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All life cycles include stages of growth and reproduction — Science

Objective

By the end of the lesson, you can complete a comparison of a human and a bean plant life cycle, identify which stages show growth and which stage shows reproduction, and justify why reproduction is needed for continuation of a species.

Hook

Prior knowledge activation

- You already know that living things grow and that living organisms produce offspring.
- Today you will connect those two ideas inside the idea of a life cycle.

Why this matters today

- A human changes from embryo to baby to child to adult.

- These organisms look very different, but both life cycles include growth and a stage that can produce the next generation.
- Question to think about: if an organism grows well but never produces offspring, what part of the life cycle is missing?
- What does growth mean in a living organism?
- What does reproduction mean in biology?
- What is an offspring?

Representation

1. WHAT A LIFE CYCLE IS

A life cycle is the sequence of stages a living organism passes through from the beginning of an individual life to the production of the next generation.

- **Growth** means the organism becomes larger and/or more developed.
- **Reproduction** means the organism produces offspring.
- Different organisms have different stages, but every life cycle includes growth and a reproductive stage.

2. HUMAN EXAMPLE

Use these stages in order: embryo, baby, child, adult.

- From embryo to adult, the human becomes more developed. That is growth.
- In the adult stage, reproduction can occur and begin a new human life cycle.
- Important: not every individual adult reproduces, but the human life cycle includes a stage where reproduction can happen.

3. BEAN PLANT EXAMPLE

Use these stages in order: seed, seedling, young plant, flowering plant.

- From seed to flowering plant, the plant grows and becomes more developed.
- When the flowering plant produces new seeds, that is reproduction because new offspring can develop from those seeds.

4. WORKED EXAMPLE

Question: In the bean plant sequence seed, seedling, young plant, flowering plant, new seeds, which parts are growth and which part is reproduction?

1. First I list the stages in order, because a life cycle is a sequence.
2. Next I ask, "Where does the organism become larger or more developed?"
Seed to seedling to young plant to flowering plant is growth.
3. Then I ask, "Where are new offspring produced?" The flowering plant producing new seeds is reproduction.
4. So my answer is: growth happens from seed to flowering plant;
reproduction happens when the flowering plant produces new seeds.

CHECK FOR UNDERSTANDING

Write one short answer before moving on.

- In the human sequence embryo, baby, child, adult, which changes show growth?
- At which stage can reproduction occur? Sentence frame: "Growth happens from _____ to _____. Reproduction can occur at the _____ stage."

5. WHAT STAYS THE SAME AND WHAT CHANGES

- In both examples, the life cycle includes growth and a reproductive stage.
- The stage names and body forms are different.
- The role of reproduction is the same in both cases: it produces offspring and allows the species to continue.

Human and bean plant life cycles

Term	Definition
life cycle	the sequence of stages an organism passes through from the start of life to the production of the next generation
growth	becoming larger and/or more developed
reproduction	the process by which an organism produces offspring
offspring	a new organism produced by parent organism(s)
adult	the mature stage of an organism

Guided practice

1. With the teacher, copy and complete this organiser for the human life cycle.
Organism | stages in order | parts showing growth | reproductive stage |
reason Human | embryo, baby, child, adult | ... | ... | ... Use this sentence
frame: "The parts showing growth are _____. The reproductive stage
is _____ because _____."
2. Check for understanding: before moving on, write one answer on your mini-
whiteboard. Prompt: "The adult stage is the reproductive stage in this
model because _____."
3. In pairs, complete the second row for the bean plant life cycle using seed,
seedling, young plant, flowering plant. Use this sentence frame: "Growth
happens from _____ to _____. Reproduction happens when
_____."

4. Work on your own for the final two questions. a) Write one similarity between the human and bean plant life cycles. b) Write one difference between them. c) Decide whether this statement is correct or incorrect: "Growth and reproduction are the same process." Justify your answer.
5. Final check for understanding: hold up your answer to part 4c before you continue. If your reason does not mention offspring or new seeds, revise it.

Grouping: whole class -> pairs -> individual *Deliverable:* A completed comparison organiser for human and bean plant life cycles, with the stages, the identified growth and reproductive parts, and written justifications.

Independent transfer

Independent practice

1. New context: frog life cycle Use this sequence: egg, tadpole, young frog, adult frog.
 - Identify which parts show growth.
 - State the stage at which reproduction can occur.
 - Write two sentences comparing the frog life cycle with either the human or the bean plant life cycle.
2. Changing conditions A bean plant grows roots, stem and leaves but never produces flowers or seeds.
 - Has growth happened? Explain.
 - Has reproduction happened? Explain.
 - What would this mean for continuation of the species if no plants reproduced?
3. Quick judgement Decide whether each statement is correct or incorrect, and rewrite any incorrect statement so it becomes accurate.
 - "Reproduction means getting bigger."

- "Different organisms can have different stages but still share growth and reproduction."

Deliverable Hand in your annotated frog sequence and your written answers, with at least one comparison and a clear reason for each explanation.

New context: Applying the same method to a frog life cycle, then analysing a plant that grows without reproducing.

Closure

Complete these sentence frames in your notebook, then say them to a partner:

- "A life cycle is ..."
- "To decide whether a stage shows growth or reproduction, I ask ..."
- "The step I must not forget is ... because ..." Use either the human or the bean plant example in your answer.

Formative assessment

Exit question: 1) In this sequence, egg → tadpole → young frog → adult frog, identify which stages show growth and which stage shows reproduction. 2) A bean plant grows roots, stem and leaves but never produces flowers or seeds. Explain whether growth and reproduction have both happened.

Success criterion:

Success criterion	Beginning	Developing	Secure
Accuracy of stage classification	Names stages but mislabels growth or reproduction.	Identifies most stages correctly with one error.	Classifies growth and reproduction correctly in both examples.

Use of biological reasoning	Gives a vague reason without referring to offspring.	Refers to offspring or seeds but explanation is incomplete.	Explains reproduction as producing offspring or new seeds clearly.
Comparison and transfer	Answers only the familiar example.	Makes a partial comparison to the new case.	Transfers the idea to the frog or plant case and compares accurately.
Written clarity	Response is difficult to follow.	Some correct ideas are written, but sequencing is unclear.	Response is organised and easy to mark quickly.

Differentiation

Support: If you need support, redo the first step from the worked example yourself: list the stages, then ask whether the organism becomes larger or more developed, then ask whether offspring are produced. Check each answer against the growth/reproduction definitions before moving on.

If writing is hard, show your thinking orally to a partner or the teacher, or complete the comparison organiser with short labels and arrows instead of full sentences.

Extension: If you finish early, tackle the frog transfer task and explain why the bean plant can grow without reproducing. Then add a stronger justification: what would happen to the species if no adult ever reached a reproductive stage?

simple but precise.

HOW THIS DOCUMENT WAS PERSONALISED

Methodology (Direct Instruction) → a structured explanation of the content, with examples and comprehension checks.

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