

# Eukaryotic and Prokaryotic Cells

**Answer the questions below.**

1. Explain how neurons are well suited for their function.

**They have long axons and dendrites so they can pass messages over long distances.**

2. Explain the difference between the coarse focusing wheel and the fine focusing wheel of a microscope.

**The coarse focusing wheel is used to roughly focus on a specimen (bring it into view) and the fine focus wheel is used to focus the image more sharply.**

3. State the word equation for aerobic respiration.

**Glucose + oxygen → carbon dioxide + water**

4. Explain why it is incorrect to say that energy is made during respiration.

**Energy is released during respiration but it cannot be created or destroyed.**

5. Name the organelles that are found in plant cells only.

**Chloroplasts, cell wall, vacuole**



# Eukaryotic and Prokaryotic Cells

B3.1.2

Science  
**Mastery**

B3.1.1 Prior Knowledge Review

➤ **B3.1.2 Eukaryotic and Prokaryotic Cells**

B3.1.3 Aseptic Technique

B3.1.4 Growth of Bacteria

B3.1.5 Microscopes

B3.1.6 Observing Cells

B3.1.7 Diffusion

B3.1.8 Diffusion in Living Things

B3.1.9 Osmosis

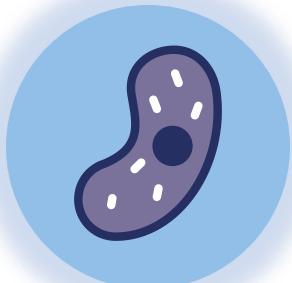
B3.1.10 Osmosis Investigation

B3.1.11 Active Transport

B3.1.12 Cell Division

B3.1.13 Cancer

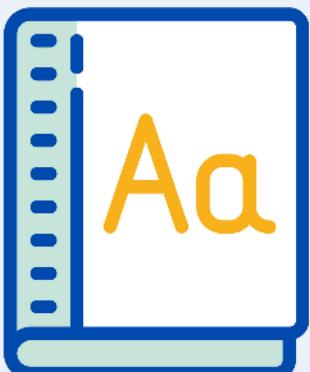
B3.1.14 Stem Cells



## Following this lesson, students will be able to:

- State examples of eukaryotic and prokaryotic cells
- Describe the differences between eukaryotic and prokaryotic cells
- Explain why prokaryotic cells do not contain mitochondria

### Key Words:



eukaryotic

prokaryotic

nucleus

ribosomes

plasmid

organelle

mitochondria

flagella

# This is the fix-it portion of the lesson

The **fix-it** is an opportunity to respond to gaps in knowledge, especially those identified by the previous lesson's exit ticket.

- The teacher should customise this slide as needed, to facilitate
  - **reteach, explanation, demonstration or modelling** of ideas and concepts that students have not yet grasped or have misunderstood.
  - **practise** answering specific questions or of key skills.
  - **redrafting** or **improving** previous work.

## Exit ticket

1. Which organelles do plant cells have but animal cells do not?  
 A. Nucleus, cell membrane, cytoplasm  
 B. Cell wall, vacuole, chloroplasts  
 C. Chloroplasts, cell membrane, nucleus
2. Which is the best explanation of the function of a microscope?  
 A. To make small objects easier to view  
 B. To see objects that are very far away  
 C. To make big objects seem smaller
3. Which statement has the cell organelle correctly matched with its function?  
 A. Cell wall, controls what enters and leaves the cell  
 B. Chloroplast, absorbs sunlight for respiration  
 C. Nucleus, controls cell activities and contains genetic information

# Eukaryotic Cells

There are two types of cell – eukaryotic and prokaryotic.

Eukaryotic cells contain **genetic material** (DNA) within their **nucleus**.

**Plant** and **animal** cells are eukaryotic.

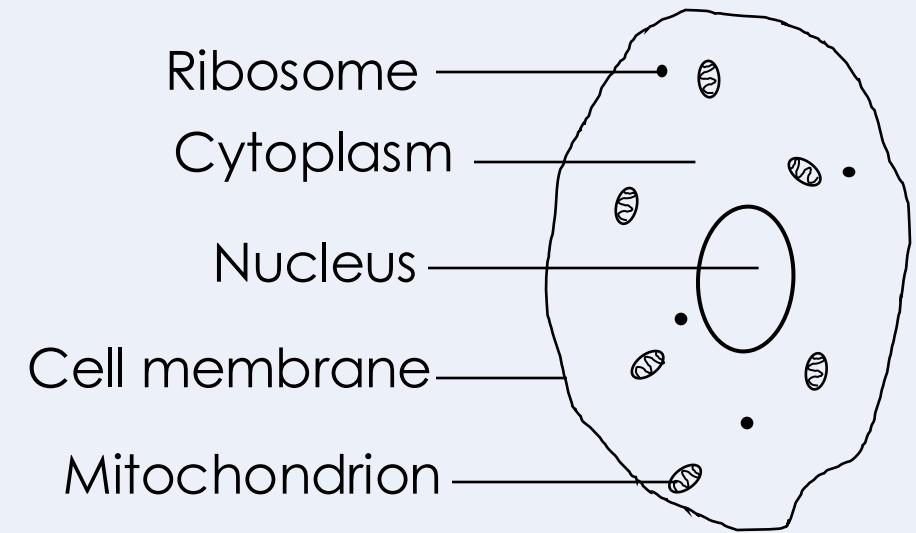
An **organelle** is a part of a cell that carries out a specific function.

The organelles in eukaryotic cells are contained within membranes.

Eukaryotic cells usually contain **mitochondria** to release energy for the cell through aerobic respiration.

Eukaryotic cells also contain **ribosomes** which are the site of protein synthesis.

Eukaryotic cells are typically between **10-100 µm** in size.



# Prokaryotic Cells

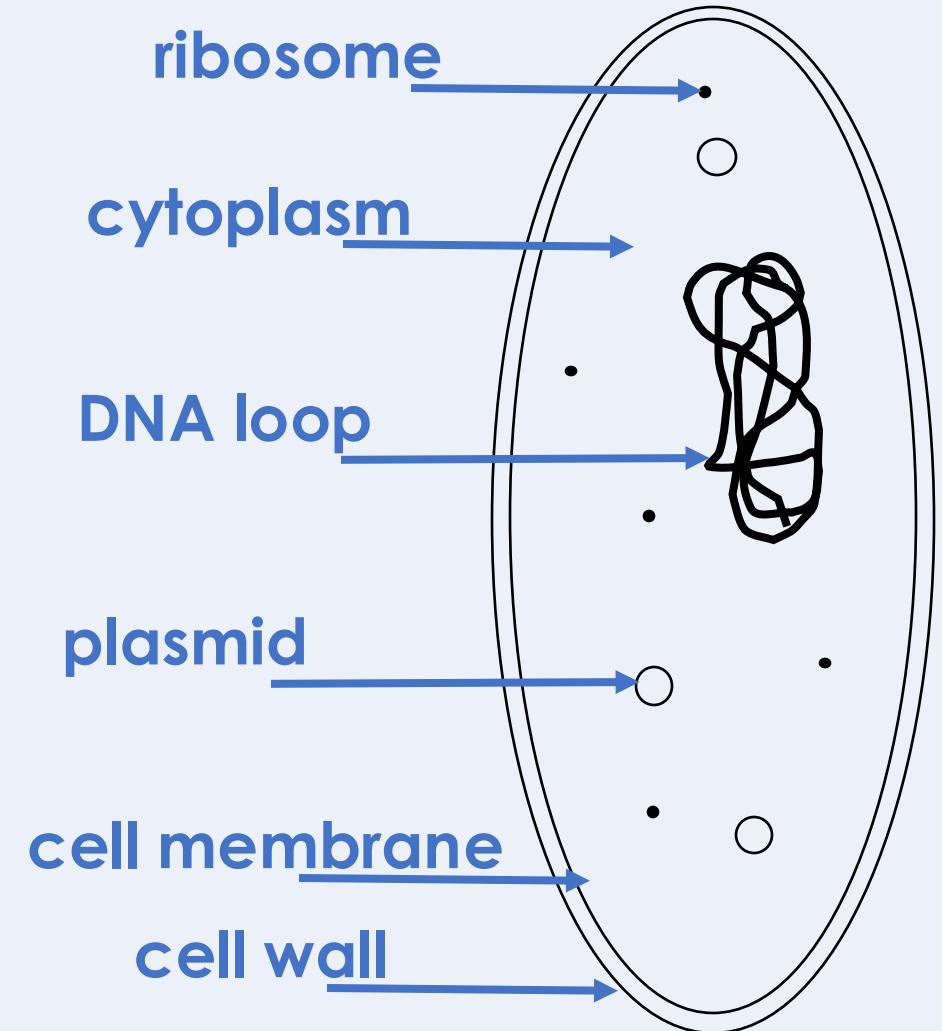
Bacterial cells are prokaryotic

Prokaryotic cells **do not** contain a **nucleus** or **membrane-bound** organelles

Prokaryotic cells are much smaller than eukaryotic cells, typically **1-10 µm** in size

Prokaryotic cells contain **genetic material** (DNA) in small rings called **plasmids**, or in larger loops

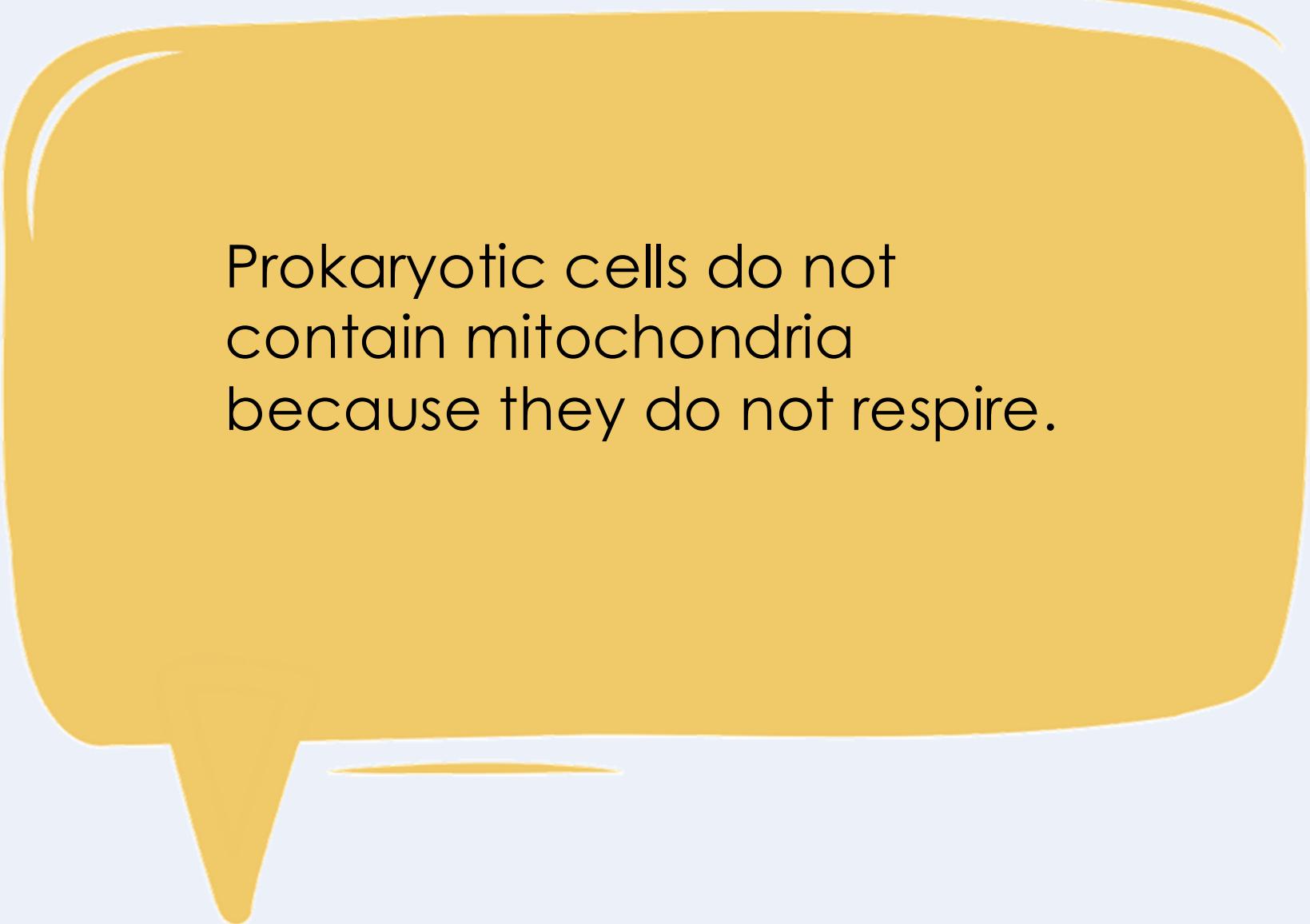
Both eukaryotic and prokaryotic cells contain **ribosomes**, which make proteins for the cell



## **State whether each statement is true or false.**

1. Eukaryotic cells are bigger than prokaryotic cells **True**
2. Prokaryotic cells contain their genetic information in a nucleus **False**
3. Bacteria are prokaryotic cells **True**
4. Plant cells are prokaryotic cells **False**
5. Eukaryotic cells can contain mitochondria to provide energy through aerobic respiration **True**

## Is this correct?



Prokaryotic cells do not contain mitochondria because they do not respire.

## Drill

1. Where is the genetic material in eukaryotic cells found?
2. Where is the genetic material in prokaryotic cells found?
3. Which type of cell contains membrane-bound organelles?
4. What type of cell is a *Salmonella* bacterium?
5. What is the function of ribosomes in both prokaryotic and eukaryotic cells?
6. Which type of cell is larger, a eukaryote or prokaryote?
7. Name the cell structure in a eukaryotic cell where aerobic respiration takes place.
8. Give one difference between the structure of a bacterial cell and an animal cell.
9. Apart from a nucleus, what other membrane bound organelles would not be present in a prokaryote?

## Drill answers

1. Enclosed within the nucleus
2. Floating freely in the cytoplasm
3. Eukaryotic cells
4. Prokaryote
5. Ribosomes make proteins for the cell
6. Eukaryote
7. Mitochondria
8. Bacteria cell has cell wall / no nucleus / no mitochondria / plasmids present/ its DNA / genetic material is not enclosed / it has no nuclear membrane or converse.
9. Chloroplast, mitochondria

Check for understanding

# I: Describing the function of organelles

Example question:

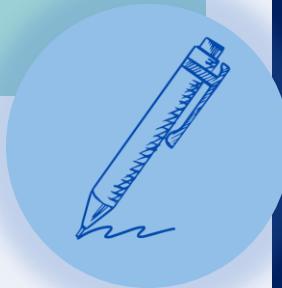
**Describe** the difference in respiration between eukaryotic and prokaryotic cells.

Model answer:

- In eukaryotic cells, respiration takes place in the mitochondria
- Prokaryotic cells do not contain any membrane-bound organelles, so there are no mitochondria. In prokaryotes, respiration occurs in the cytoplasm.

To 'describe', your answer should:

- Use **bullet points** to keep your answer clear
- Cover enough points to **fully answer** the question
- Use scientific **keywords** in your answer
- '**Say what you see**' if there is a diagram, graph or table.



# We: Comparing structural differences

Example question:

**Describe** the difference in genetic material between eukaryotic and prokaryotic cells

Model answer:

- In eukaryotic cells, the **genetic material** is within their **nucleus**
- Prokaryotic cells do not have a **nucleus**. The genetic material is found in small rings called **plasmids, or in larger loops.**

To ‘compare’, your answer should:

- Give **similarities**.
- Write **paired statements** that **show differences relating to the same feature**.
- Use the term ‘**whereas**’ to link your statements.

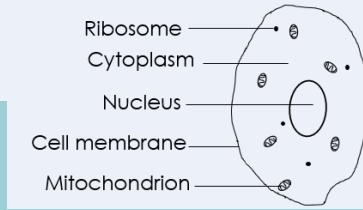
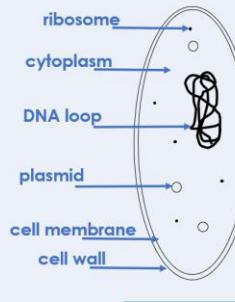
# You: Describing differences

Example question:

**Describe** the differences between eukaryotic and prokaryotic cells

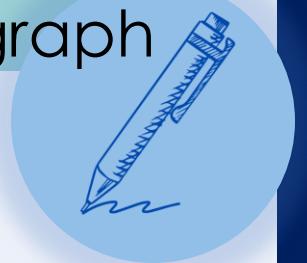
Model answer (any of the following):

- Prokaryotic cells do not have a nucleus, whereas eukaryotic cells do
- Prokaryotes do not contain mitochondria (or any membrane bound organelles), but eukaryotes do
- Prokaryotes do not have a nucleus, but eukaryotes do have a nucleus
- Prokaryotes have plasmids (or small rings of DNA), eukaryotes do not
- Prokaryotic cells are smaller than eukaryotic cells (or converse)



To ‘describe’, your answer should:

- Use **bullet points** to keep your answer clear
- Cover enough points to **fully answer** the question
- Use scientific **keywords** in your answer
- **‘Say what you see’** if there is a diagram, graph or table.



## Answer the questions below.

1. Which of these is an example of a prokaryotic cell?  
 A. Animal cell  
 B. Plant cell  
 C. Bacterial cell
  
2. What is the relative size of eukaryotic cells and prokaryotic cells?  
 A. Prokaryotic cells are larger than eukaryotic cells  
 B. Eukaryotic cells are larger than prokaryotic cells  
 C. Prokaryotic cells and eukaryotic cells are roughly the same size
  
3. What is the difference between eukaryotic and prokaryotic cells?  
 A. Eukaryotic cells contain DNA within a nucleus, prokaryotic cells contain DNA in loops and plasmids  
 B. Eukaryotic cells contain DNA in loops and plasmids, prokaryotic cells contain DNA within a nucleus  
 C. Prokaryotic cells contain mitochondria to provide them with energy so they can move

## Lesson B3.1.2

What was good about this lesson?

What can we do to improve this lesson?

[Send us your feedback by clicking this link](#)  
or by emailing [sciencemastery@arkonline.org](mailto:sciencemastery@arkonline.org)  
Thank you!