Reproduction in living organisms

Lesson plan and teacher's notes · Form 1 Biology · 1 period of 40 minutes

School	(write school name)	**Teacher**	(write name)
Date	(date)	**Class**	Form 1
Subject	Biology	**Enrolment**	Boys ___ Girls ___ Total ___
Time	40 minutes	**Topic**	Reproduction in living organisms

Learners say what reproduction is and why living things need it, describe sexual reproduction in simple terms, describe asexual reproduction by binary fission, budding, spore formation and vegetative parts, compare the two modes, and plan a simple investigation using vegetative parts. Examples come from banana plants, yeast, bacteria and fungi.

Specific outcomes

By the end of the lesson, learners should be able to:

1. Say what reproduction is and why living things need it
2. Describe sexual reproduction in simple terms
3. Describe asexual reproduction by binary fission, budding, spore formation and vegetative parts
4. Compare sexual and asexual reproduction
5. Plan a simple investigation using vegetative parts

Prior knowledge

- Living things grow, feed and respond to their surroundings
- Plants grow from seeds
- Animals have young

Teaching and learning materials

- chalk and board
- exercise books
- cuttings, suckers or tubers
- a tray of moist soil
- water

References

Ministry of Education (CDC) Form 1 Biology syllabus and module; 25Schools learners' note: Reproduction in living organisms.

Lesson development

Stage and time	Teacher activities	Learner activities
Introduction 5 min	Remind learners that no species lives for ever. Mention a banana plant sending up shoots, yeast making bread rise by budding, bacteria dividing, and people and animals having young. Write the title and key words.	Suggest other living things that produce new individuals and copy the title and key words.
Development: reproduction and sexual reproduction 10 min	Define reproduction and explain why species need it. Explain sexual reproduction, gametes, fertilisation and the zygote, and describe puberty, ovulation and menstruation briefly as in the note.	Copy the definitions and write what happens in fertilisation.
Development: asexual reproduction 12 min	Explain that one parent produces offspring without gametes and the offspring are clones. Describe binary fission, budding, spore formation and vegetative parts with examples.	Write each kind of asexual reproduction with one example.
Development: investigating 8 min	Describe how to plant cuttings, suckers or tubers in a tray of moist soil, keep it warm and bright but not in direct sunlight, and observe daily.	Plan the investigation in their books.
Conclusion 5 min	Ask learners to compare sexual and asexual reproduction. Set the homework.	Answer orally and copy the homework.

Teacher's content notes

Read these before the lesson. They are what you need to know, not what to copy onto the board.

What reproduction is

Reproduction is the process by which living organisms produce new individuals of the same species. This ensures the survival and continuity of the species, because no species lives for ever.

Sexual reproduction

In sexual reproduction two parents contribute genetic material, so the offspring have a mix of traits from both. A male gamete fuses with a female gamete in fertilisation, and the cell formed is a zygote.

Human reproduction terms

Puberty is the stage of physical and emotional development that marks the change from childhood to adulthood. Ovulation is the release of a mature egg cell from the ovary into the fallopian tube, where it can be fertilised by a sperm. Menstruation is the natural process in which the uterus sheds its lining, resulting in bleeding.

Asexual reproduction

In asexual reproduction a single parent produces offspring without gametes. The offspring are exact copies of the parent, often called clones.

Ways of asexual reproduction

Binary fission is common in bacteria. Budding happens in yeast. Spore formation happens in fungi. Plants can reproduce from vegetative parts such as tubers, cuttings, buds, leaves, suckers, bulbs, corms, rhizomes and runners.

Investigating

Plant cuttings, suckers or tubers in a tray of moist soil, water gently but thoroughly, place the tray in a warm, bright place that is not in direct sunlight, keep the soil moist and observe it every day. To investigate spores, look at a fungus or a video of one.

Questions to ask during the lesson

Question	Expected answer
A learner at a school near Feira asks why species must reproduce when each living thing will die. (a) Say what reproduction is. (b) Say why species need it. (c) Name the two main modes of reproduction.	(a) The process by which living organisms produce new individuals of the same species. (b) No species lives for ever, so reproduction ensures survival and continuity. (c) Sexual and asexual reproduction.
A teacher near Feira explains that a male gamete fuses with a female gamete. (a) Name this process. (b) Name the cell that is formed. (c) Say how many parents are involved and what the offspring have.	(a) Fertilisation. (b) A zygote. (c) Two parents, and the offspring have a mix of traits from both.
A farmer near Feira plants pieces of an old plant and new plants grow, and a learner says the new plants are clones. (a) Name the kind of reproduction. (b) Say what clones are. (c) Name two vegetative parts a plant can reproduce from.	(a) Asexual reproduction. (b) Exact copies of the parent. (c) Any two of tubers, cuttings, buds, leaves, suckers, bulbs, corms, rhizomes and runners.

Worked examples for the board

Naming the kind of asexual reproduction

A banana plant sends up shoots beside it. The new plants grow from a vegetative part of one parent, so this is asexual reproduction by suckers. Yeast grows a new organism from an outgrowth of the parent, so this is budding. Bacteria divide into two identical new individuals, so this is binary fission. Fungi make spores that grow into new individuals when conditions are right, so this is spore formation.

Comparing sexual and asexual reproduction

In sexual reproduction two parents contribute genetic material and a male gamete fuses with a female gamete, so the offspring have a mix of traits. In asexual reproduction a

single parent produces offspring without gametes, so the offspring are exact copies called clones.

Board plan

Write the title and key words. Left: sexual reproduction with fertilisation. Right: asexual reproduction with four ways. Bottom: how to plan the cuttings investigation.

Feature	Sexual reproduction	Asexual reproduction
Number of parents	Two	One
Gametes	Male and female gametes fuse	No gametes
Offspring	A mix of traits from both parents	Exact copies, or clones
Examples	People and animals	Bacteria, yeast, fungi, banana suckers

Sexual and asexual reproduction compared

Mistakes to expect

Learners often think	Put it right
Asexual reproduction needs two parents.	In asexual reproduction a single parent produces offspring without gametes.
Offspring from asexual reproduction are different from the parent.	The offspring are exact copies of the parent, often called clones.
Only animals reproduce.	All living things reproduce so that their kind survives. Bacteria divide, yeast buds, fungi make spores and plants grow from vegetative parts.
Fertilisation is the same as ovulation.	Ovulation is the release of a mature egg cell from the ovary. Fertilisation is the fusion of a male gamete with a female gamete to form a zygote.

Differentiation

Learners who struggle

Give learners a table with the headings sexual and asexual and the rows number of parents, gametes and offspring, and let them complete it with one-word answers.

Learners who finish early

Ask learners who finish early to plan how they would compare a cutting and a seed grown in the same conditions, and what they would observe each day.

Hearing or visual impairment

For learners with visual impairment, let them feel a cutting, a sucker and a tuber and describe each aloud. For learners with hearing impairment, write each key word on the board and draw the four ways of asexual reproduction.

No projector, no printing

Use cuttings or suckers from plants near the school and a tray or container of moist soil. Draw the comparison table on the board.

If time is short

Skip the investigation stage and keep the definitions, the four ways of asexual reproduction and the banana shoots scenario; set the rest as homework.

Evaluation

Question or task	A correct answer shows
A farmer near Feira notices new banana shoots coming up beside her old banana plant. (a) Is this sexual or asexual reproduction. (b) What name is given to these shoots. (c) Explain how the new plants compare with the parent.	(a) Asexual reproduction. (b) Suckers. (c) They are exact copies of the parent because only one parent is involved and no gametes are used.
A group of learners plants cuttings in a tray of moist soil. (a) Where should they put the tray. (b) How should they care for it. (c) Say how this shows asexual reproduction and compare it with growing a plant from a seed.	(a) In a warm, bright place that is not in direct sunlight. (b) Water gently but thoroughly, keep the soil moist and observe it daily. (c) The new plant grows from a vegetative part of one parent without gametes, so it is identical to the parent, while a plant grown from a seed comes from the fusion of gametes from two parents.
A teacher at a school near Feira tells learners that yeast makes bread rise, that bacteria divide into two, and that fungi make spores. (a) Name the way yeast reproduces. (b) Name the way bacteria reproduce. (c) Name the way fungi reproduce.	(a) Budding. (b) Binary fission. (c) Spore formation.

Homework

A learner near Feira sees a banana plant send up shoots and bread rise because of yeast. (a) Name the kind of asexual reproduction in each. (b) Say how many parents are involved. (c) Say how the new organisms compare with the parent.

Extra practice with answers

Question	Answer

1. A farmer near Feira notices new banana shoots coming up beside her old banana plant. (a) Is this sexual or asexual reproduction. (b) What name is given to these shoots. (c) Explain how the new plants compare with the parent.	(a) Asexual reproduction. (b) Suckers. (c) They are exact copies of the parent because only one parent is involved and no gametes are used.
2. A group of learners plants cuttings in a tray of moist soil. (a) Where should they put the tray. (b) How should they care for it. (c) Say how this shows asexual reproduction.	(a) In a warm, bright place that is not in direct sunlight. (b) Water gently but thoroughly, keep the soil moist and observe it daily. (c) The new plant grows from a vegetative part of one parent without gametes.
3. A teacher at a school near Feira tells learners that yeast makes bread rise and that bacteria divide into two. (a) Name the way yeast reproduces. (b) Name the way bacteria reproduce. (c) Say how many parents each uses.	(a) Budding. (b) Binary fission. (c) One parent.
4. A learner near Feira says that sexual and asexual reproduction give the same kind of offspring. (a) Do you agree. (b) Say what the offspring of sexual reproduction have. (c) Say what the offspring of asexual reproduction are.	(a) No. (b) A mix of traits from both parents. (c) Exact copies of the parent.

Answers to the learners' check-yourself questions

1. What is reproduction?
   The process by which living organisms produce new individuals of the same species.
2. How many parents are needed for asexual reproduction?
   One.
3. What is fertilisation?
   The fusion of a male gamete with a female gamete to form a zygote.
4. Name three vegetative parts that plants can reproduce from.
   Any three of tubers, cuttings, buds, leaves, suckers, bulbs, corms, rhizomes and runners.
5. Name the type of asexual reproduction that is common in bacteria.
   Binary fission.
6. A farmer near Feira notices new banana shoots coming up beside her old banana plant. (a) Is this sexual or asexual reproduction? (b) What name is given to these shoots? (c) Explain how the new plants compare with the parent.
   (a) Asexual reproduction. (b) Suckers. (c) They are exact copies of the parent because only one parent is involved and no gametes are used.
7. A group of learners plants cuttings in a tray of moist soil. (a) Where should they put the tray? (b) How should they care for it? (c) Say how this shows asexual reproduction and compare it with growing a plant from a seed.
   (a) In a warm, bright place that is not in direct sunlight. (b) Water gently but

thoroughly, keep the soil moist and observe it daily. (c) The new plant grows from a vegetative part of one parent without gametes, so it is identical to the parent; a plant grown from a seed comes from the fusion of ga

Teacher's reflection

What went well:

What I will change next time:

Learners who need follow-up: