These notes are posted on my site for the following reasons:

- **for students to copy in their own hand-writing**
  - **in order to complete their class notes**
  - **if student did not have enough time in class**
  - **if student was away and missed this section**
- **for assistants and tutors to follow progress of the concepts taught**

Photocopied/printed notes can not be used during the Unit Notebook Check in class.

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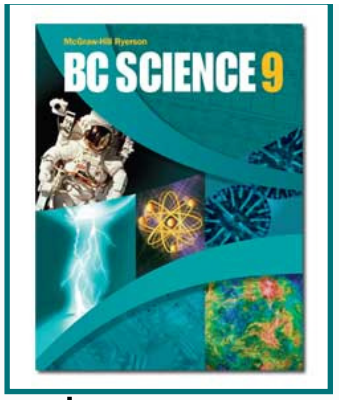
5.2 Asexual Reproduction



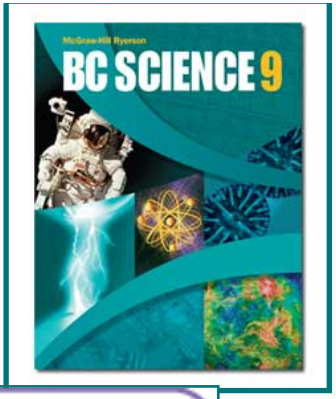
- A **clone** is an identical genetic copy of its parent
- Many organisms naturally form clones via asexual reproduction
- Cloning is also used in agriculture and research to copy desired organisms, tissues and genes

Type of Asexual Reproduction

- Binary fission - single cell organisms splitting into identical copies
- Budding - areas of multicellular organisms undergo repeated mitosis to form an identical organism. Buds sometimes detach to form a separate organism
- Fragmentation - part of an organism breaks off due to injury, and the part grows into a clone of the parent
- Vegetative reproduction - special cells in plants that develop into structures that form new plants identical to the parent
- Spore formation - some bacteria, micro-organisms and fungi can form spores - single cells that can grow into a whole new organism

See pages 168 - 175

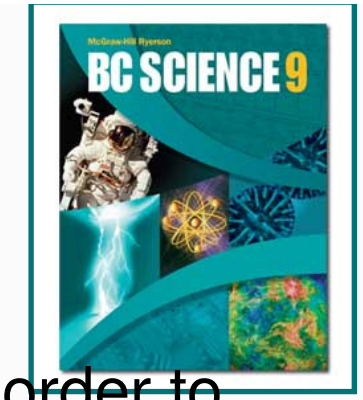
Asexual Reproduction



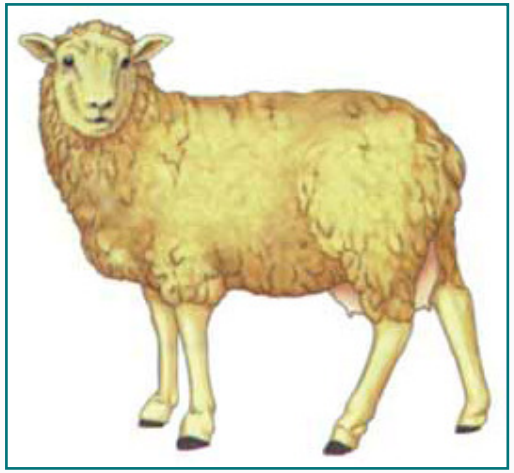
Advantages and Disadvantages

Advantages	Disadvantages
• Large numbers of offspring are reproduced very quickly from only one parent when conditions are favourable.	• Offspring are genetic clones. A negative mutation can make asexually produced organisms susceptible to disease and can destroy large numbers of offspring.
• Large colonies can form that can out-compete other organisms for nutrients and water.	• Some methods of asexual reproduction produce offspring that are close together and compete for food and space.
• Large numbers of organisms mean that species may survive when conditions or the number of predators change.	• Unfavourable conditions such as extreme temperatures can wipe out entire colonies.
• Energy is not required to find a mate.	

Human Assisted Cloning

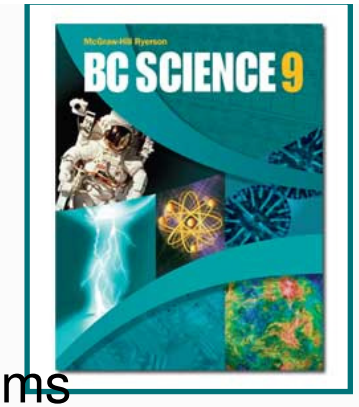


- Humans use all the asexual cloning methods in order to produce desired results with organisms. This is done in several ways:
- **Reproductive cloning** - purpose is to produce a genetic duplicate of an existing or dead organism. Steps involved:
    1. Remove nucleus from an egg cell
    2. A mammary gland cell is removed from an adult female
    3. Electricity fuses mammary & egg cell
    4. Fused cell begins dividing
    5. Dividing embryo is inserted into surrogate mother



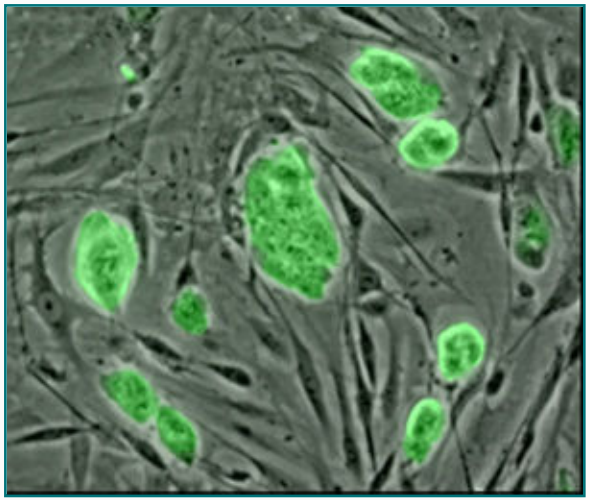
See pages 176 - 177

Human Assisted Cloning



- **Therapeutic cloning** - purpose is to correct health problems

  - Very important to therapeutic cloning are **stem cells** - cells that can become different types of cells
  - Stem cells can be used to replace cells damaged from injuries or disease
  - Diabetes, spinal injuries, Parkinson's disease are only a few that can benefit from stem cell therapy
  - Controversial because the best stem cells are from embryos which are destroyed when harvesting cells



Mouse Stem Cells

Take the Section 5.2 Quiz

See pages 177 - 178