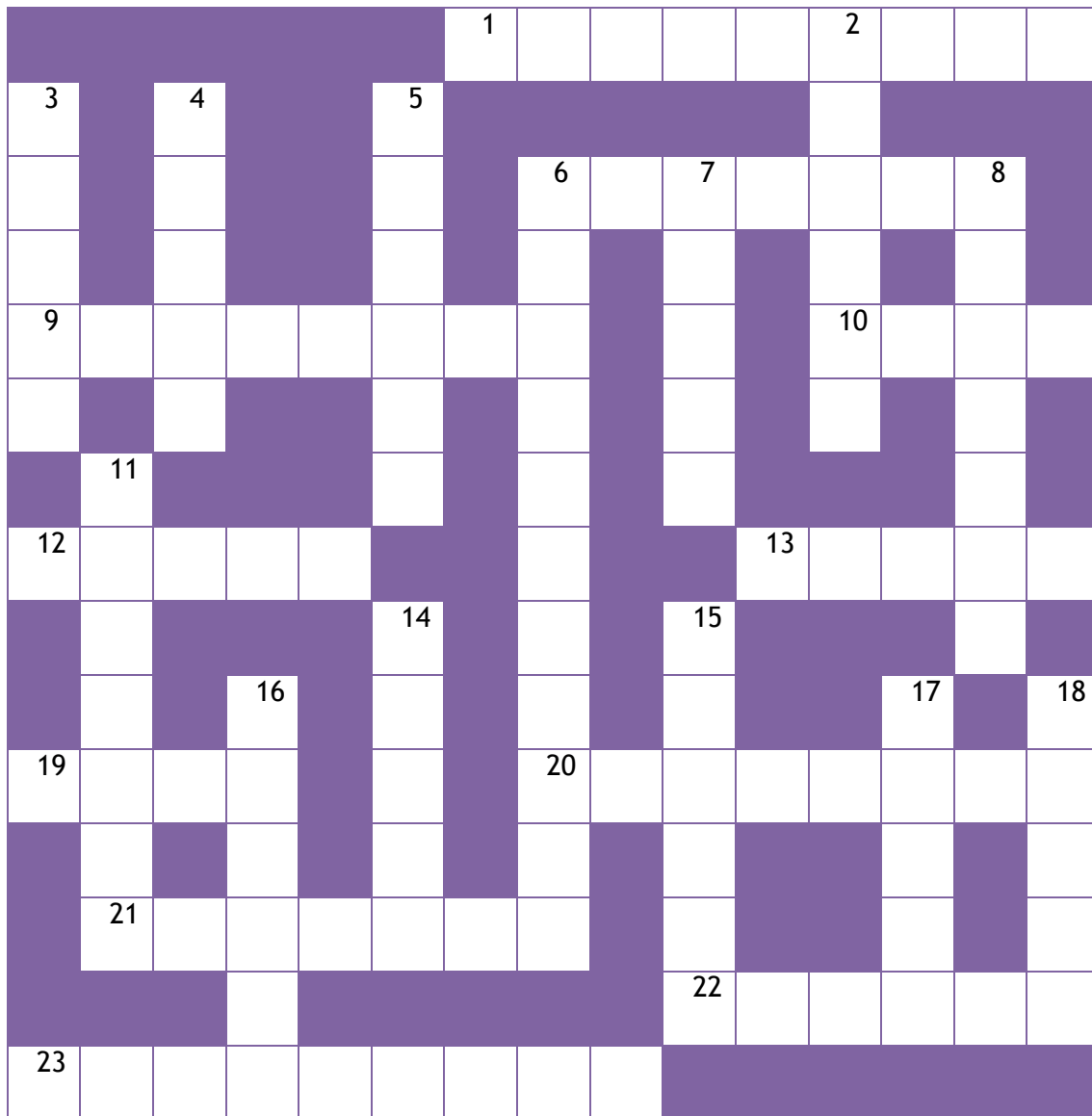
A.	The places where bones meet	1.	Antagonistic
B.	The jelly like substance found in the middle of some (but not all) bones. It is where new blood cells are made	2.	Blood cells
C.	These muscle pairs work together to move joints	3.	Bone marrow
D.	These are bone to bone connectors	4.	Cartilage
E.	These are muscle to bone connectors	5.	Contract
F.	The tough smooth substance found at the end of each bone in a moveable joint. It helps to stop the bones from wearing away	6.	Cranium
G.	Red and white ones are manufactured in your bone marrow	7.	Ear
H.	This bony structure protects your heart and lungs	8.	Femur
I.	This part of your skeleton protects your brain	9.	Fixed
J.	The biceps muscle in your arm will do this when you bend your elbow	10.	Hammer
K.	Muscles can contract and .....	11.	Heart
L.	This lubricating fluid reduces wear and tear in joints	12.	Hinge
M.	The muscles at the front of your thigh bone	13.	Involuntary
N.	The longest bone in your body; it is found in your leg	14.	Iris
O.	The flexible column of vertebra also known as your backbone; it supports you in the upright position	15.	Joints
P.	Your knees are this type of joint	16.	Ligaments
Q.	These muscles only move when you want them to	17.	Muscle
R.	These muscles move automatically	18.	Newton meter

S.	An instrument used to measure force; an indicator of physical strength	19.	Pivot
T.	This involuntary muscle controls the size of the pupil in your eye	20.	Quadriceps
U.	These types of joints do not move; they can be found in your head	21.	Relax
V.	This tissue is made up of protein fibres; it is essential for the movement of joints	22.	Ribcage
W.	The smallest bones in your body are found here	23.	Spine
X.	One of the three smallest bones in your body	24.	Synovial fluid
Y.	This involuntary muscle pumps blood around your body	25.	Tendons
Z.	This type of joint enables you to turn your head	26.	Voluntary

A	B	C	D	E	F	G	H	I	J	K	L	M
15												
N	O	P	Q	R	S	T	U	V	W	X	Y	Z

## Puzzle 4 - the skeletal muscular system

In this puzzle you can see that the numbered answers do not match the lettered clues. Can you sort them out? Use the grid provided to write the correct numbered answer under each lettered clue. The first has been done for you.



Across	
1.	Your biceps muscle does <b>this</b> when you bend your elbow (9)
6.	Penguins get through the water by ___ ___ ___ ___ ___ ___ ___ it out of the way with their flat, stiff wings (7)
9.	Any muscle that is used to move a body part away from the midline (8)
10.	Lactic ___ ___ ___ ___ builds up in the muscles of athletes who have used up most of their oxygen (4)

12.	This is how most babies get from one place to another (5)
13.	In a skeleton this can be a hinge, pivot, ball and socket or fixed (5)
19.	Trout, salmon and haddock; these ___ ___ ___ ___ rhythmically bend their bodies to help them move through the water (4)
20.	One method of travelling through the trees in a jungle; it is used by spider monkeys and gibbons (8)
21.	Bones do not move on their own; ___ ___ ___ ___ ___ ___ ___ ___ are needed to pull the bones into position (7)
22.	Bone is made up of several layers of dense connective <b>this</b> (6)
23.	The blink reflex is this: so is the contraction and relaxation of your heart ; they are involuntary or ___ ___ ___ ___ ___ ___ ___ ___ ___ movements

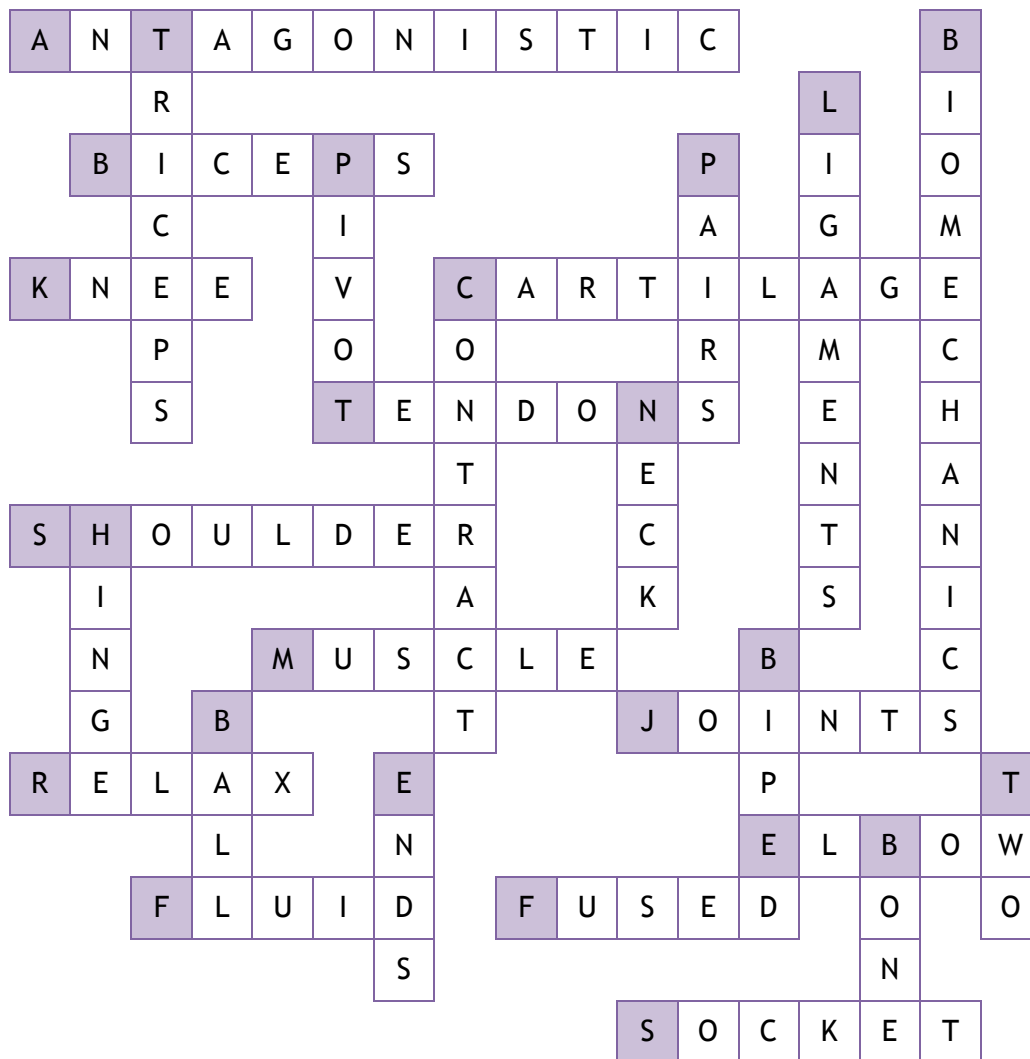
Down	
2.	How an ___ ___ ___ ___ ___ ___ moves depends on the arrangement of its muscular skeletal system
3.	When your biceps muscle contracts the triceps muscle will ___ ___ ___ ___ ___ (5)
4.	Some seeds move away from their parent plant by using the prevailing ___ ___ ___ ___ ___ to carry them off (5)
5.	The gluteal muscles in your bottom are commonly called ___ ___ ___ ___ ___ They are used to move your leg at the hip joint (6)
6.	The rhythmical movement used by your intestines to push food through your digestive system (10)
7.	The supportive flexible backbone that begins at the base of the skull and ends at the small of your back (5)
8.	Flying lizards are good at this; they cut through the air by stretching out flaps of skin and catching the breeze (7)
11.	The joints are fixed in this protective dome of bone (7)
14.	One of the three tiny bones in your ear that vibrate in time to the movement of your eardrum (5)
15.	Birds use this method of movement to get from one place to another (6)
16.	A form of exercise; can be used to rehabilitate patients in hospital (6)
17.	The skeletal adaptation used by birds; it enables them to fly (5)
18.	A nimble type of movement; a person with agility is said to be this (5)

Solution 1 - bones

1. Cranium	2. Mandible	3. Sternum
4. Ribs	5. Humerus	6. Radius
7. Ulna	8. Femur	9. Patella
10. Tibia	11. Fibula	12. Vertebral column

Σ	B	Γ	Δ	E	λ	H	Θ	I	K	Λ	+	N
H		S	E		C	B			V	I	D	
Ξ	O	Π	¶	Σ	α	Υ	Φ	X	Ψ	Ω	↑	Β
M		O	P	L	R		F	A	T	N		U

Solution 2 - joints





**Solution 3 - the skeletal muscular system**

A	B	C	D	E	F	G	H	I	J	K	L	M
15	3	1	16	25	4	2	22	6	5	21	24	20
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
8	23	12	26	13	18	14	9	17	7	10	11	19

**Solution 4 - movement**

Across					
1.	Contracts	10.	Acid	20.	Swinging
3.	Rowing	21.	Crawl	21.	Muscles
6.	Pushing	13.	Joint	22.	Tissue
9.	Abductor	19.	Fish	23.	Automatic

Down					
2.	Animal	6.	Peristalsis	14.	Anvil
3.	Relax	7.	Spine	15.	Flight
4.	Winds	8.	Gliding	16.	Physio
5.	Glutes	11.	Cranium	17.	Wings
18.	Agile				

							C	O	N	T	R	A	C	T	S
R	O	W	I	N	G									N	
E		I			L		P	U	S	H	I	N	G		
L		N			U		E		P		M		L		
A	B	D	U	C	T	O	R		I		A	C	I	D	
X		S			E		I		N		L		D		
	C				S		S		E					I	
C	R	A	W	L			T			J	O	I	N	T	
	A				A		A		F					G	
	N		P		N		L		L			W		A	
F	I	S	H		V		S	W	I	N	G	I	N	G	
	U		Y		I		I		G			N		I	
	M	U	S	C	L	E	S		H			G		L	
				I					T	I	S	S	U	E	
A	U	T	O	M	A	T	I	C							