Cell Division

Answer the questions below.

1. Arrange the following in increasing size order: cell, DNA, nucleus. From smallest to largest.

   DNA, nucleus, cell

2. Explain why new cells have to be made.

   For growth and to replace damaged or lost cells.

3. Explain the difference between unicellular and multicellular organisms.

   Unicellular organisms are made up of one cell only whereas multicellular organisms can be made up of any number of cells.

4. State the location of genetic material in eukaryotic cells.

   Nucleus

5. Many species of animals and plants have chromosomes in pairs. Explain why this is.

   They inherit one chromosome from each pair from each parent.

Do Now

Cell Division

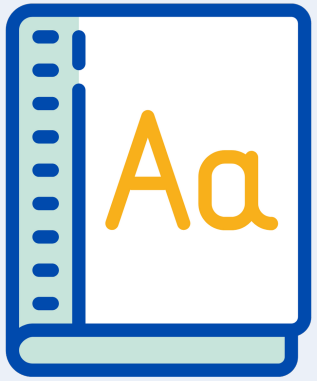
B3.1.12

Science
Mastery

Following this lesson, students will be able to:

- State the three stages of the cell cycle
- Describe how cells divide to produce two identical daughter cells
- Explain the importance of the growth phase of cell division

Key Words:



cell division **mitosis** **chromosome**

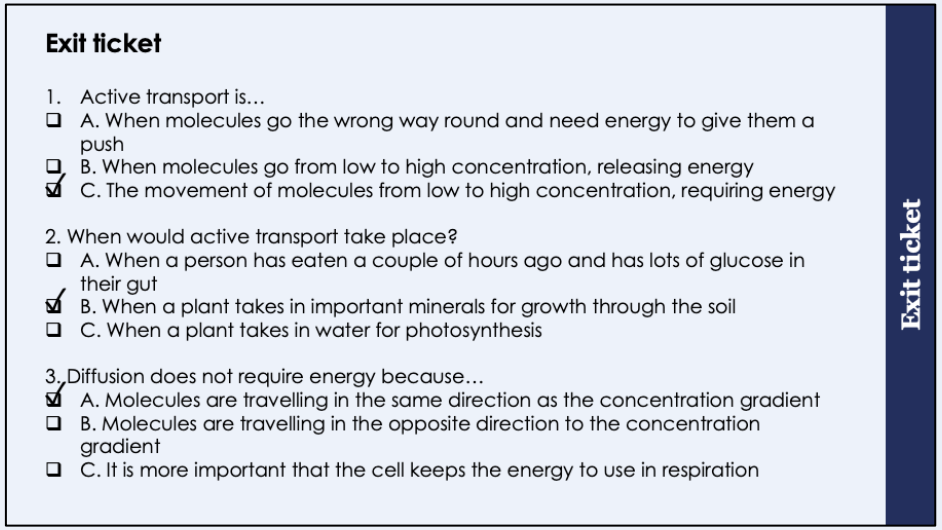
daughter cells **asexual**

Lesson Objectives

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. Active transport is…
   - ☐ A. When molecules go the wrong way round and need energy to give them a push
   - ☐ B. When molecules go from low to high concentration, releasing energy
   - ☑ C. The movement of molecules from low to high concentration, requiring energy

2. When would active transport take place?
   - ☐ A. When a person has eaten a couple of hours ago and has lots of glucose in their gut
   - ☑ B. When a plant takes in important minerals for growth through the soil
   - ☐ C. When a plant takes in water for photosynthesis

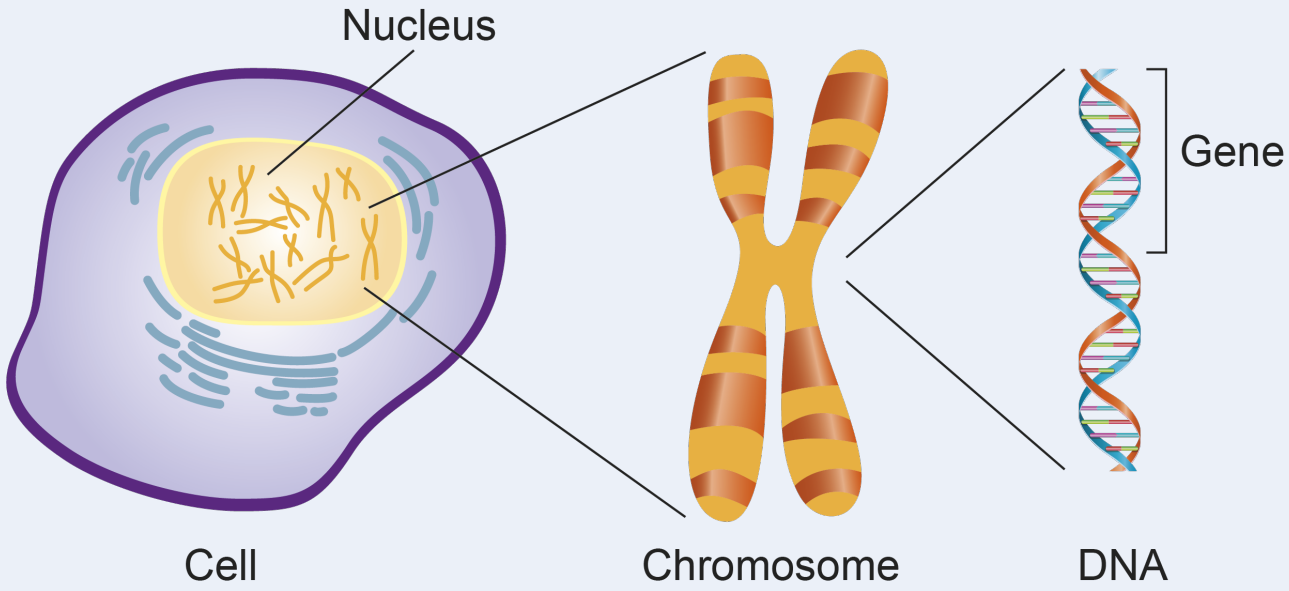
3. Diffusion does not require energy because…
   - ☑ A. Molecules are travelling in the same direction as the concentration gradient
   - ☐ B. Molecules are travelling in the opposite direction to the concentration gradient
   - ☐ C. It is more important that the cell keeps the energy to use in respiration

Exit ticket

Fix-it

What is in the nucleus?

The nucleus consists of chromosomes and their genes which are made of a molecule called **DNA**.



A **gene** is a small section of DNA that controls a characteristic of your body (e.g. eye colour). Different versions of genes are called **alleles.**

The genes are grouped together on **chromosomes** (there may be thousands of genes on one chromosome).

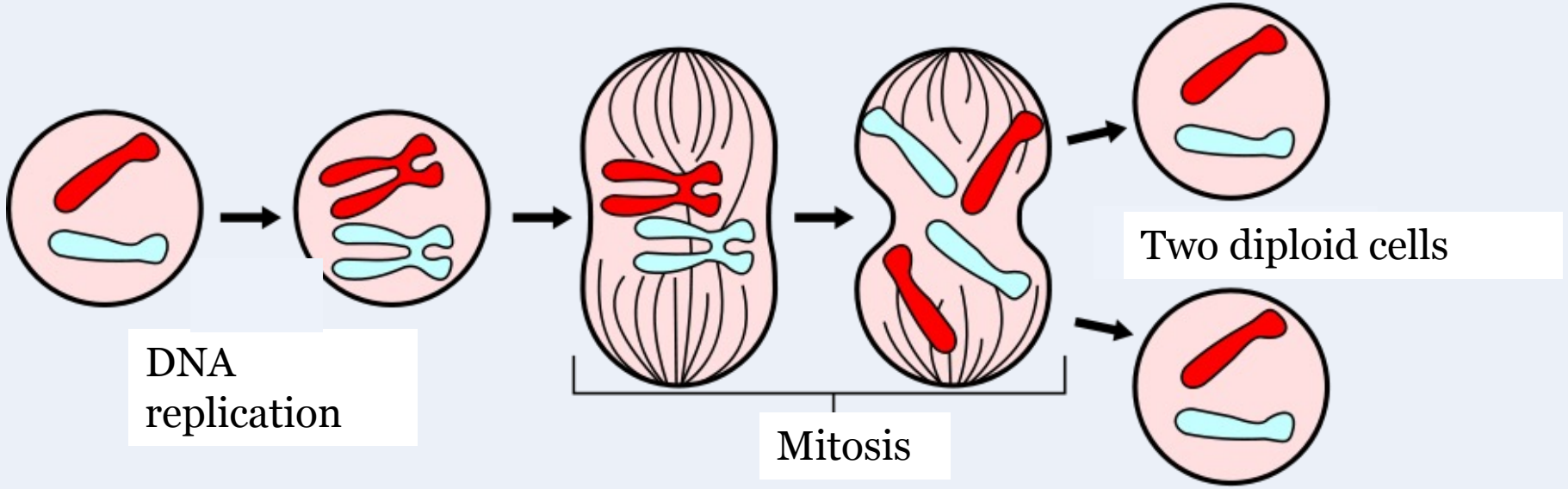
Cell Division

Cell division is used by multicellular organisms to **grow and repair.**

It is also used by organisms that **reproduce asexually**, such as bacteria.

Cells increase in number by dividing into 2.

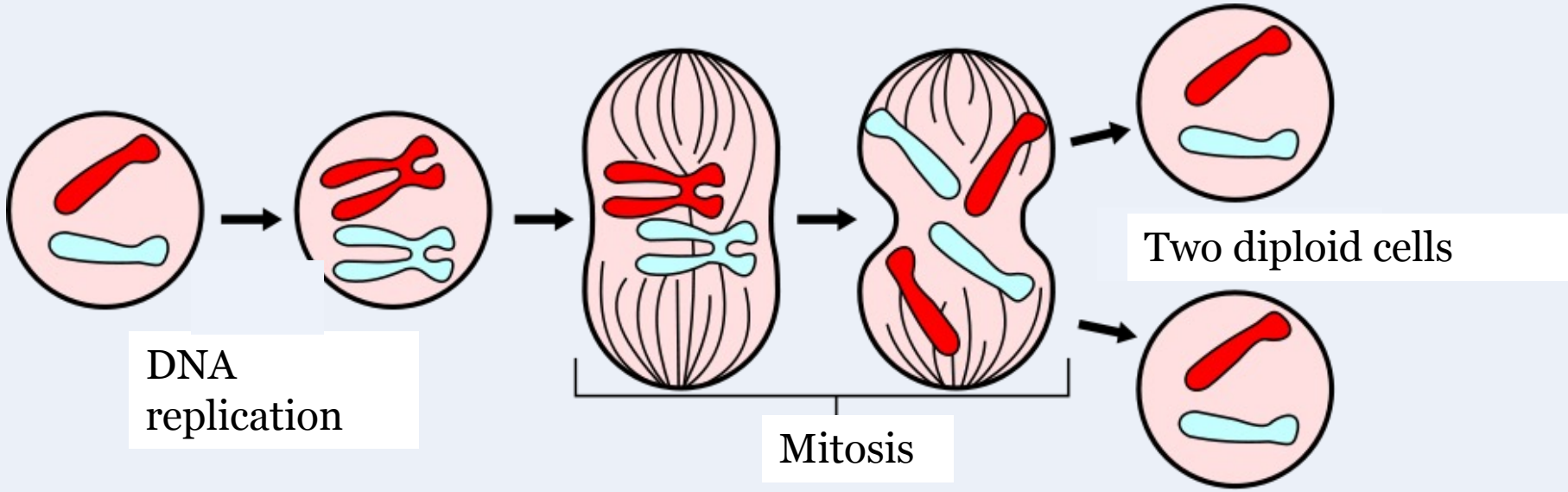
The process of cell division includes a growth phase, where the cell **doubles its sub-cellular structures** and **DNA**, before it splits in two



Cell Division

After the growth phase where DNA has been replicated the **chromosomes** are **pulled apart** to separate ends of the cell, ready for division

The final part of the cell cycle is the splitting of the **cell membrane** to produce **two identical cells**



Determine whether each statement is true or false.

1. Cell division with mitosis is used by multicellular organisms to reproduce asexually **False**

2. During mitosis DNA is replicated **False**

3. At the end of cell division with mitosis four identical cells are produced **False**

4. Cell division with mitosis can be used for growth and repair **True**

5. The cells produced at the end of cell division with mitosis have half the number of chromosomes as the original cell. **False**

Check for understanding

Which statements do you agree with?

I think that chromosomes are pulled to opposite ends of the cell during mitosis

I think that unicellular organisms use mitosis to replace damaged cells

I think that DNA is replicated during mitosis

I think that the growth phase is important so that the two daughter cells have the same amount of DNA as the parent cell

Talk Task

Drill

1. Define a gene.
2. State where in the cell genes are found.
3. Explain why cell division is important for multicellular organisms.
4. State how many daughter cells are made from cell division of one cell.
5. State one change to the DNA that occurs at the start of cell division.
6. State if the daughter cells are identical or non-identical.
7. State the number of chromosomes in a normal human cell.
8. State the number of chromosomes in a human cell produced from mitotic cell division.

Check for understanding

Drill answers

1. A gene is a small section of DNA that controls a characteristic of your body (e.g. eye colour). Different versions of genes are called alleles.
2. The nucleus
3. Growth and repair
4. Two cells
5. DNA replication
6. Identical
7. 46
8. 46

Check for understanding

I: Describe *to recall facts, events or processes in an accurate way*

Example question:

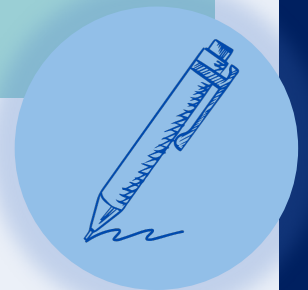
Describe the cells produced of mitotic cell division.

Model answer:

- Two genetically identical daughter cells
- Each containing the same number of chromosomes as the parent cell

To 'describe', your answer should:

- Use **bullet points.**
- Include each step of the process in a **logical order.**
- Use **keywords** throughout the answer
- Stay **focused** on the question.



Writing like a scientist

We: Describe *to recall facts, events or processes in an accurate way*

Example question:

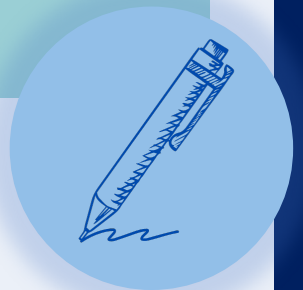
Describe what mitotic cell division is used for.

Model answer:

- In multicellular organisms it is used for growth and repair
- In unicellular organisms it is used for asexual reproduction

To 'describe', your answer should:

- Use **bullet points.**
- Include each step of the process in a **logical order.**
- Use **keywords** throughout the answer
- Stay **focused** on the question.



Writing like a scientist

You: Describe *to recall facts, events or processes in an accurate way*

Example question:

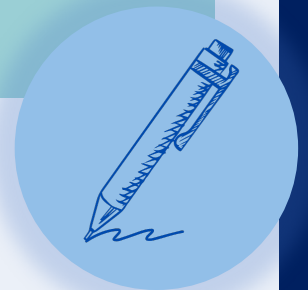
Describe the process of mitotic cell division.

Model answer:

- DNA replicates
- Chromosomes are pulled apart
- Cell membrane divides to produce two identical cells

To 'describe', your answer should:

- Use **bullet points.**
- Include each step of the process in a **logical order.**
- Use **keywords** throughout the answer
- Stay **focused** on the question.



Answer the questions below.

1. Mitosis is…

- ☐ A. the process of making new cells
- ☑ B. the process of cells dividing their genetic material to make two new cells
- ☐ C. the process of cells replicating their DNA and sub-cellular structures

2. Which is a stage of cell division?

- ☑ A. Replication of DNA and sub-cellular structures
- ☐ B. One cell being replaced by a newer cell
- ☐ C. A cell producing two new cells alongside it

3. Which best describes the cells that are produced at the end of cell division with mitosis?

- ☐ A. Two daughter cells with half the number of chromosomes as the original cell
- ☑ B. Two daughter cells with the same number of chromosomes as the original cell
- ☐ C. One daughter cell with double the number of chromosomes as the original cell

Exit ticket

Feedback

Lesson B3.1.12	
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
Thank you!