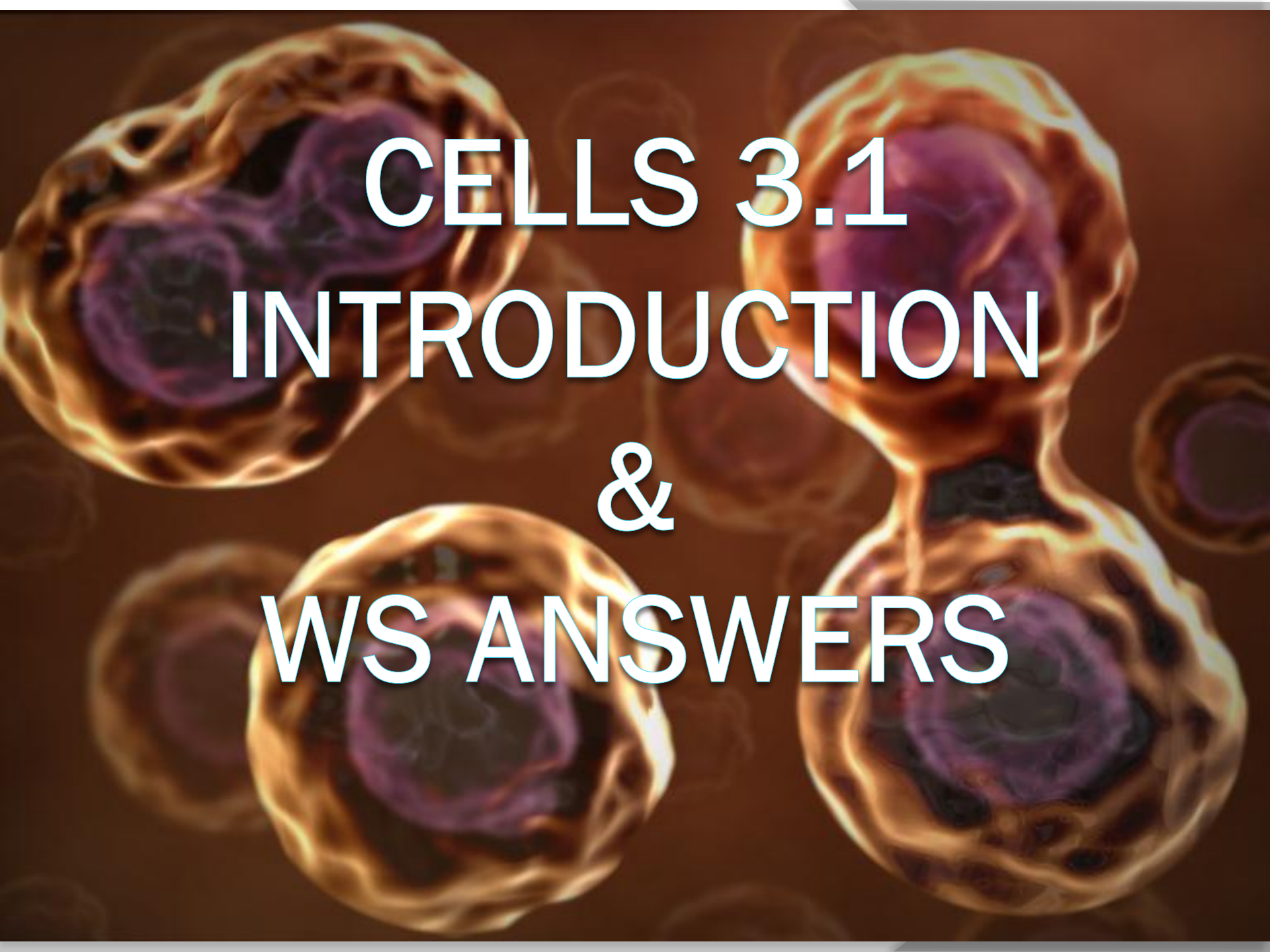
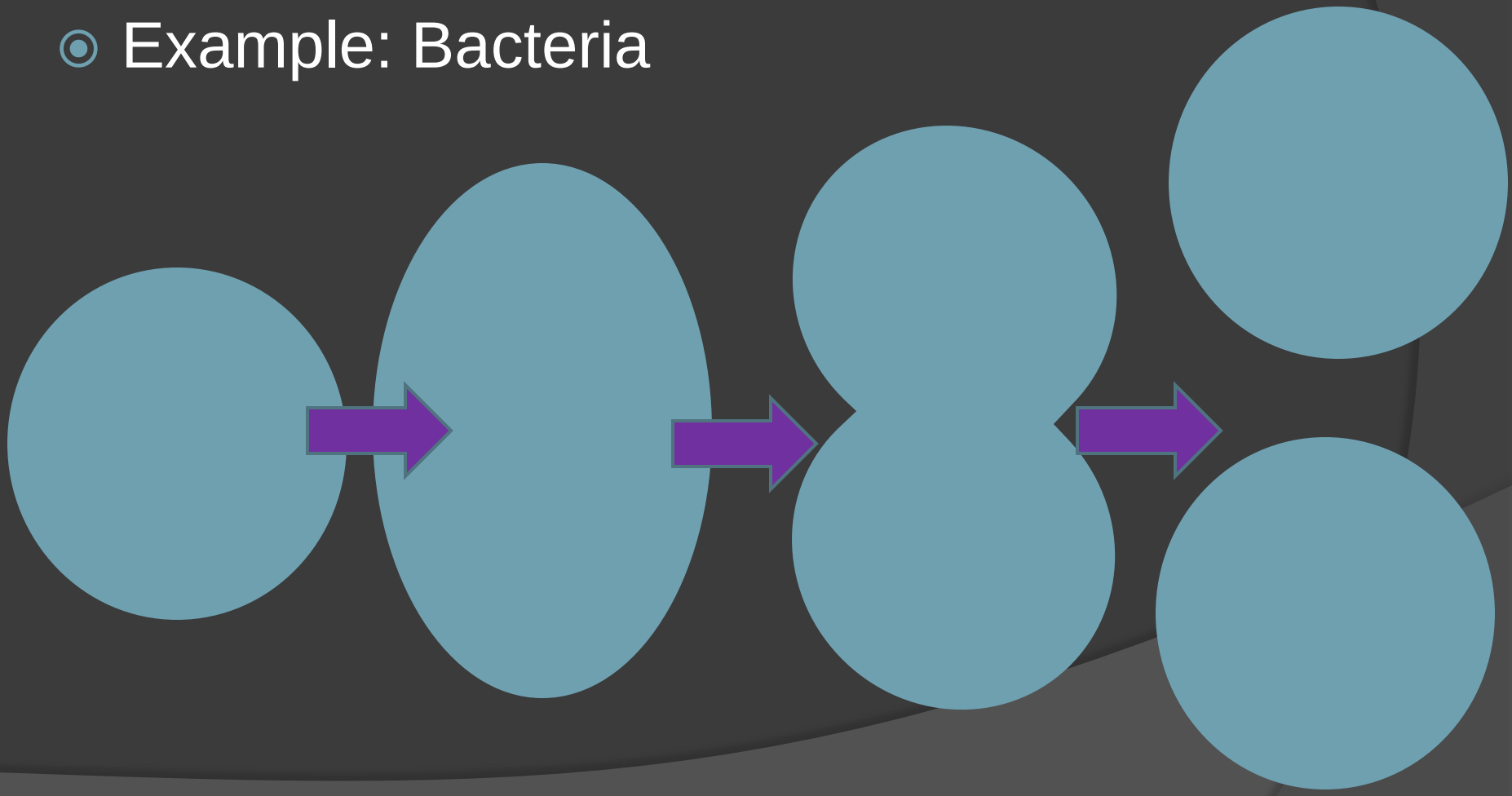

CELLS 3.1
INTRODUCTION
&
WS ANSWERS

A bit of review...

- **Multicellular** (2 or more cells) organisms are made up of eukaryotic cells.
  - Most genetic material in eukaryotic cells is contained in the nucleus.
- **Unicellular** (one-celled) organisms are made up of prokaryotic cells.
  - The genetic material in prokaryotic cells is contained in the cytoplasm because prokaryotic cells do not have organelles, including nuclei.

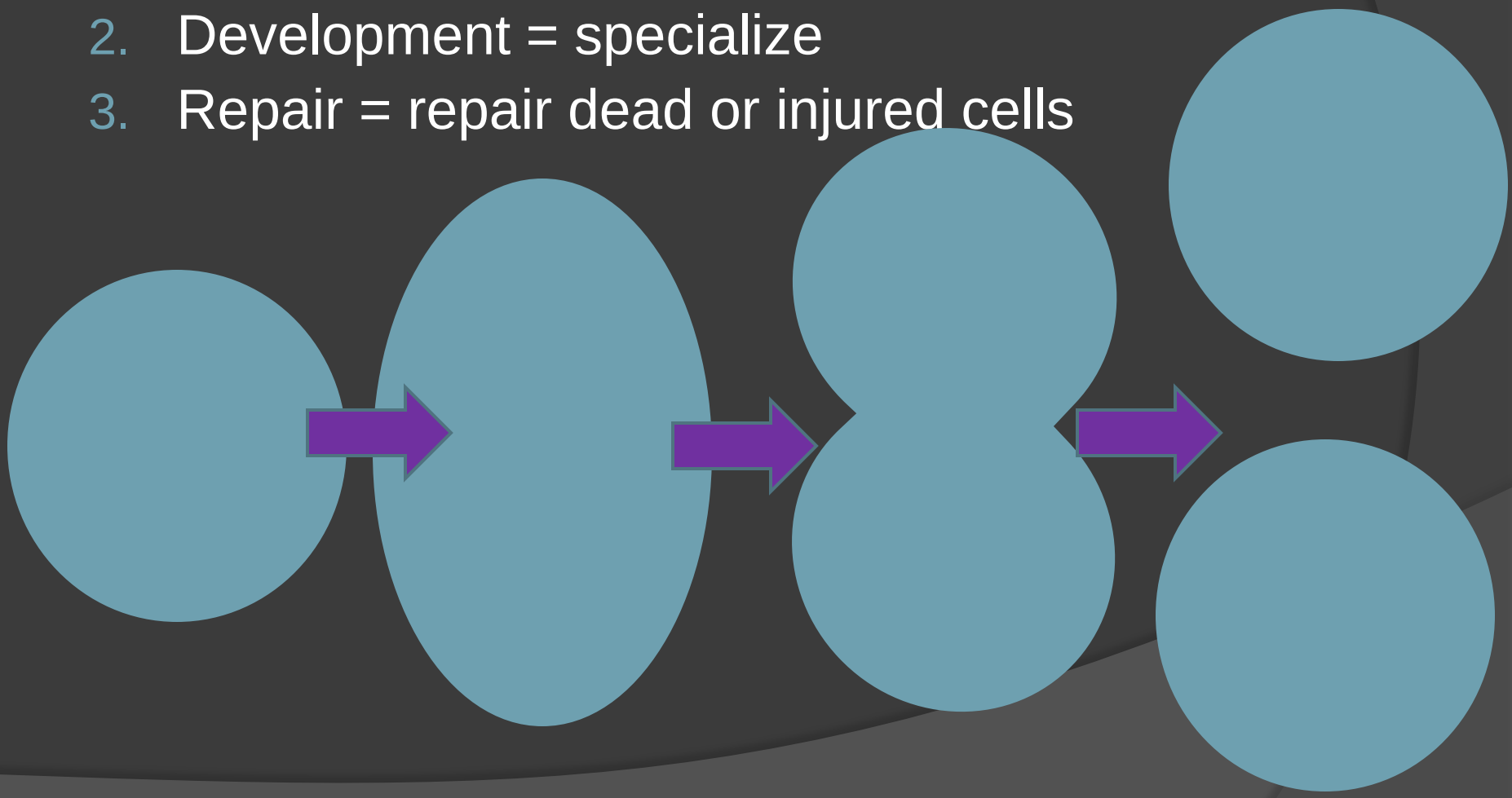
Unicellular

- Goal: Reproduction; make more organisms
- Example: Bacteria



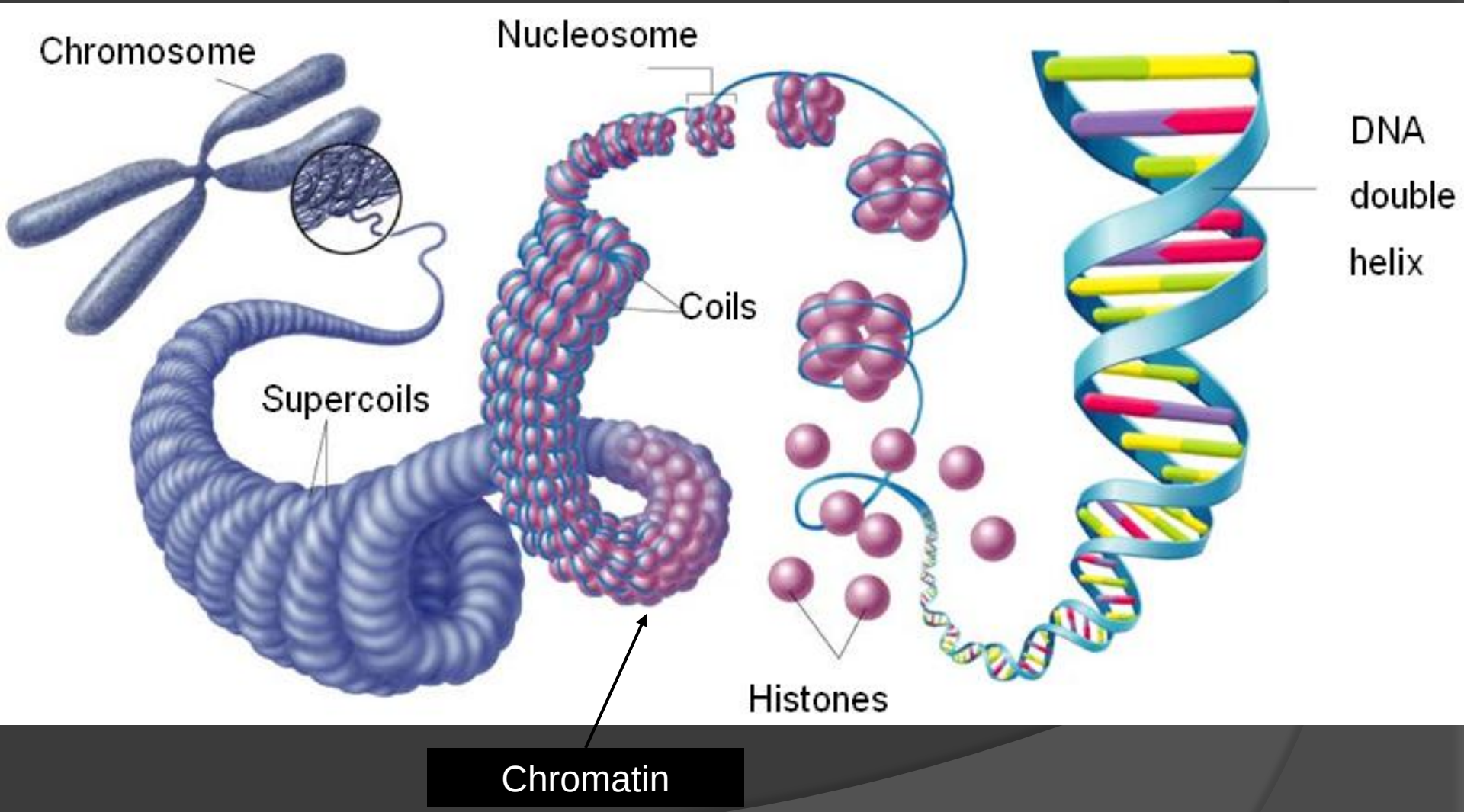
Multicellular

- Goal:
  1. Growth = make more
  2. Development = specialize
  3. Repair = repair dead or injured cells



The genetic material of eukaryotic cells is organized in chromosomes. (p. 74)

The Chromosome



DNA

- The genetic material of a cell contains information needed for the cell's growth and other activities. When a cell divides into two new cells, each cell receives a full set of genetic material. Most of the genetic material in cells is contained in a molecule called **DNA**. (p. 74)
- The genetic material in cells is DNA. What does DNA stand for?

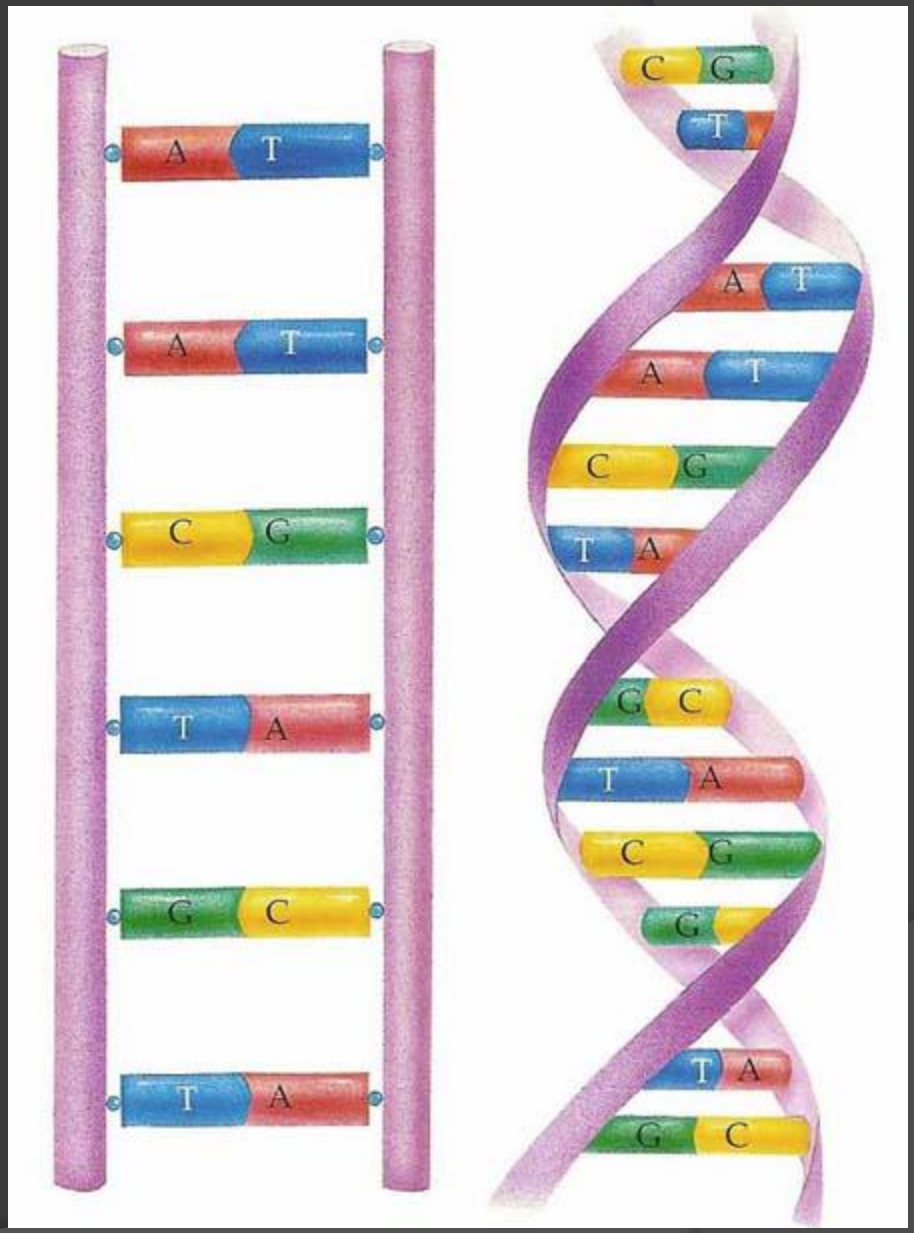
  deoxyribonucleic acid (p. 74)

DNA

- Definition: **DNA is a chemical that contains information for an organism's growth and functions.**
  - **It is the genetic material for the cell.**
- **Back of the book definition: The genetic material found in all living cells that contains the information needed for an organism to grow, maintain itself, and reproduce. (R61)**

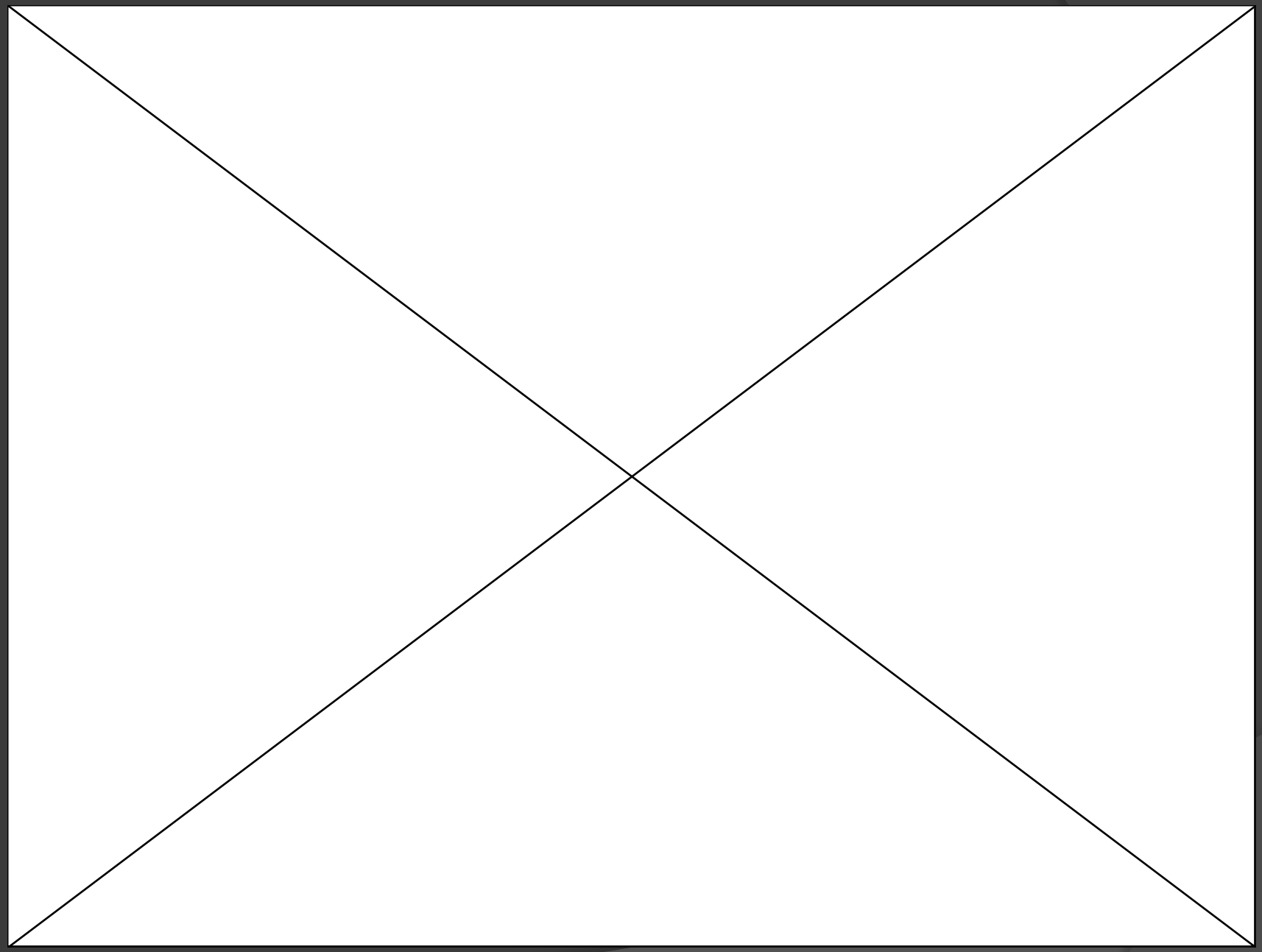
DNA

- **DNA is made of two strands of molecules joined in a structure that <u>resembles a twisted ladder or a double helix</u>. There are two strands that have "rungs" to connect the two strands. The rungs are like the steps of the ladder.**



Steps that DNA goes through to form chromosomes (p. 75)

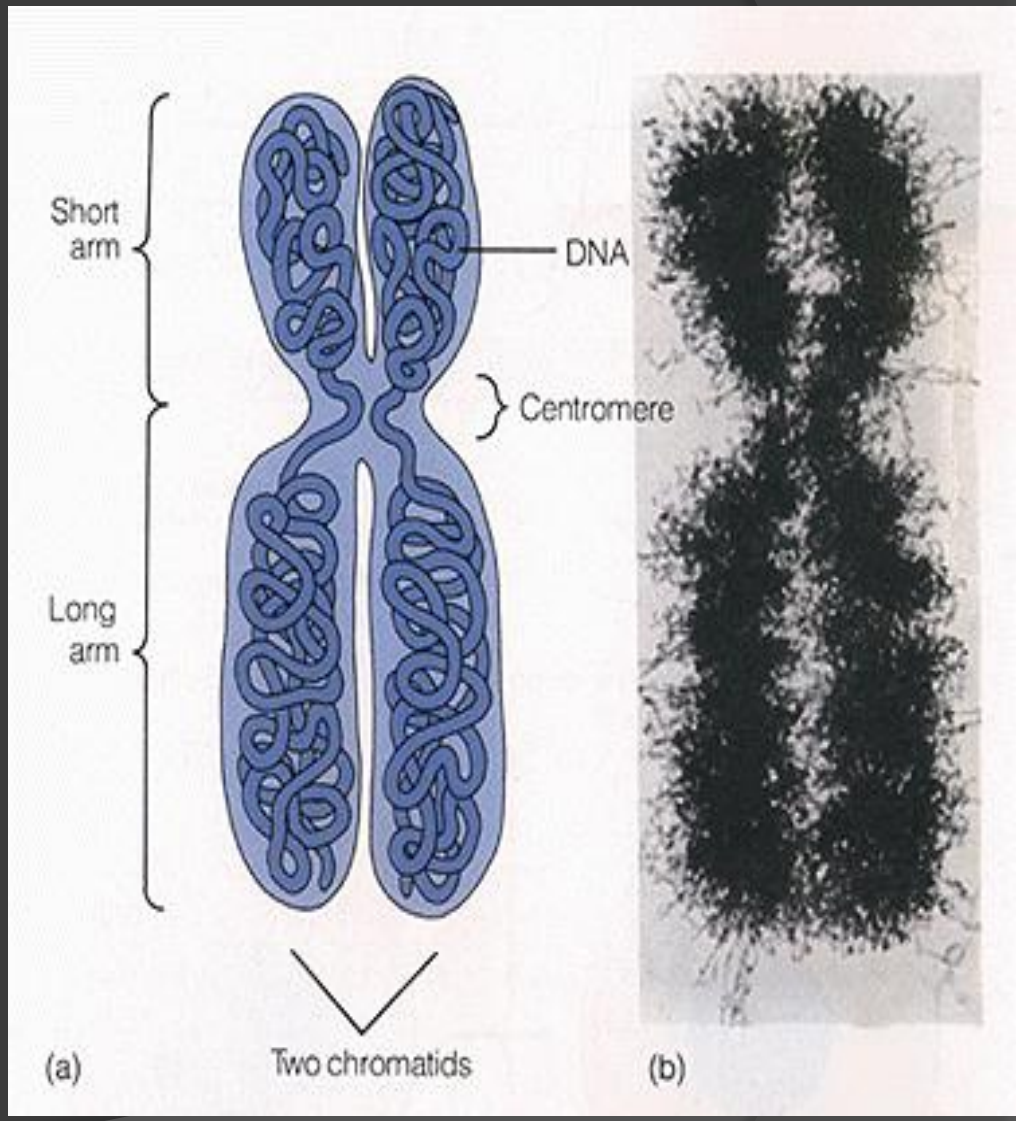
1. In the **nucleus of eukaryotic cells** during most of the cell's life cycle, DNA exists as **a mass of loose strands**. **(think of it like a bunch of single pieces of yarn all in a pile)** While the DNA is spread throughout the nucleus, the cell performs the functions needed for survival. During this time, the DNA is **duplicated**, or copied. (p. 75)
2. Before a cell divides, the DNA becomes wrapped around **proteins** like a spool of thread until it takes up very little space, or compacted. (p. 75)
3. The DNA is further compacted into structures called **chromosomes**.



How DNA is Packaged (Bas

Chromosomes in Dividing Cells

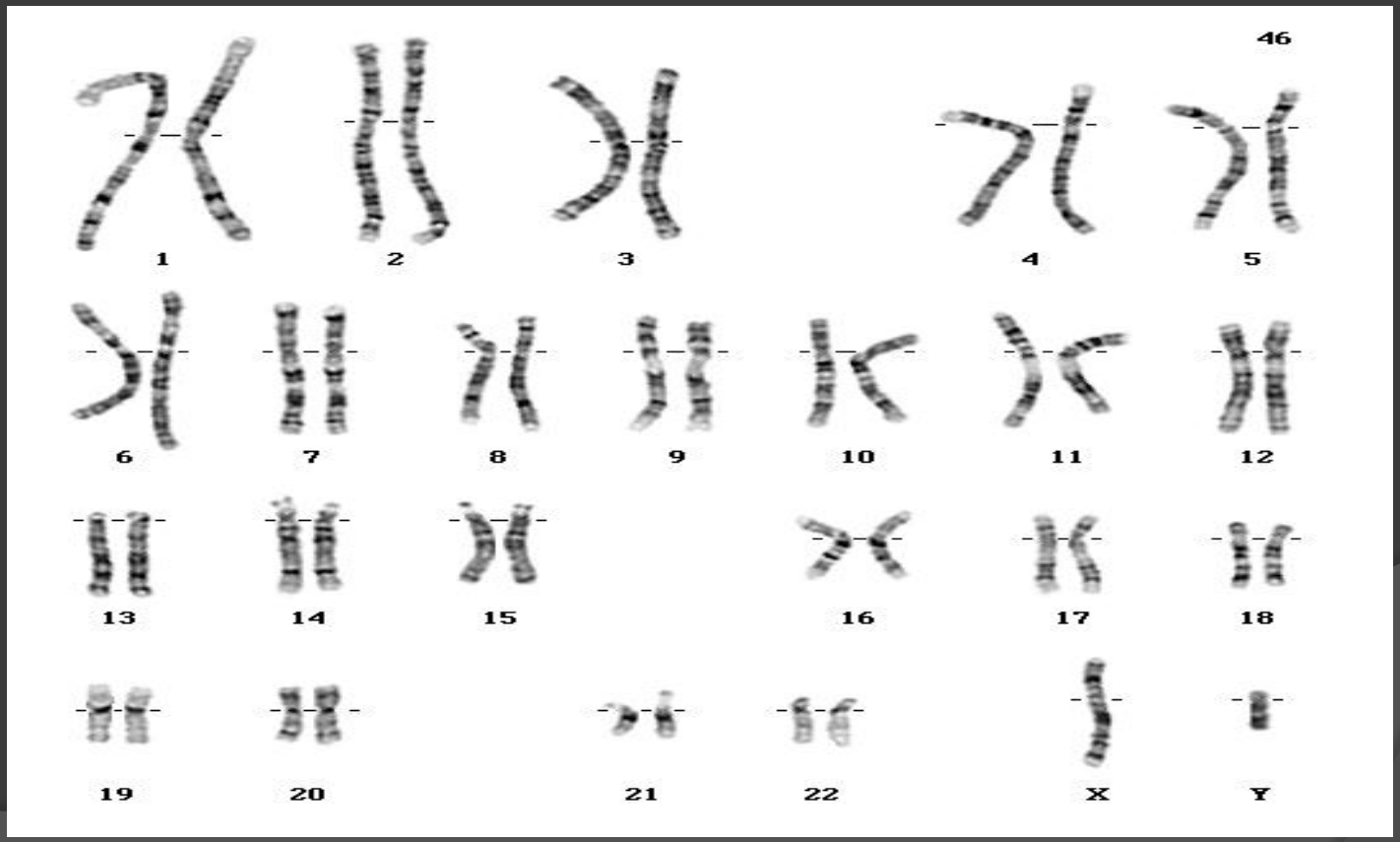
A duplicated chromosome consists of two identical structures called **chromatids** that are held together near the center by a structure called a **centromere**.



Called Sister Chromatids

How many chromosomes do human cells have?

<u>46 or 23 pairs</u> (p. 75)



Cell division is involved in growth, development, and repair. (pp. 76-78)

- Through cell division, a single cell becomes two cells. Those two cells divide into four, and the four cells divide into eight, and so on. A multicellular organism grows because **cell division** increases the number of cells in it. As the organism develops and its cells divide, many of the cells become **specialized**, and most of them continue to divide. (p. 76)

Cell division is involved in growth, development, and repair. (pp. 76-78)

- Even when growth and development appear to stop, cell division is still occurring. When an organism ages or is injured, the worn-out or damaged cells need to be replaced by new cells formed when healthy cells **divide**. (p. 76)
- In multicellular organisms, cell division is essential for three major functions: **growth**, **development**, and **repair**. (p. 76)

GROWTH

- Describe how the number of cells in a multicellular organism changes as the organism grows. (p. 77)
- **The number of cells increases.**

DEVELOPMENT

- Not only do multicellular organisms grow into larger organisms through cell division, the cells also become **specialized** to perform specific functions. These cells may take on shapes or structures that help them to perform their functions. For example, some cells might become skin cells or nerve cells. (p. 77)
- It is important to remember that these cells still have the **same set of genetic material** as all the other cells in the organism's body, but as the organism develops they **specialize**. (p. 77)

REPAIR

- The body repairs injuries by using cell division. (p. 78)
- As cells age and die, they need to be replaced. In the human body, there are about **200** different types of cells. Each of these types of cells is replaced at different rates.
- For example, your skin cells are replaced constantly while your brain cells hardly ever are replaced. (p. 78)

*NOTE: CELLS REPRODUCE AT DIFFERENT RATES

EXAMPLE: SKIN CELLS VS. NERVE CELLS