NOTES 4.2

Chapter 4 - Reproduction of Organisms
Lesson 2 - Asexual Reproduction

Asexual Reproduction

Q: What is asexual reproduction?
A: reproduction where one parent organism produces offspring without meiosis & fertilization

Offspring produced by asexual reproduction –

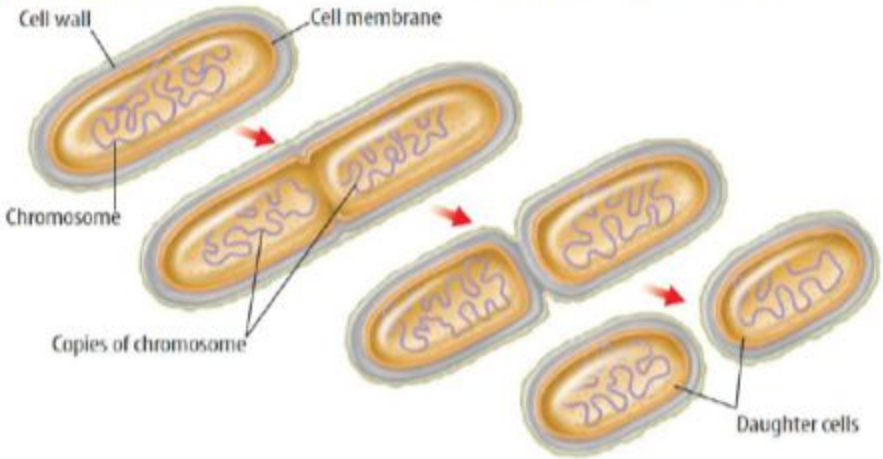
- inherit all of their DNA from one parent
- are genetically the same as each other and their parent

You have seen the results of asexual reproduction if you have ever seen mold on bread or fruit. Mold is a type of fungus that can reproduce either sexually or asexually. Not only fungi, but also bacteria, protists, plants, and some animals can reproduce asexually.

There are 6 types of asexual reproduction – fission, mitotic cell division, budding, animal regeneration, vegetative regeneration & cloning

1. Fission

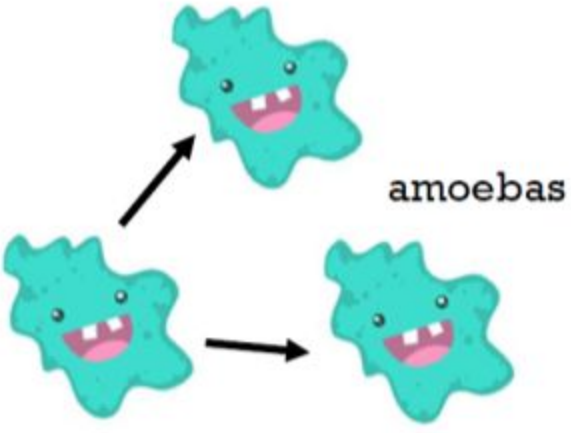
Q: What is fission?
A: cell division in prokaryotes that forms two genetically identical cells



bacteria

2. Mitotic Cell Division

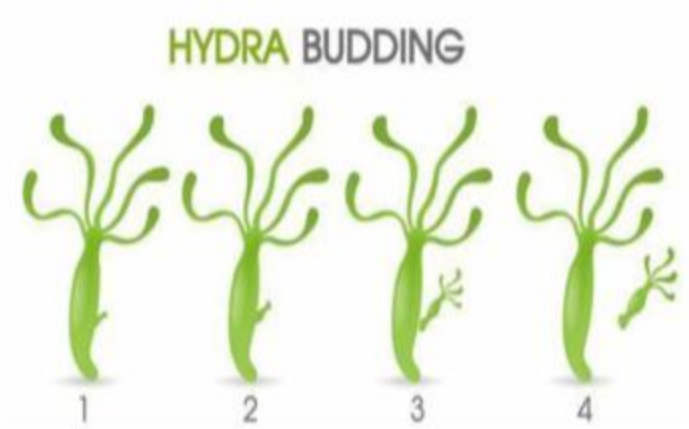
Many unicellular eukaryotes, such as amoebas, reproduce by mitotic cell division. In this type of asexual reproduction, an organism forms 2 offspring through mitosis and cell division. The nucleus of the cell divides by mitosis. Next, the cytoplasm and its contents divide through cytokinesis. Two new amoebas form.



amoebas

3. Budding

Q: What is budding?
A: the process during which a new organism grows by mitosis and cell division on the body of its parent



A hydra (as seen in the diagram) is a microscopic organism that can be found in most unpolluted fresh-water ponds, lakes, and streams. Ex. mushrooms & sponges

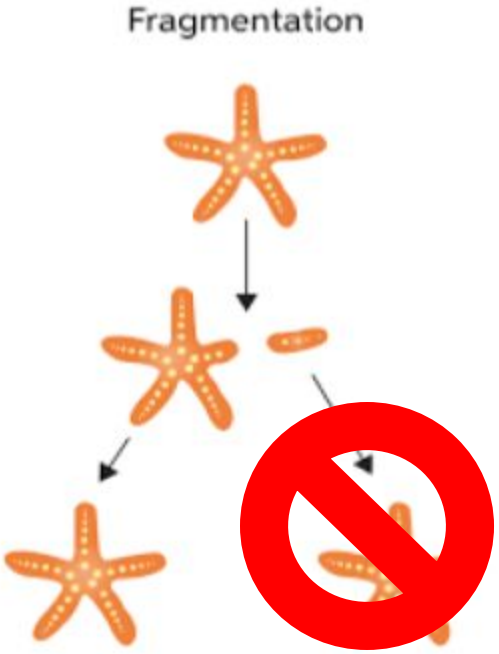
4. Animal Regeneration

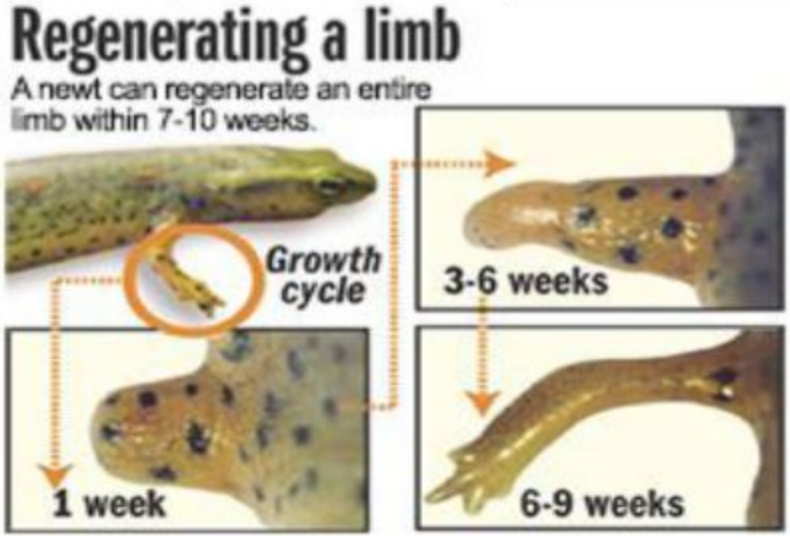
Q: What is regeneration?
A: a type of asexual reproduction that occurs when an offspring grows from a piece of its parent

Animals that can reproduce asexually through regeneration include sponges, sea stars (star fish), and planarians.

If the arms are separated from the parent sea star, each of these arms has the potential to grow into a new organism.

To regenerate, organisms must have a **part** of the central disk of the **parent**. As with all types of asexual reproduction, the offspring are **genetically** the same as the parent.





Some animals, such as newts, tadpoles, crabs, hydras, zebra fish, and salamanders, can regenerate a lost or damaged body part.

5. Vegetative Reproduction

Plants can also reproduce asexually in a process similar to regeneration.

Q: What is vegetative regeneration?
A: a form of asexual reproduction in which offspring grow from part of a parent plant

Strawberries, raspberries, potatoes, grass and geraniums are other plants that can reproduce this way.

6. Cloning

Q: What is cloning?
A: a process that produces an organism that is genetically identical to the organism from which it was produced with EXACTLY the same genes

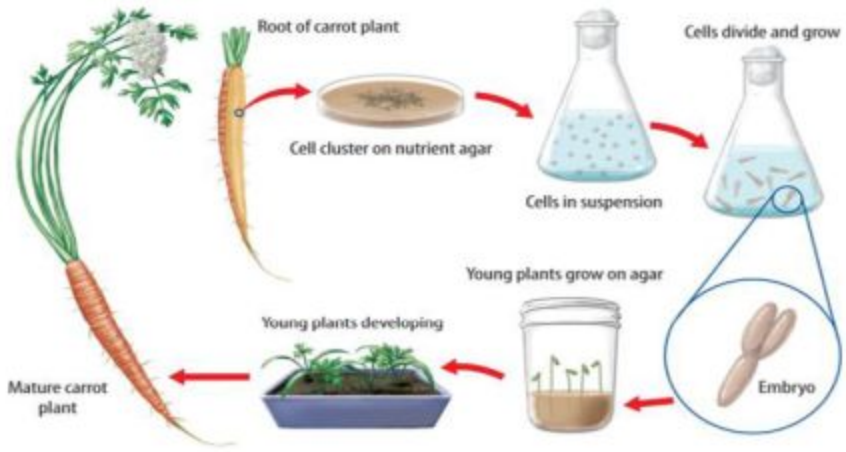
Cloning –

- is performed in **labs** and is conducted by **scientists** using **microscopes**
- produces **identical** individuals from a **cell** or from a cluster of cells taken from a multicellular organism
- can occur in **plants** (by cutting a section of stern or leaf that will then grow into an identical plant)
- can occur in **animals** (by removing an egg cell and implanting it in another)

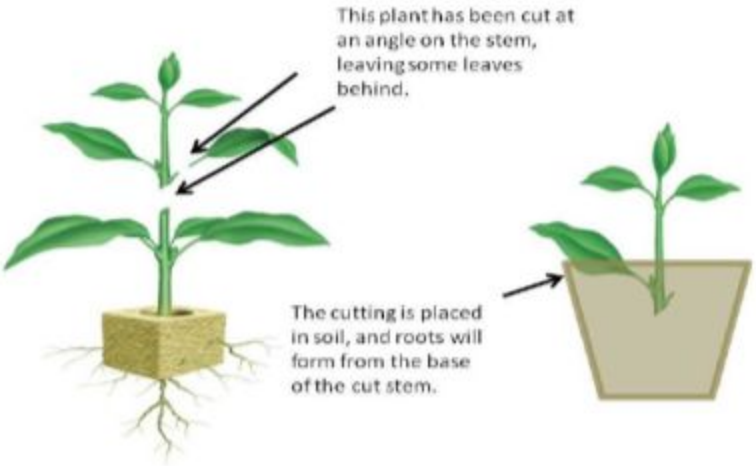
Farmers and scientists often clone cells or organisms that have desirable **traits**

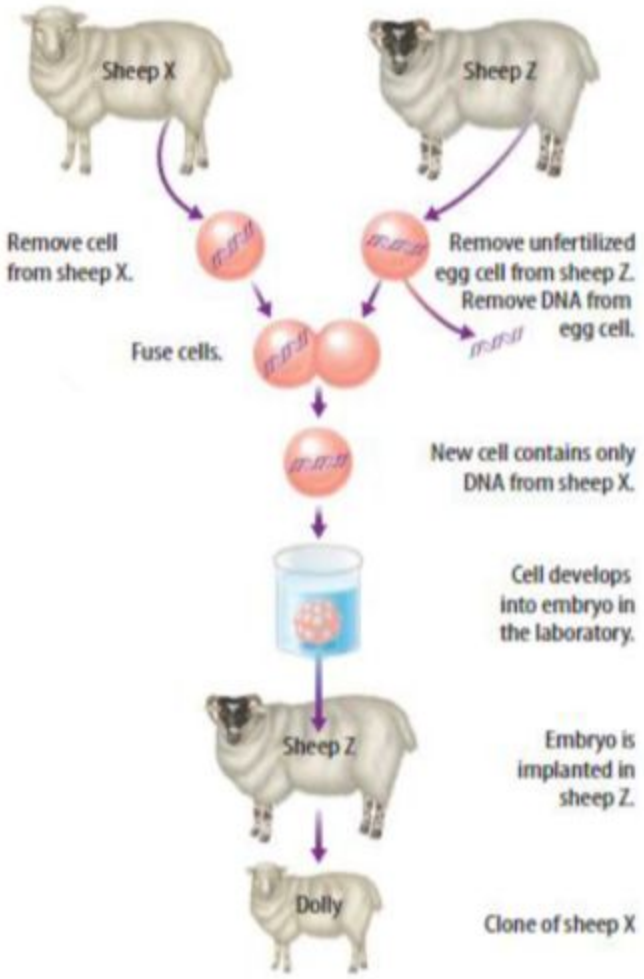
Some plants can be cloned from just a few cells using a method called a **tissue culture**

Tissue cultures make it possible for plant growers and scientists to make many copies of a plant with desirable traits. The new plants are genetically the same as the parent plant. Also, cloning produces plants more quickly than vegetative reproduction does.



A plant might be infected with a disease. To clone such a plant, a scientist can use cells from the meristem of the plant. Cells in meristems are disease-free. Therefore, if a plant becomes diseased, it can be cloned using meristem cells.





Scientists have been able to clone many animals. All of a clone's chromosomes come from one parent, the donor of the nucleus.
This means that the clone is genetically the same as its parent. The first mammal cloned was a sheep named Dolly.

Q: Which 2 sheep in the diagram are genetically identical?

A: Sheep X

Cloning Issues

Scientists are working to save some endangered species from extinction by cloning. Some people are concerned about the cost and ethical issues of cloning. Ethical issues include the possibility of human cloning.

Advantages of Asexual Reproduction

- organisms can reproduce without a mate
- some organisms can quickly produce a large number of offspring

Disadvantages of Asexual Reproduction

- little genetic variation within a population leads to a decreased chance of surviving if the environment changes