25SCHOOLS
FREE LEARNING NOTES FOR ZAMBIA

FORM 1

Biology

Continuity of life

Lesson notes for learners · Competence-Based Curriculum

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Plants grow from seeds and from cuttings, and yeast makes new yeast from buds. All of these are living things making more of their kind. In this note you learn how organisms reproduce so that their species continues, and how asexual and sexual reproduction differ.

AFTER THESE NOTES YOU SHOULD BE ABLE TO

- Explain that continuity of life means living organisms reproducing so that their species continues
- Compare asexual and sexual reproduction
- Describe budding, binary fission, spore formation and vegetative propagation
- Describe how plants reproduce from seeds and from vegetative parts
- State how viruses, protozoa, bacteria and fungi reproduce

KEY WORDS

reproduction	the process through which living organisms produce new individuals so that their species survives
asexual reproduction	reproduction with a single parent, giving offspring that are genetically identical to the parent, called clones
sexual reproduction	reproduction in which genetic material from two parents is joined
budding	asexual reproduction in which a new organism grows from a bud on the parent, as in yeast
spore	a special reproductive cell that can grow into a new individual under the right conditions
replication	the process of making an exact copy of genetic material

1 Two ways of reproducing

Continuity of life is all about living organisms reproducing so that their species continues. Reproduction is a basic process: through it living things produce new individuals.

There are two main modes of reproduction, asexual and sexual. Asexual reproduction involves a single parent, and the offspring are genetically identical to the parent. We call them clones. Sexual reproduction involves the joining of genetic material from two parents.

To study this, learners go outside to observe different living organisms or watch a video of them reproducing, then research the types of reproduction and present their findings.

Feature	Asexual	Sexual
Number of parents	One	Two
Genetic material	Offspring identical to the parent (clones)	Genetic material from two parents is joined

Figure 1. Asexual and sexual reproduction compared

2 Asexual reproduction

Asexual reproduction can happen in four ways: budding, binary fission, spore formation and vegetative propagation.

In budding, a new organism develops from a bud, or outgrowth, of the parent. Yeast is an example. Binary fission is found in prokaryotic organisms such as bacteria. In spore formation the organism produces spores, special reproductive cells that grow into new individuals under the right conditions.

In vegetative propagation, new plants grow from vegetative parts of a plant. The parts named for this topic are tubers (from the stem or root), cuttings, buds, leaves, suckers, bulbs, corms, rhizomes and runners.

A simple investigation shows this. Groups fill a tray with moist soil, prepare vegetative parts, plant them and water them gently but thoroughly. They keep the tray in a warm, bright place, out of direct sunlight, and keep the soil moist. They record changes on days 1, 5, 10, 15 and 20. After a few weeks new plants grow from the vegetative parts, which shows asexual reproduction. Learners then discuss the advantages and disadvantages to a farmer of using vegetative parts.

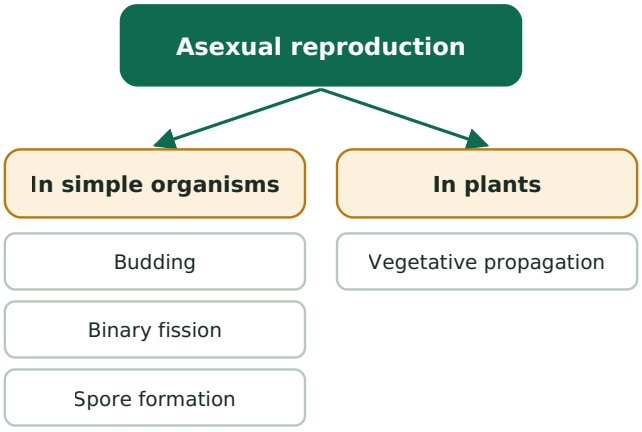

Figure 2. Ways in which asexual reproduction happens

3 Reproduction from seeds

Sexual reproduction in plants happens through seed production. Learners can investigate it by planting seeds in containers of soil.

The seeds are planted about 1 to 2 cm deep and 1 to 2 cm apart, covered with a thin layer of soil and watered gently so that the soil is moist but not waterlogged. The containers go in a warm place without direct light. The ideal temperature for germination is between 20 and 25 degrees Celsius.

Learners observe the seeds for 7 to 15 days and record the time they take to germinate, on days 1, 5, 10 and 15. The seeds grow into seedlings with roots and leaves. In time the plant develops flowers, which are the sites for pollination and fertilisation, leading to fruits and seeds.

Learners also discuss the advantages and disadvantages to a farmer of using seeds to produce offspring.

4 Reproduction in human beings

Sexual reproduction in humans is made possible by specialised reproductive structures.

At the onset of puberty, humans develop secondary sexual characteristics. These show that the body has reached reproductive maturity.

Good hygiene practices are essential for keeping the reproductive structures healthy.

5 Viruses, protozoa, bacteria and fungi

Viruses can only reproduce when there are host cells. They take over a host cell and replicate their genetic material, producing new viral particles.

Protozoa and bacteria reproduce asexually through binary fission. Fungi reproduce both asexually and sexually. They produce spores that can grow into new individuals.

The fungus Rhizopus is made up of mycelium and hyphae. The hyphae have three parts: the stolon, the sporangiophore and the rhizoids.

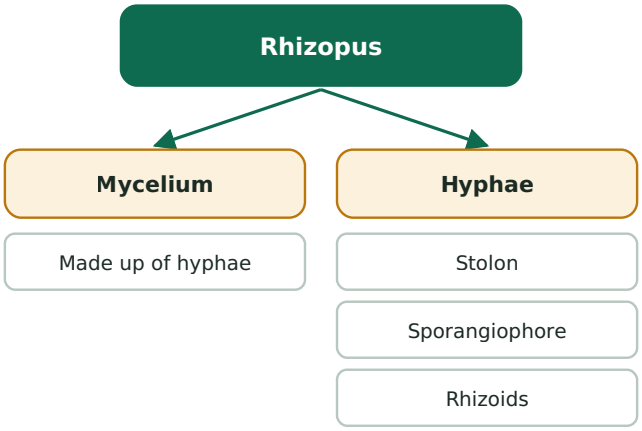

Figure 3. The parts of Rhizopus

TRY THIS

Plant a few seeds in a tin or tray of moist soil, and in a second one plant a cutting or another vegetative part from a plant at home. Keep both moist and warm, away from direct sunlight, and record what you see on days 1, 5, 10 and 15. Say which tin shows asexual reproduction and which shows sexual reproduction.

REMEMBER

- Continuity of life is living organisms reproducing so that their species continues.
- Asexual reproduction needs one parent and gives clones, while sexual reproduction joins genetic material from two parents.
- Asexual reproduction can be by budding, binary fission, spore formation or vegetative propagation.
- Plants reproduce sexually through seeds, and seeds need moisture and warmth to germinate.
- At puberty humans develop secondary sexual characteristics, and good hygiene keeps the reproductive structures healthy.
- Viruses need host cells, protozoa and bacteria use binary fission, and fungi make spores.

? Check yourself

1. What does continuity of life mean.
2. Name the two modes of reproduction and say how many parents each needs.

3. Name the four ways in which asexual reproduction can happen.
4. Name three vegetative parts of plants that can grow into new plants.
5. Name the three parts of the hyphae of Rhizopus.
6. A learner at a school near Feira plants pieces of a plant in a tray of moist soil, waters them and records changes on days 1, 5, 10, 15 and 20. After a few weeks new plants grow. (a) Name the type of reproduction shown. (b) Name the kind of plant parts used. (c) Say where the tray should be kept.
7. A group of learners in Luangwa plants bean seeds 1 to 2 cm deep in a container and watches them for two weeks. (a) Say what the group should record. (b) Name the temperature range that suits germination. (c) Say what the seedlings develop and what the plant later forms after flowering.

ANSWERS

1. Living organisms reproducing so that their species continues.
2. Asexual reproduction needs one parent. Sexual reproduction needs two parents.
3. Budding, binary fission, spore formation and vegetative propagation.
4. Any three of tubers, cuttings, buds, leaves, suckers, bulbs, corms, rhizomes and runners.
5. The stolon, the sporangiophore and the rhizoids.
6. (a) Asexual reproduction. (b) Vegetative parts. (c) In a warm, bright place, not in direct sunlight, with the soil kept moist.
7. (a) The time the seeds take to germinate, noted day by day. (b) Between 20 and 25 degrees Celsius. (c) Roots and leaves, and later flowers that lead to fruits and seeds.

Written by 25Schools to follow the Form 1 Biology syllabus of the Zambian competence-based curriculum. Free for learners to read, download and share. More notes and quizzes at 25schools.com.