

# Abraham Darby Academy



## KS3 Biology | Cells, tissue, organs

Knowledge series | Study Booklet | 2017





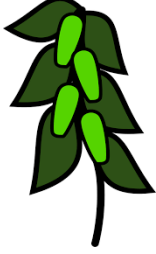


## Key terms

- **Adaptation:** A feature of an organism's body which helps it to survive.
- **Bacteria:** Single-celled micro-organisms. Singular is bacterium.
- **Bacterial cell:** A microscopic individual cell of a bacterium.
- **Cell:** Basic unit of life. Unicellular organisms only have one cell. Multicellular organisms have many cells.
- **Cell membrane:** A selectively permeable membrane surrounding the cell and controlling the entry and exit of materials.
- **Cell wall:** a structural layer surrounding all types of plant cells, situated outside the cell membrane. It can be tough, flexible, and sometimes rigid. It provides the cell with both structural support and protection, and also acts as a filtering mechanism.
- **Chloroplast:** Contains the green pigment chlorophyll; the site of photosynthesis.
- **Cytoplasm:** The gel like substance inside a cell.
- **Light microscope:** Device that uses visible light and a series of lenses to produce an enlarged image of an object.
- **Mitochondria:** Structures in the cytoplasm of cells where respiration takes place (singular is mitochondrion).
- **Multicellular:** Having more than one cell.
- **Nucleus:** The nucleus controls what happens inside the cell. Chromosomes are structures found in the nucleus of most cells. The plural of nucleus is nuclei.
- **Organ:** A group of different tissues that work together to carry out a particular function, e.g. heart and lungs.
- **Organ system:** A group of organs that work together to complete a specific function.
- **Specialised:** A cell that has become differentiated to carry out a particular function, e.g. red blood cell.
- **Tissue:** A group of similar cells that carry out the same function, e.g. muscle tissue.
- **Unicellular:** A single-celled organism.
- **Vacuole:** A space within the cytoplasm of plant cells that contains cell sap.



# Characteristics of Life


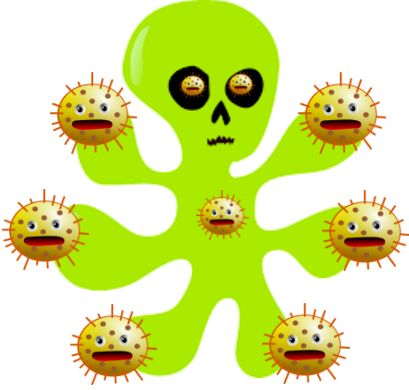
**Task:** Complete each column of the following table, with an example of each of the characteristics of living things in the 'Plant' and 'Animal' columns.

<p><b>Plants</b></p> 	<p><b>Life Processes</b></p> 	<p><b>Animals</b></p> 
	<p><b>M</b> _____</p>	
	<p><b>R</b> _____</p>	
	<p><b>S</b> _____</p>	
	<p><b>G</b> _____</p>	
	<p><b>R</b> _____</p>	
	<p><b>E</b> _____</p>	
	<p><b>N</b> _____</p>	



# Living or (un)dead?

**Task:** Applying the facts from what you've just learned from the previous (MRS. GREN) test; list reasons (MRS. GREN) why you believe a zombie, and a virus are either alive or dead!

 <p style="text-align: center;"><b>ZOMBIE</b></p>	 <p style="text-align: center;"><b>Ebola Virus</b></p>
<b>M</b>	<b>M</b>
<b>R</b>	<b>R</b>
<b>S</b>	<b>S</b>
<b>G</b>	<b>G</b>
<b>R</b>	<b>R</b>
<b>E</b>	<b>E</b>
<b>N</b>	<b>N</b>
<b>Alive or dead, because?</b>	<b>Alive or dead, because?</b>



## Discovering the microscope

**Task:** Label all main part of the microscope image below.





# Tissues, organs and organ systems.

**Task:** Answer the seven questions below:

**1.** State what all living things are made of.

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**2.** Name three parts of animal and plant cells.

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**3.** Name three specialised cells.

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**4.** What is a tissue?

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**5.** State the name of a group of tissues working together.

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**6.** What is an organ system?

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**7.** Give three examples of organ systems and their functions.

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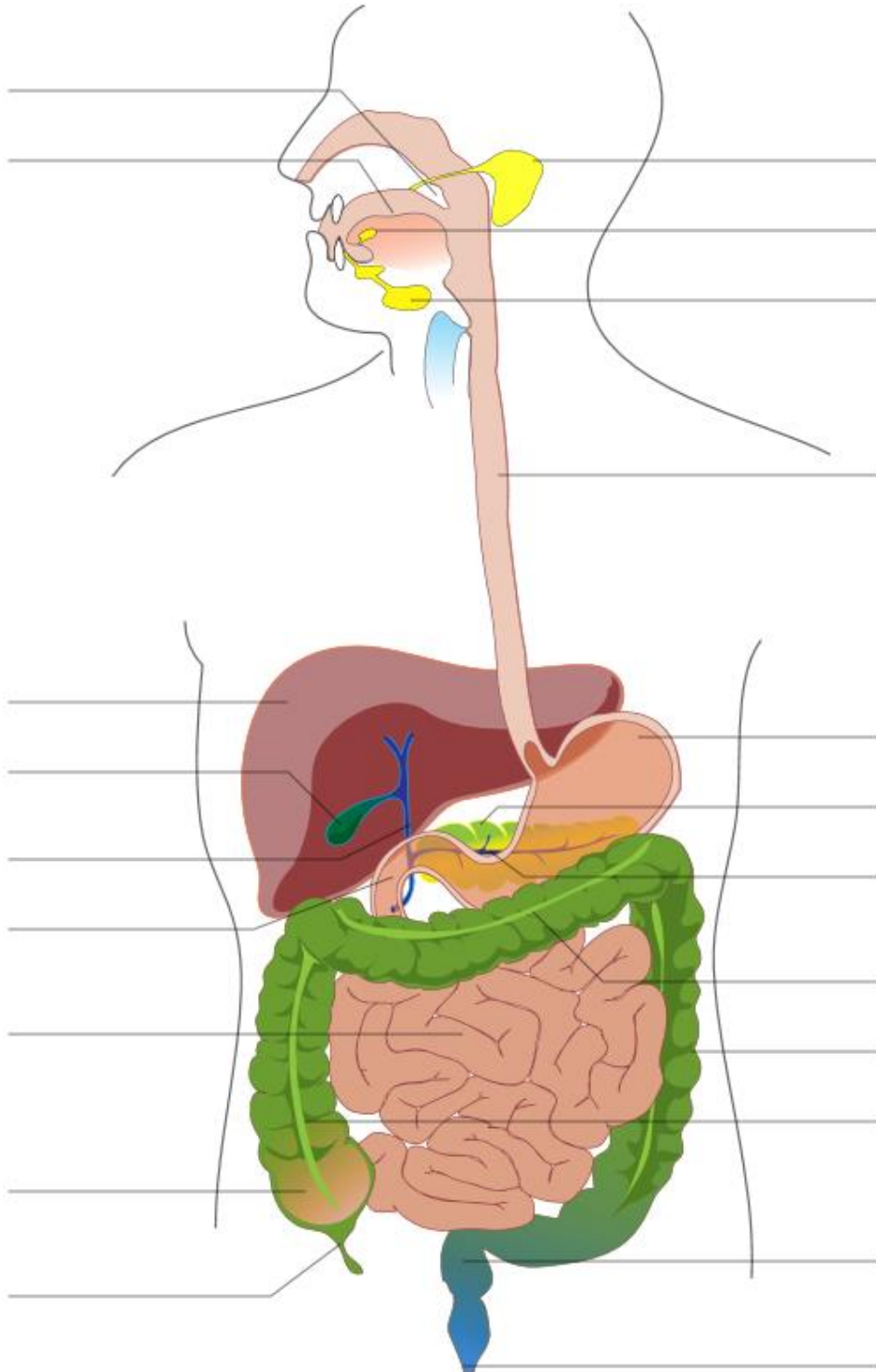
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# Organs and organ systems.

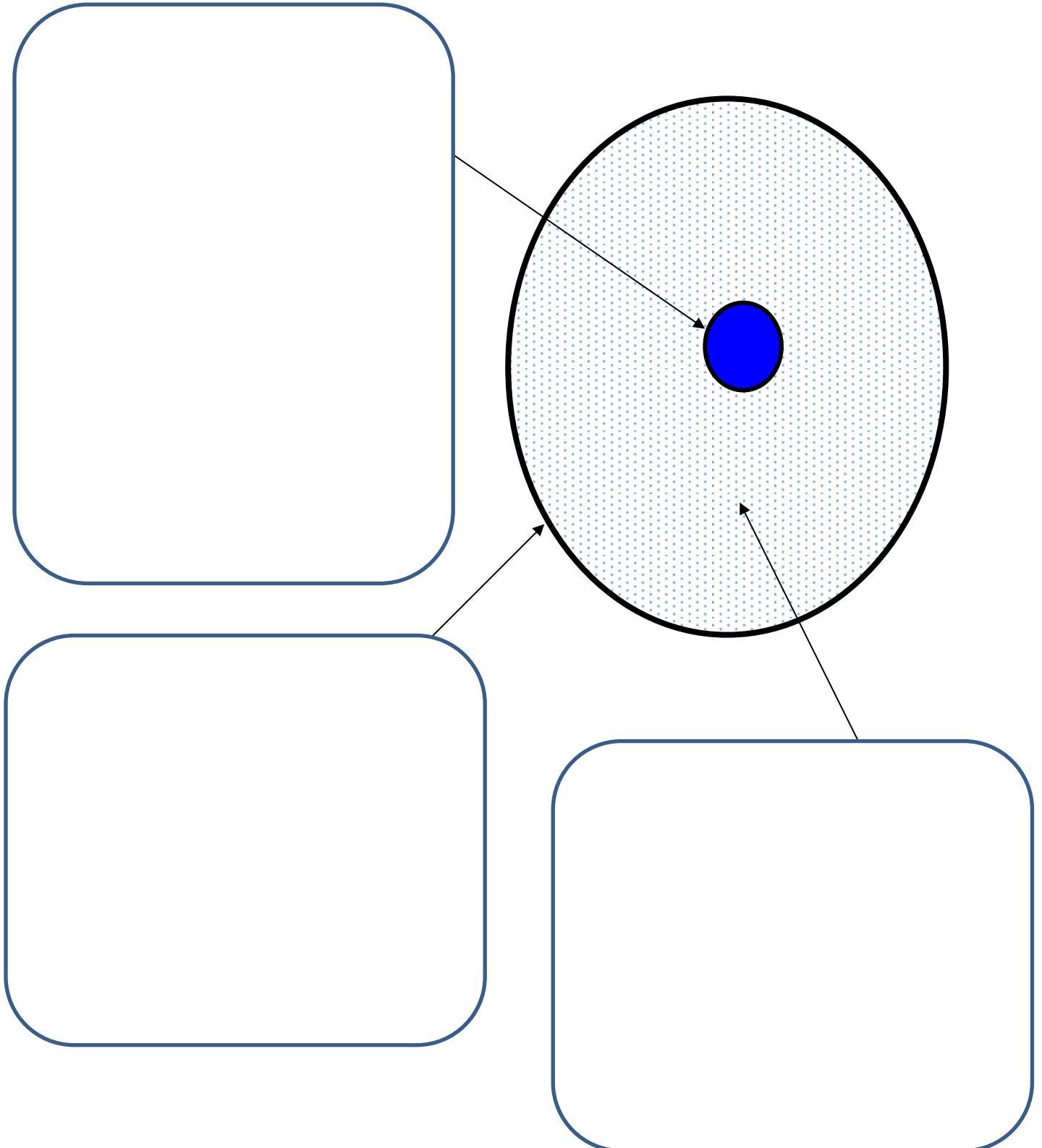
**Task:** Label all parts of an adult digestive system on the diagram below.





# The Animal Cell

**Task:** Label the three parts of an animal cell on the diagram below. Add a brief explanation of their use for each part.







# The Plant Cell

**Task:** Label the six parts of a plant cell on the diagram below. Add a brief explanation of their use for each part.

The diagram shows a plant cell with the following labeled parts:

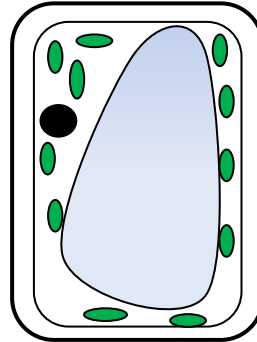
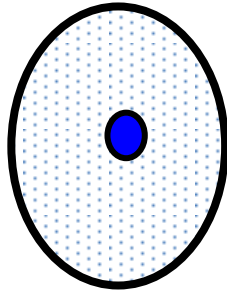
- Cell wall
- Cell membrane
- Chloroplast
- Nucleus
- Vacuole
- Cytoplasm

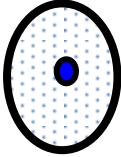

There are six empty boxes for labeling and two larger boxes for explanations.



# Comparing Plant Cells and Animal Cells

**Task:** State the differences and similarities between plant and animal cells, by completing the table below. Label the parts of cells which appear in both types of cells on the two diagrams below.



Part of cell	Present in animal cell (yes or no)? 	Present in plant cell (yes or no)? 
nucleus		
cytoplasm		
cell wall		
cell membrane		
vacuole		
chloroplasts		



# Check your cells and systems knowledge

**Task:** Answer the six questions below:

1. Getting rid of waste is one of the life processes. What name is given to this process? Underline the correct answer.

**Ingestion**

**Nutrition**

**Excretion**

2. What is the job of the nucleus? Underline the correct answer.

- To control what substances go into and out of the cell.
- To give a plant cell its shape.
- To control what happens inside the cell.

3. What is the job of the cell membrane? Underline the correct answer.

- To control what substances go into and out of the cell.
- To give a plant cell its shape.
- To control what happens inside the cell.

4. Which of these is only present in plant cells? Underline the correct answer.

**Membrane**

**Cell-wall**

**Nucleus**

5. What sort of structure is the heart? Underline the correct answer.

**A tissue**

**An organ**

**An organ system**

6. Which of the following is not an organ system? Underline the correct answer.

**Circulatory system**

**Nervous system**

**One-way system**

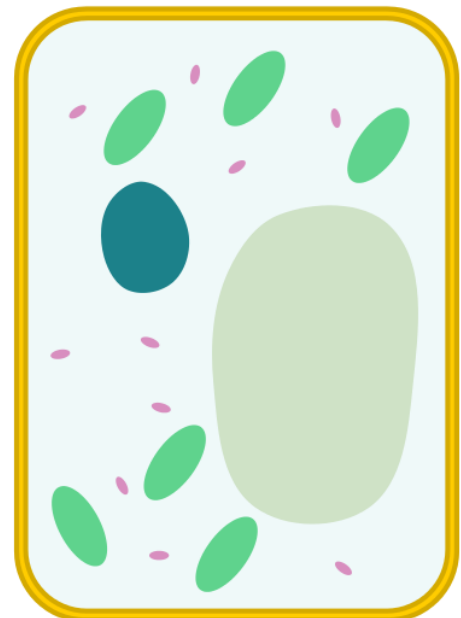
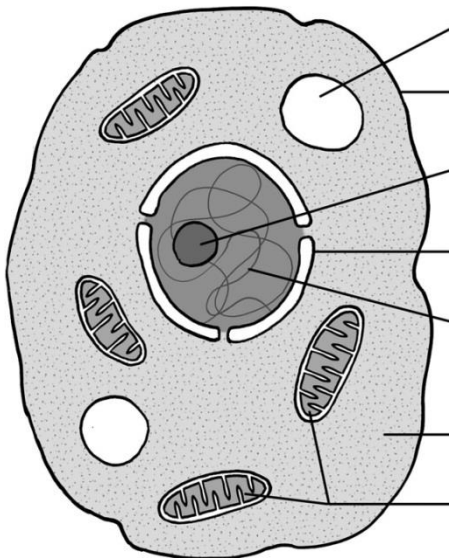


# Cells, tissues, organs and systems

**Task:** Fill in the missing words from the four common definitions listed below.

- \_\_\_\_\_ are organised into tissues, organs, systems and organisms.
- Tissue. A group of similar cells that carry out the same \_\_\_\_\_.
- \_\_\_\_\_. A group of different tissues that work together to carry out a particular function, e.g. heart and lungs.
- Organ system. A group of \_\_\_\_\_ that work together to complete a specific \_\_\_\_\_.

**Task:** Label the diagram below to show which three common properties are shared between these two types of cells. Label each type of cell.

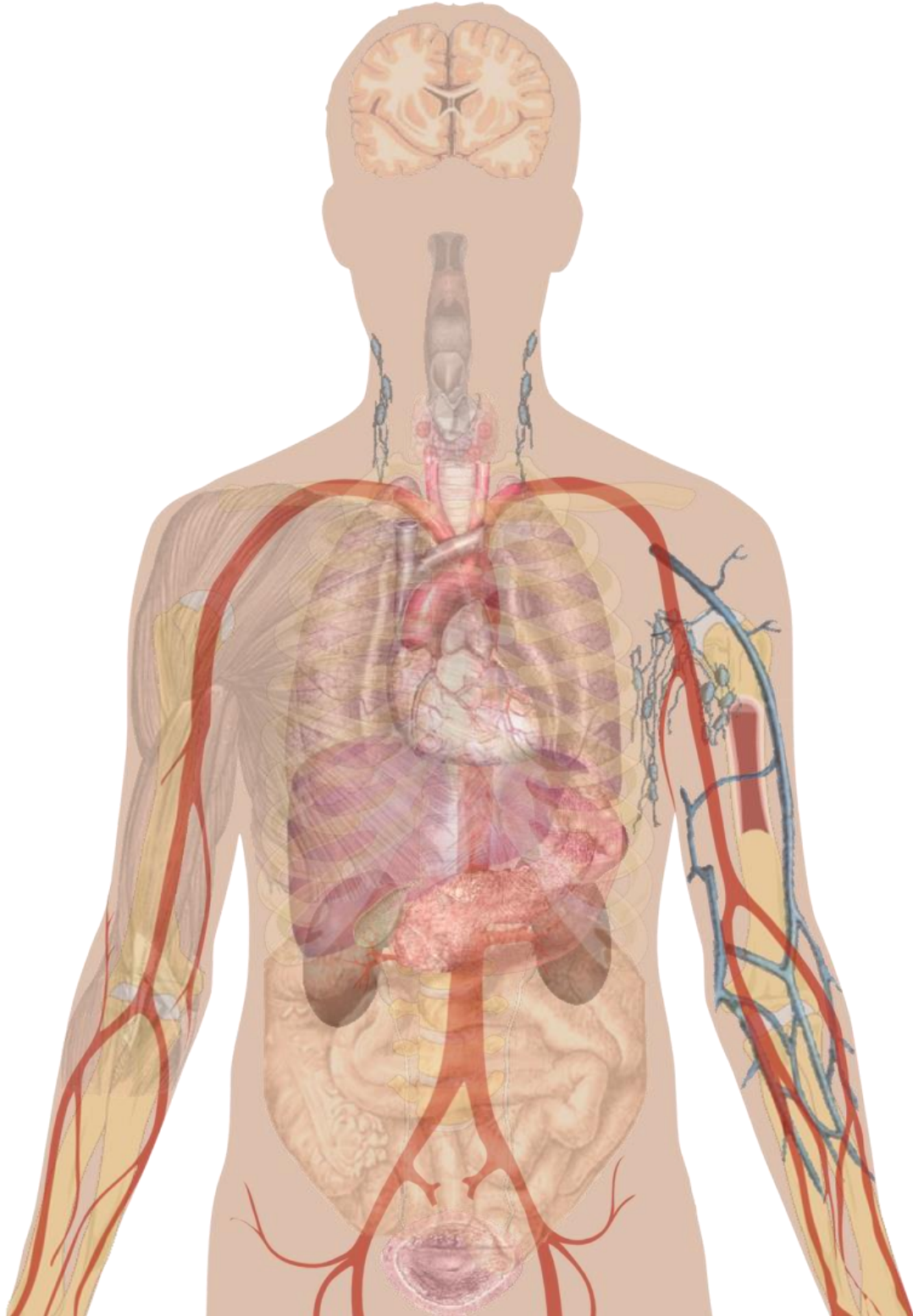


**Organs**



*A group of tissues that work together to perform a function, e.g. the heart.*

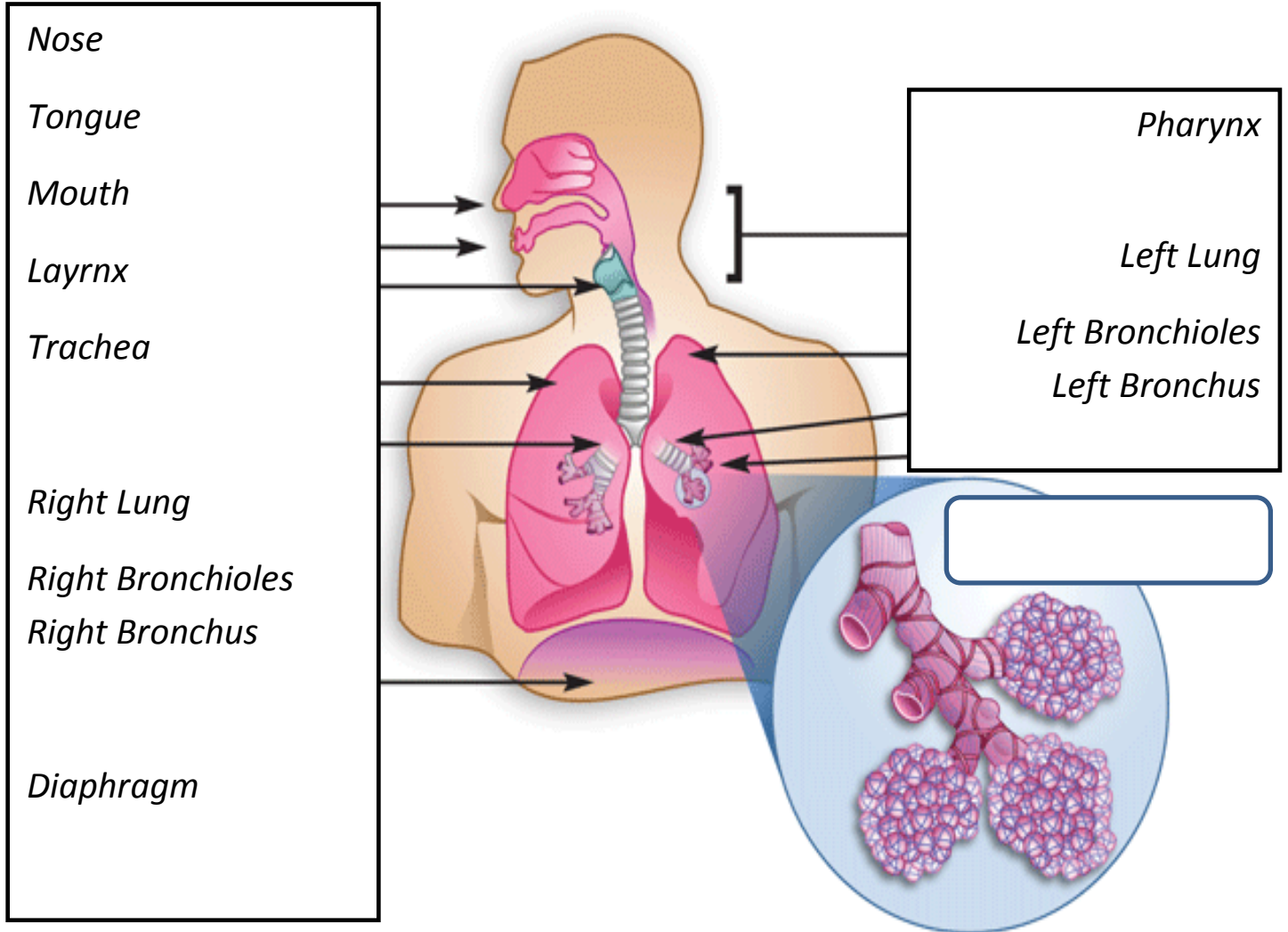
**Task:** Label the major organs on the male image below. Next to each organ, state their major function in the body.



## Organs



**Task:** Draw a line from the list of words on the left and right boxes to the corresponding part of the lungs image.



**Task:** Label the magnified view of the lung section above right.

## Organs



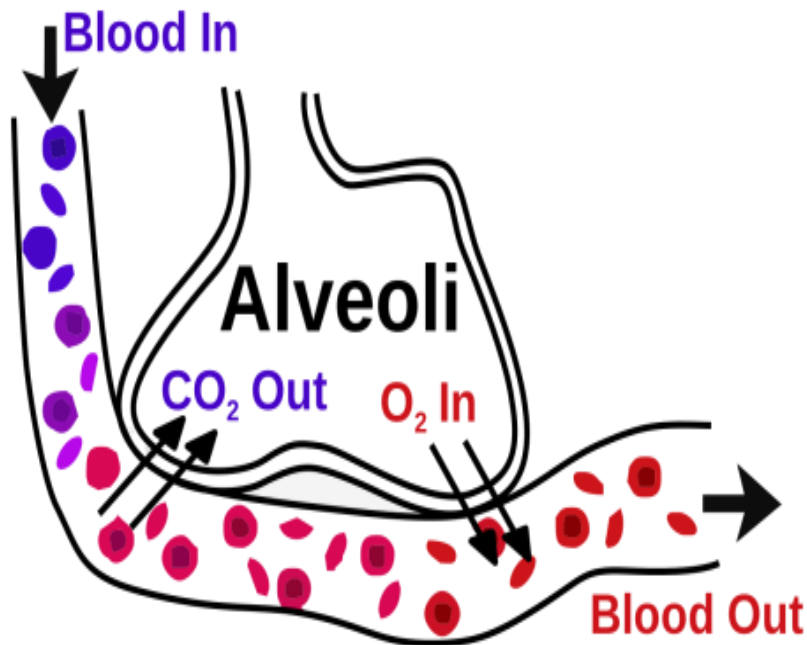
**Task:** Briefly explain how gas exchange in the alveoli occurs.

**Task:** What is the name of the gas marked  $\text{CO}_2$  in the diagram below?

\_\_\_\_\_

**Task:** What is the name of the gas marked  $\text{O}_2$  in the diagram below?

\_\_\_\_\_



## The Respiratory System



**Task:** Circle which organs which are involved in the respiratory system (breathing).

Diaphragm

Trachea

Aorta

Alveoli

Mouth

Ciliated epithelial cells

Larynx

Lungs

Bronchioles

Stomach

Heart

Nose

Oesophagus

Intercostal muscles

Bronchus

Arteries

Rib cage

## The Respiratory System

**Task:** Underline which are the odd ones out in each of these three sets, and state why.





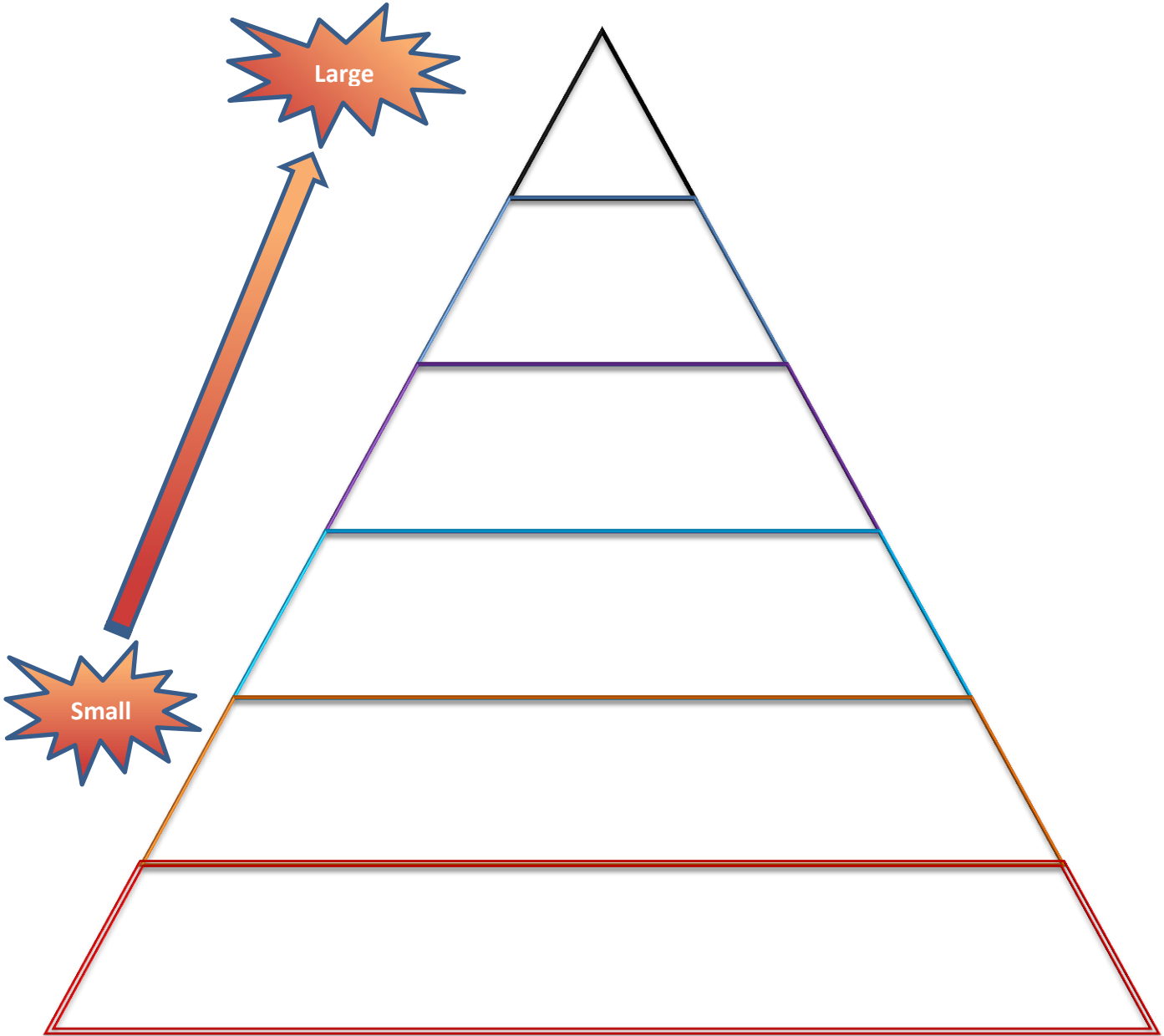
<p><b>Set one:</b></p> <ul style="list-style-type: none"><li>• Gullet</li><li>• Trachea</li><li>• Bronchiole</li></ul>	<p>Why?</p>
<p><b>Set two:</b></p> <ul style="list-style-type: none"><li>• Stomach</li><li>• Bronchi</li><li>• Alveoli</li></ul>	<p>Why?</p>
<p><b>Set three:</b></p> <ul style="list-style-type: none"><li>• Diaphragm</li><li>• Bronchiole</li><li>• intercostal muscles</li></ul>	<p>Why?</p>

## Organ Systems



**Task:** Write the words listed below on the pyramid. Put them in the correct order, so you have the *smallest structure* on the bottom and work up to the largest.

Key words: **Organism, Cell, Organelle, Tissue, Organ system and Organ.**



## Organ Systems



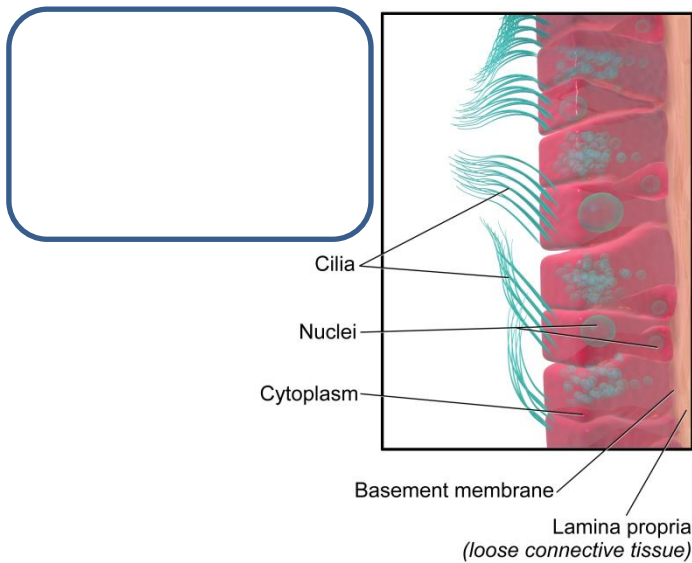
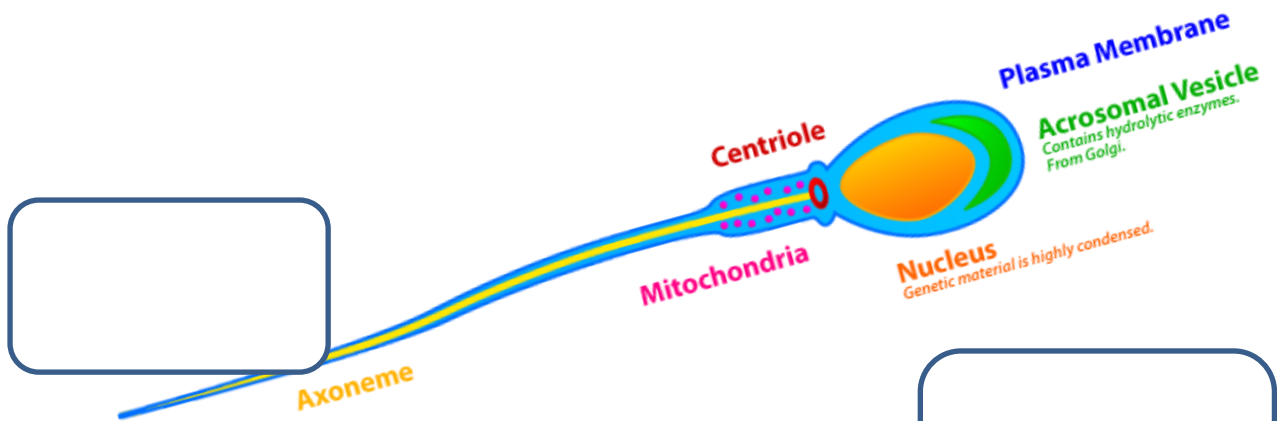
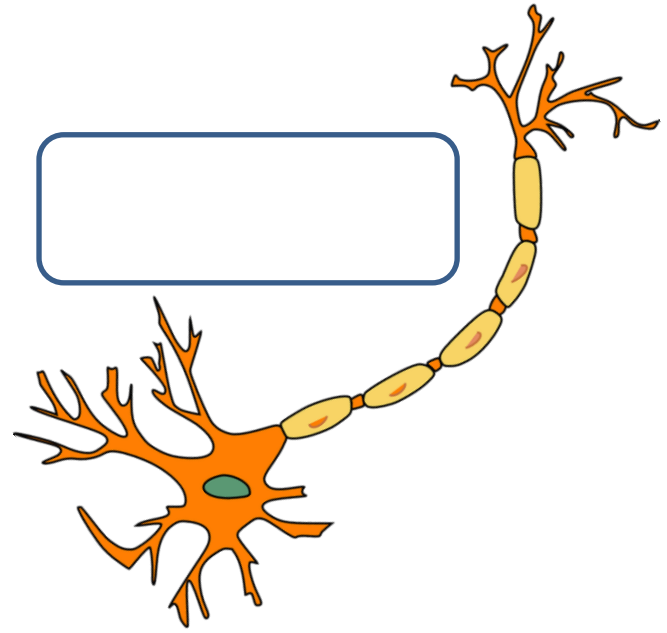
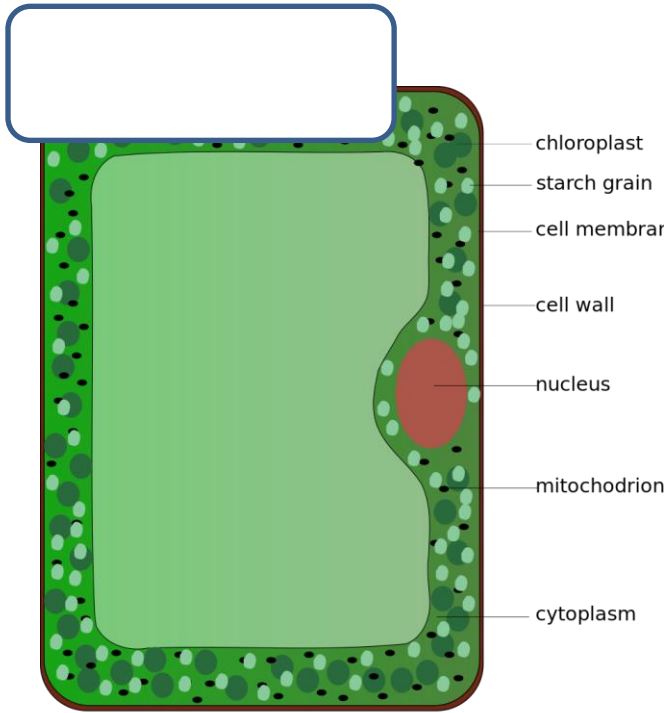
**Task:** Test your knowledge of how cells and systems work together by answering true or false to the six statements below.

Questions	True or False?
The spinal cord and brain are organs in the central nervous system?	
The circulatory system carries electrical messages around the body?	
An organelle is bigger than an organ?	
Lots of organ systems work together to make an organism?	
Tissues are made from only one type of cell?	
A cell is bigger than an organ?	

## Specialised cells



Task: Label each one of these five specialised cells.



## Specialised cells



Task: Check your knowledge of specialised cells by answering true or false to the seven statements below.

Questions	True or False?
Another name for the egg cell is the 'ovum'.	
When the filaments in muscle cells contract the muscle cell gets longer and when the filaments in the muscle cell relax the muscle cell gets shorter.	
The function of a red blood cell is to carry oxygen and carbon dioxide around the body.	
Palisade cells are found in the roots of plants.	
The neuron nerve cell has a long thin axon which makes it faster to send electrical messages around the body.	
The scientific name for a sperm cell tail is the flagellum.	
The heart is mostly made up of specialist muscle cells.	
Root hair cells form the hair on our heads.	



## Under the microscope

Task: Use the words in the box to fill in the gaps in the sentences below.

- Coverslip
- Eyepiece
- Magnified
- Microscope
- Objective
- Slide
- Specimen



- Cells need to be \_\_\_\_\_ to see them clearly. We can use a \_\_\_\_\_ to do this.
- When using a microscope, the thing we are looking at is called the \_\_\_\_\_ and it is placed on a piece of glass called a \_\_\_\_\_.
- A drop of water is also added and another thin piece of glass called a \_\_\_\_\_ is placed on top.
- The lens of the microscope that is closest to the object we want to look at is called the \_\_\_\_\_ lens. The other lens is the \_\_\_\_\_ lens.

**Task:** Label the stages of a frog's lifecycle.



**Task:** Draw out and label four distinct stages in the lifecycle of a human.

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**NOTES**

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