McGraw-Hill Ryerson

BC Science Connections 9

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Unit 1: The continuity of life depends on cells being derived from cells

Topic 1.1: Why is the reproduction of cells important?

- Reproduction ensures that life exists beyond its present generation
- Reproduction transfers genetic information from parents to offspring

Concept 1: Reproduction ensures that life exists beyond its present generation.

Kwantlen First Nation (Fort Langley): First Foods Ceremony

- Welcomes the return of salmon during the start of the salmon run
- Honours promise to renew and replenish the spirit and flesh

Figure 1.1

Reproduction and Sustainability

- **Sustainability**: Ability of the environment and living things it supports to endure into the future
- **Reproduction**: New organisms are produced from parent organism(s)

- **Sustainability** of living things depends on **reproduction**

Figure 1.2: The Western Painted Turtle is found on B.C.'s southwest coast, where it is endangered.

Reproduction and Continuity

Cell Theory: All cells come from pre-existing cells

- All cells are formed by reproduction

Continuity: How each species of organism continues to exist over time

- Species can only exist in the future if they reproduce (produce offspring)

Discussion Questions

1. What does the word *continuity* mean in terms of reproduction?

2. How are these three terms related: *reproduction*, *sustainability*, *continuity*?

Concept 2: Reproduction transfers genetic information from parents to offspring.

There are several different strategies for reproduction.

- A) Flowers: Colours and scents attract animals to transfer pollen
- B) Animals: Courtship rituals enable individuals to find mates
- C) Bacteria: Reproduce on their own by dividing in two

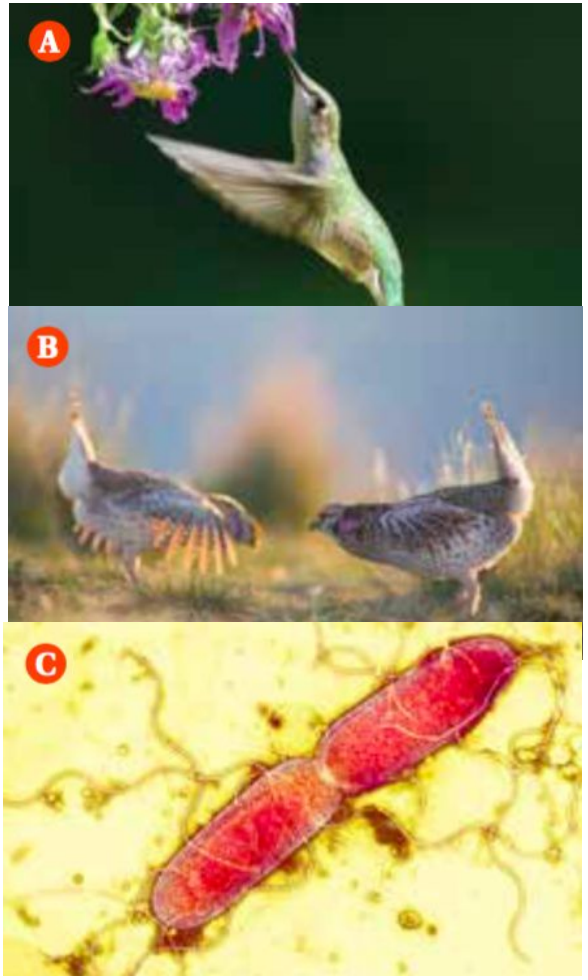

Figure 1.3: Examples of different strategies for reproduction

Two Basic Types of Reproduction: Asexual and Sexual Reproduction

A) Asexual reproduction:

- Requires only one parent
- Produces genetically identical offspring

B) Sexual reproduction:

- Requires two parents
- Produces genetically different offspring

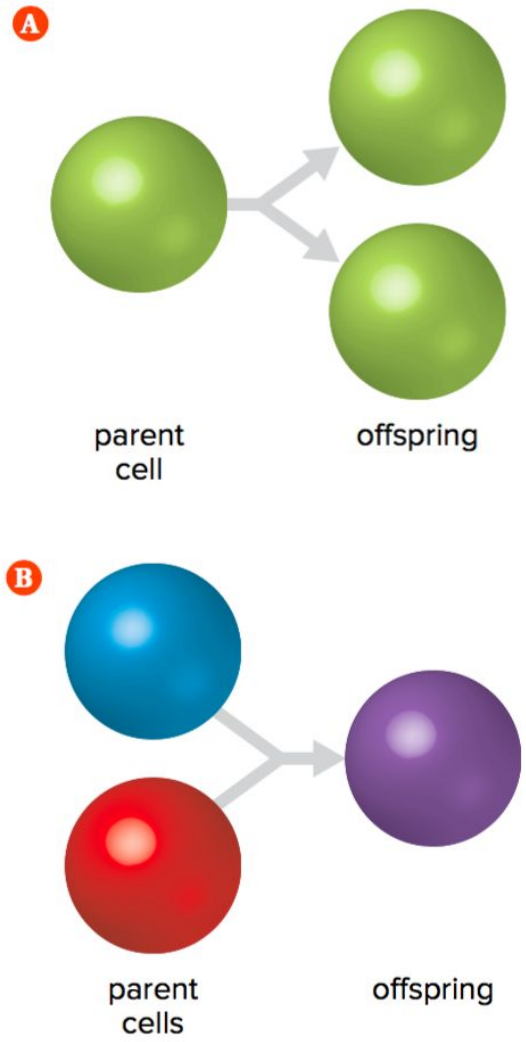

Figure 1.4: A) Asexual reproduction and B) Sexual reproduction.

Two Basic Types of Reproduction: Asexual and Sexual Reproduction (continued)

Both asexual and sexual reproduction:

- Genetic information is passed onto offspring
- Information is contained in DNA (the "molecule of life")

Figure 1.5: DNA

DNA: An Organism's Genetic Material

DNA: **D**eoxyribo**n**ucleic **a**cid

- Stores the genetic information of an organism
- Genetic information determines how an organism looks, functions, and behaves

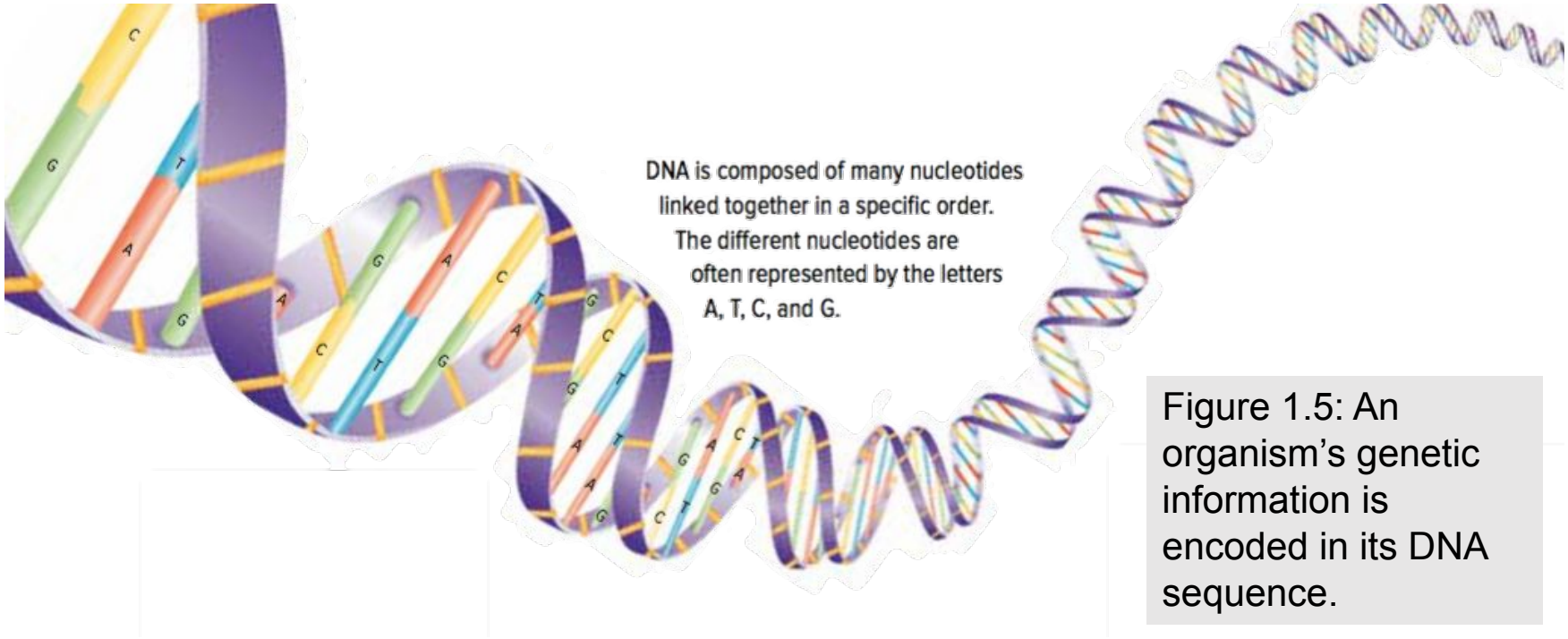

Figure 1.5: An organism's genetic information is encoded in its DNA sequence.

DNA: Structure and Function

Structure of DNA:

- Two long strands shaped like a twisted ladder
- Consists of many copies of four different chemical building blocks called *nucleotides*: adenine (A), thymine (T), cytosine (C), guanine (G)
- DNA sequence: The specific order of nucleotides; the "code" that holds the genetic information

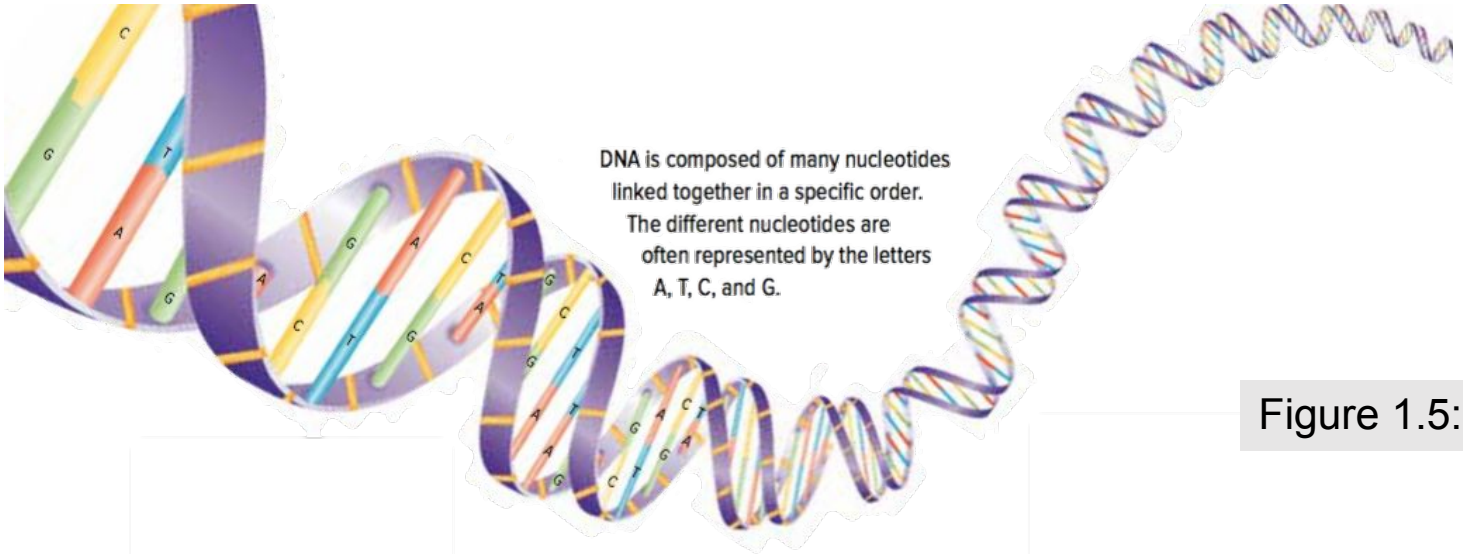

Figure 1.5: DNA

DNA: Structure and Function (continued)

Function of DNA:

- Stores the genetic information of an organism
- An organism's DNA is stored in each of its cells
  - DNA molecules coil and compact into a condensed form called *chromatin* to fit into the cells
  - Just before reproduction: DNA condenses further into structures called ***chromosomes***
  - During reproduction: Copies of chromosomes (and therefore DNA) are transferred to the offspring

Discussion Questions

1. What is the function of DNA?

2. How is sexual reproduction different from asexual reproduction?

Topic 1.1 Summary: Why is the reproduction of cells important?

- Reproduction ensures that life exists beyond its present generation
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