

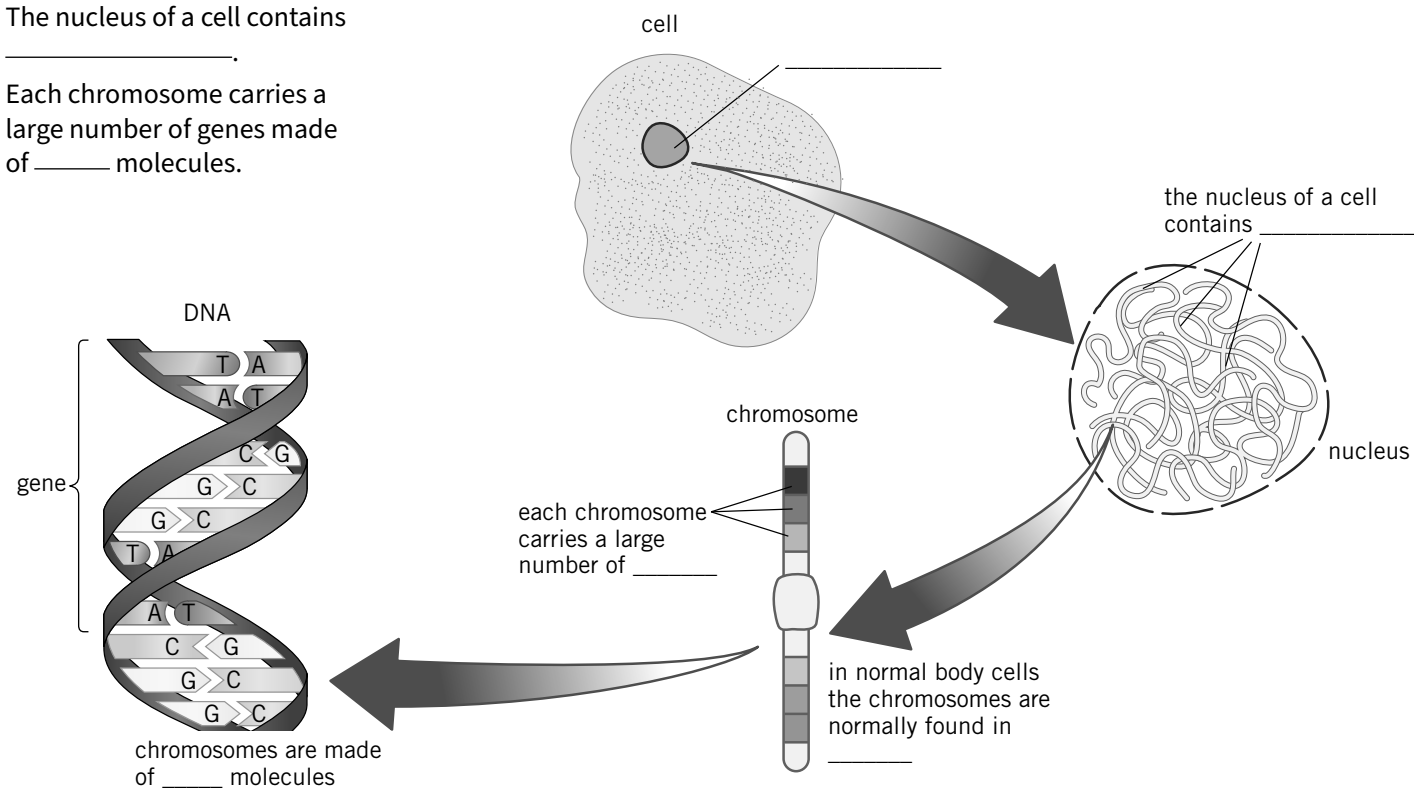
# Chapter 2: Cell division

## Knowledge organiser

### Chromosomes

The nucleus of a cell contains \_\_\_\_\_.

Each chromosome carries a large number of genes made of \_\_\_\_\_ molecules.



### Stem cells in medicine

A stem cell is an undifferentiated cell that can develop into one or more types of \_\_\_\_\_ cell.

There are two types of stem cell in \_\_\_\_\_: **adult stem cells** and \_\_\_\_\_ **stem cells**.

Stem cells can be \_\_\_\_\_ to produce large numbers of identical cells. Complete the table.

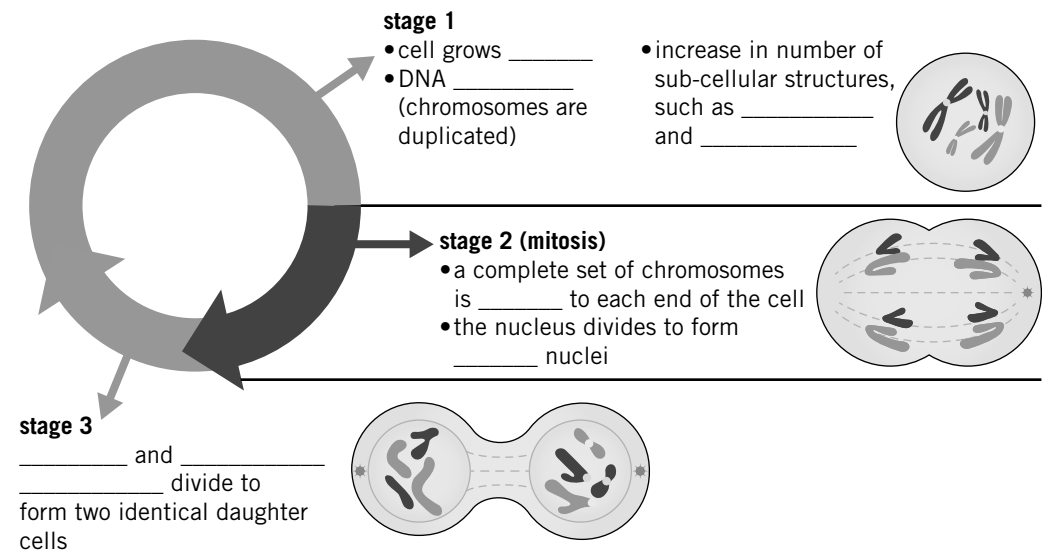
Type of stem cell	Where are they found?	What can they differentiate into?	Advantages	Disadvantages
adult stem cells			<ul style="list-style-type: none"><li></li><li></li><li></li></ul>	<ul style="list-style-type: none"><li></li><li></li></ul>
embryonic stem cells			<ul style="list-style-type: none"><li></li><li></li><li></li></ul>	<ul style="list-style-type: none"><li></li><li></li><li></li></ul>
plant meristem			<ul style="list-style-type: none"><li></li><li></li><li></li></ul>	<ul style="list-style-type: none"><li></li></ul>

### The cell cycle

Body cells divide to form \_\_\_\_\_ identical **daughter cells** by going through a series of stages known as the **cell cycle**.

Cell division by \_\_\_\_\_ is important for the growth and \_\_\_\_\_ of cells, for example, the replacement of skin cells. Mitosis is also used for \_\_\_\_\_ reproduction.

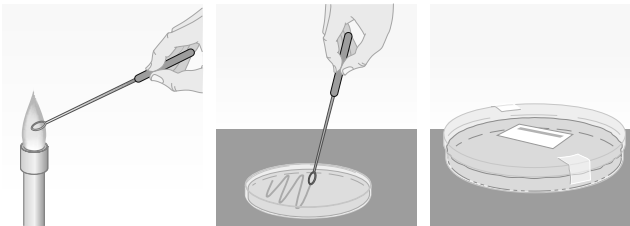
There are *three* main stages in the cell cycle:



### Binary fission

Cell division in \_\_\_\_\_ is called binary fission. In optimum \_\_\_\_\_ and \_\_\_\_\_, bacteria can multiply as often as every 20 minutes. In a lab, bacteria can be grown in \_\_\_\_\_ conditions on an agar gel plate or in a nutrient broth.

The lid of the petri dish must be sealed but not all the way so that \_\_\_\_\_ can still get in. This is so that harmful \_\_\_\_\_ that do not need oxygen aren't able to grow.



### Therapeutic cloning

In **therapeutic cloning**

- cells from a patient's own body are used to create a cloned early \_\_\_\_\_ of themselves
- stem cells from this embryo can be used for medical treatments and growing new \_\_\_\_\_
- these stem cells have the same genes as the patient, so are less likely to be \_\_\_\_\_ when transplanted.

#### Key terms

Make sure you can write a definition for these key terms.

adult stem cell	binary fission	cell cycle
chromosome	clone	daughter cells
gene	meristem	embryonic stem cell
	mitosis	therapeutic cloning
	nucleus	

# Chapter 2: Cell division

## Retrieval questions

Answer the following questions using the information from the knowledge organiser.

B2 questions		Answers
1	What is a stem cell?	
2	What are adult stem cells?	
3	Where can adult stem cells be found?	
4	What are embryonic stem cells?	
5	Where are embryonic stem cells found?	
6	What is therapeutic cloning?	
7	Give one advantage of using therapeutic cloning.	
8	Give one advantage of using adult stem cells.	
9	Give two disadvantages of using adult stem cells.	<ul style="list-style-type: none"><li></li></ul>
10	Give two advantages of using embryonic stem cells.	<ul style="list-style-type: none"><li></li><li></li></ul>
11	Give two disadvantages of using embryonic stem cells.	<ul style="list-style-type: none"><li></li><li></li></ul>
12	What are plant meristems?	
13	Give two advantages of using plant meristems to clone plants.	<ul style="list-style-type: none"><li></li><li></li></ul>
14	Give one disadvantage of using plant meristems to clone plants.	
15	What is cell division by mitosis?	
16	What is the purpose of mitosis?	
17	What happens during the first stage of the cell cycle?	
18	What happens during mitosis?	
19	What happens during the third stage of the cell cycle?	
20	What is the term for cell division in bacteria?	