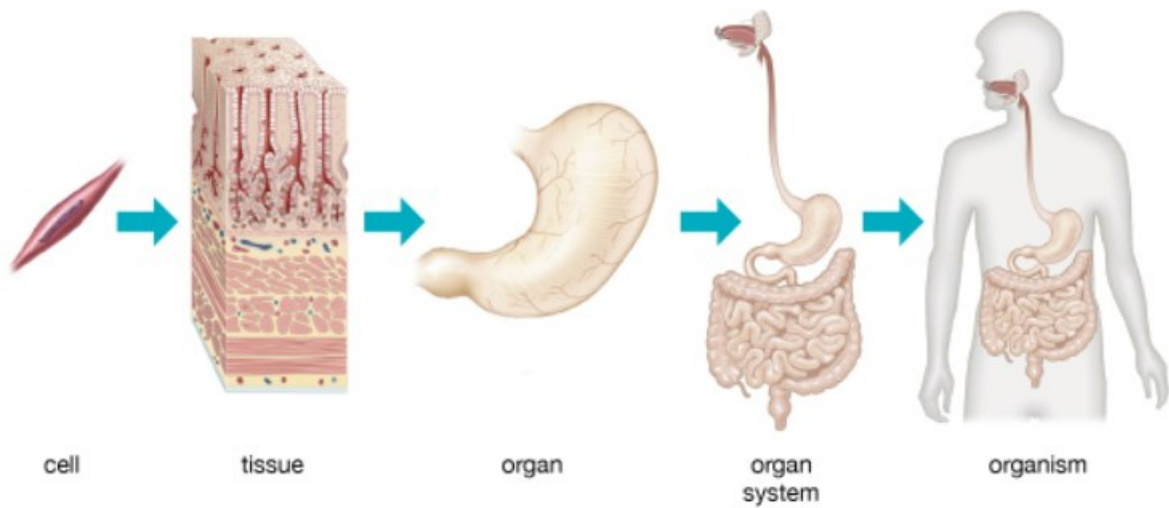


Principles of Organisation

Levels of organization



Name: **ANSWERS**

Principles of Organisation

Cells are the basic building blocks of all living organisms. Unicellular and simple multicellular organisms carry out all the exchanges they need across the cell membranes.

Large multicellular organisms may contain billions of cells and they have to overcome the problems linked to their size.

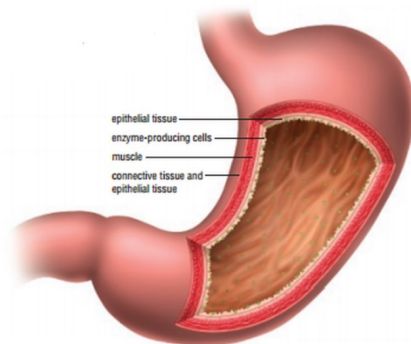
They have evolved different ways of exchanging materials. During the development of multicellular organisms, cells differentiate becoming specialised to carry out particular jobs. However, the adaptations of multicellular organisms go beyond specialised cells. Similar specialised cells are often found grouped together to form a tissue.

Tissues

A tissue is a group of similar cells with a similar structure and function working together. For example, muscular cells can contract to bring about movement. Glandular tissues contain secretory cells that can produce and release substances such as enzymes and hormones. Epithelial tissue covers the outside of your body as well as your internal organs.

Organs

Organs are collections of tissues. Each organ contains several tissues working together to perform a specific function.



The stomach consists of many types of specialized tissues grouped together to function as an organ.

For example, the stomach is an organ involved in the digestion of food. It contains:

- ⇒ Muscular tissue to churn the food and digestive juices of the stomach together
- ⇒ Glandular tissue to produce the digestive juices that break down food
- ⇒ Epithelial tissue which covers the inside and the outside of the organ.

The pancreas is an organ that has two important functions. It makes hormones to control blood sugar as well as some of the enzymes that digest food. It contains two very different types of tissue, which produce these different secretions.

Organ Systems:

A whole multicellular organism is made up of a number of organ systems working together. Organ systems are groups of organ systems that work together to form specific functions.

The way in which one organ functions often depends other organs in the system. Organ systems work together to form organisms.

Organ systems within the human body include the digestive system, respiratory system and the gas exchange system.

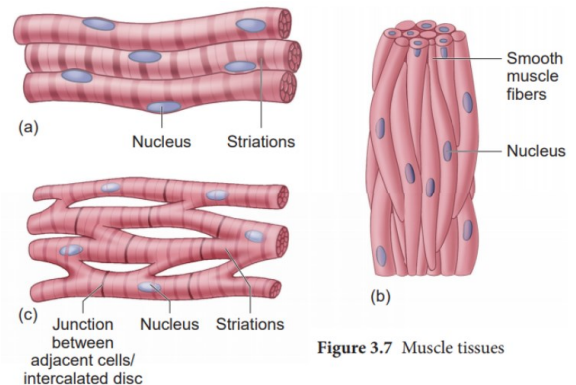


Figure 3.7 Muscle tissues

All of these systems have adaptations in some of their organs that make them efficient exchange systems. These adaptations include features to increase the surface area of a part of an organ system, a rich blood supply to areas where exchange takes place, areas with short diffusion distances for exchange and mechanisms to increase the concentration gradients by ventilating surfaces or moving materials on.

Deliberate Practice

Use the information on the previous pages to help you to complete the following tasks.

1. Define the word tissue:

A tissue is a group of cells with similar structure and function working together [1 mark]

2. Define the word organ:

An organ is a collection of tissues. Each organ, containing several tissues works together to perform a specific function [1 mark]

3. For each of the following, state whether they are a specialised cell, a tissue or an organ. Explain your answers.

Sperm: **Specialised cell**

Explanation: **It has lots of adaptations that allow it to move to egg and to be able to fertilise it if it.** [2 marks]

Kidney: **Organ**

Explanation: **A group of tissues working together to perform a specific function** [2 marks]

Stomach: **Organ**

Explanation: **A group of tissues working together to perform a specific function** [2 marks]

4. Describe how the stomach is adapted for its role in the digestion of food.

The stomach is comprised of several different tissues that allow it carry out the role in the digestion of food. It has layers of muscle that can contract to churn the food, it has epithelial and glandular tissue on the inside, the glandular tissue secretes digestive juices such as hydrochloric acid and enzymes to kill microorganisms and to begin breaking the food down into smaller, soluble pieces. It also has a folded lining

[5 marks]

PPQs

Q1.

This question is about organisation in living organisms.

(a) Write the biological structures from the box in the correct size order.

cell	nucleus	organ	tissue
------	---------	-------	--------

Smallest	nucleus
↓	_____
	cell

	tissue

Largest	organ

(3)

(b) Name **one** animal organ.

Stomach, heart, lungs, kidney etc (any other animal organ)

(1)

(c) Which is a plant tissue?

Tick (✓) **one** box.

- Flower
- Leaf
- Phloem
- Root

(1)

Q2.

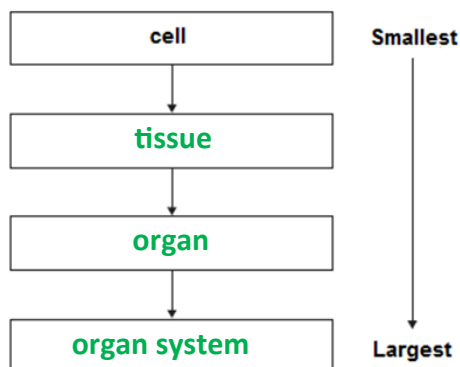
The human body is organised to carry out many different functions.

(a) Use words from the box to complete **Figure 1** by putting the parts of the body in order of size from smallest to largest.

The smallest one has been done for you.

cell	organ system	organ	tissue
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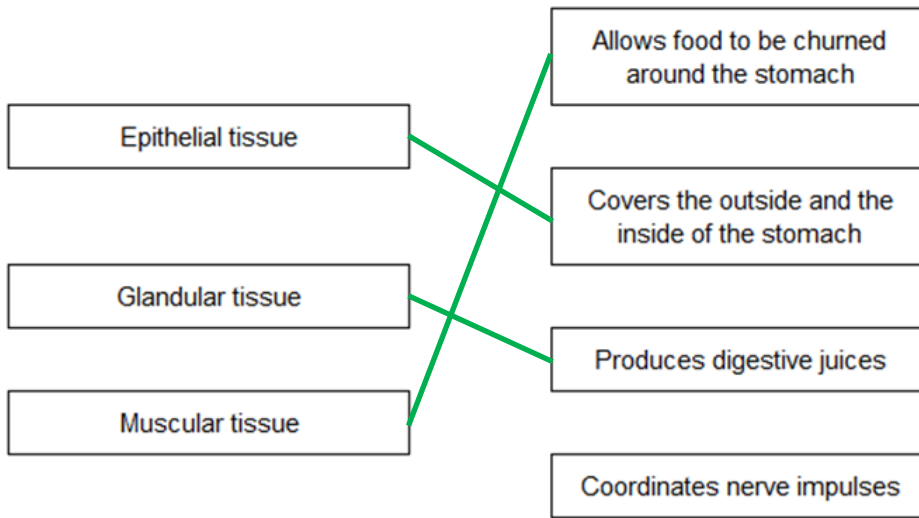
Figure 1



(2)

(b) The stomach is made of different types of tissue.

Draw **one** line from each type of stomach tissue to the correct description.

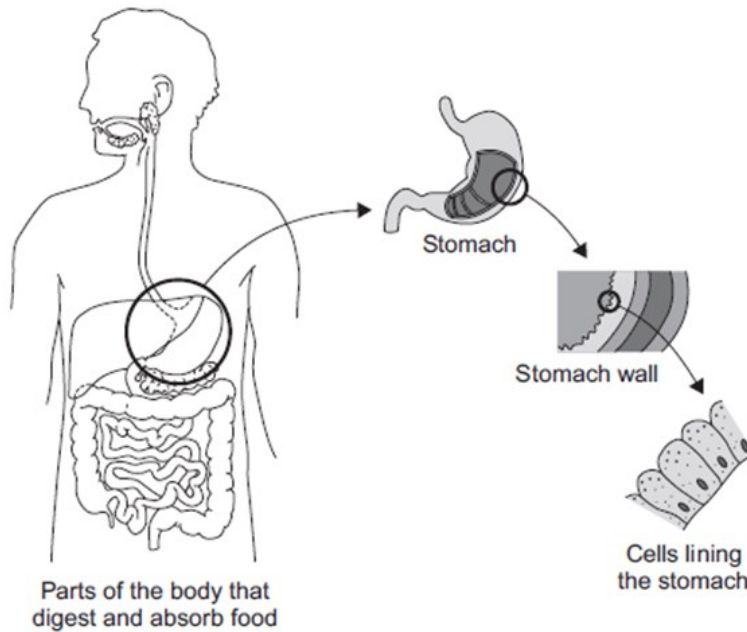


(3)

Q3.

The diagram below shows the parts of the body that digest and absorb food.

It also shows some details about the structure of the stomach.



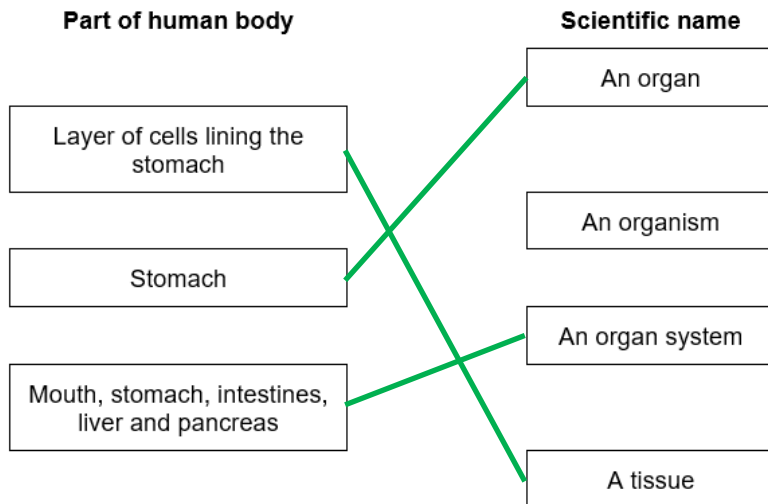
(a) Complete the table to show whether each structure is an organ, an organ system or a tissue.

For each structure, tick (✓) **one** box.

Structure	Organ	Organ system	Tissue
Stomach	★		
Cells lining the stomach			★
Mouth, oesophagus, stomach, liver, pancreas, small and large intestine		★	

(2)

(b) Draw **one** line from each part of the human body to its correct scientific name.



(3)

Pivot Question:

Why don't single celled organisms require organ systems to exchange substances with the environment?

They have a short diffusion distance allowing the exchange of substances across the membrane of the cell. Multicellular organisms need the substances they exchange with the environment to be able to move around the body to get to where they are needed, we can't simply diffuse oxygen needed for respiration through our skin, it would not reach the cells it is needed in.