Grade 11 Biology

Term 2 - 46 complete lesson plans

Ready to teach, in the KICD lesson-plan format | 40-minute lessons | PDF and editable Word

ABOUT THIS PACK

46 complete, ready-to-teach Grade 11 Biology lesson plans for Term 2, covering cell division, reproduction in plants and growth and development in plants.

TOPICS IN THIS PACK

Topic	Name	Lessons
1.4	Cell Division	12
2.1	Reproduction in Plants	16
2.2	Growth and Development in Plants	18

INSIDE EVERY LESSON PLAN

- The specific learning outcomes, key inquiry question, core competencies, values and PCIs, and the resources needed.
- A timed lesson flow: what the teacher does and what the learners do, from introduction to summary.
- The key content (a worked example, notes or a practical with its expected results), then four practice questions with the answers for the teacher.
- The common mistake to watch for, and ideas for learners who need support and for those ready for more.
- A four-level CBC assessment rubric (EE, ME, AE, BE), homework, and a blank reflection space to fill in after teaching.

A TASTE OF LESSON 1

Meaning of cell division; structure of chromosomes

By the end of the lesson, the learner should be able to: a) explain the meaning of cell division; b) describe the structure of a chromosome

Cell division and chromosomes

CELL DIVISION is the process by which a parent cell divides to form daughter cells. It involves division of the nucleus (mitosis or meiosis) followed by division of the cytoplasm (CYTOKINESIS).

CHROMOSOMES are thread-like structures in the nucleus made of DNA and protein; they carry GENES (units of inheritance). Before division each chromosome copies itself to form two identical CHROMATIDS joined at a CENTROMERE. Body cells have pairs of HOMOLOGOUS chromosomes (one from each parent) - the DIPLOID number (2n); humans have 46 (23 pairs). Gametes have one set - the HAPLOID number (n); humans 23.

You also receive this pack as an editable Word file, so you can change any lesson to suit your class before you print it. Lessons follow the order of the KICD curriculum design.

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Meaning of cell division; structure of chromosomes

Strand 1.0 Cell Biology and Biodiversity > Sub-strand 1.4 Cell Division | Lesson 1 of 12 | 40 minutes

SCHOOL	TEACHER	DATE
CLASS / STREAM	TIME	ROLL (B / G)

SPECIFIC LEARNING OUTCOME(S)

By the end of the lesson, the learner should be able to: a) explain the meaning of cell division; b) describe the structure of a chromosome

KEY INQUIRY QUESTION(S)

- How is cell division important?

CORE COMPETENCIES, VALUES AND PCIS IN THIS LESSON

COMPETENCY	**Creativity and imagination**	Learners make up their own examples, patterns or ways of showing the idea.
COMPETENCY	**Digital literacy**	Learners use a phone, tablet or the class computer to explore or check the idea.
VALUE	**Unity**	Learners share materials fairly and work as one team.
VALUE	**Respect**	Learners listen while others explain and accept correction politely.
PCI	**Safety and security**	Learners follow safety rules when using materials and moving about.
PCI	**Communicable diseases**	Developed through the activities in this lesson.

LEARNING RESOURCES

Charts and animations of mitosis and meiosis | Models of chromosomes (pipe cleaners, wool, beads or plasticine) | Manila paper and marker pens | Notebooks and pencils

ORGANISATION OF LEARNING

Pairs at microscopes; groups of four for chromosome models; whole class for animations and summaries.

KEY WORDS

chromosome | chromatid | centromere | gene | diploid | haploid | mitosis | meiosis | spindle | crossing over | cytokinesis | binary fission | budding | tissue culture

THE LESSON AT A GLANCE

Introduction	Teacher models	Guided practice	On their own	Wrap-up
6 min	9 min	10 min	9 min	6 min

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LESSON FLOW

Stage	Minutes	The teacher	The learners
Introduction	6	Greet the class and ask: "You started life as one cell. Where did the trillions of cells in your body come from?" Take two or three answers, link them to earlier work, then state today's outcome.	Answer the starter question, recall what they already know and read the outcome aloud.
Step 1: Teacher models	9	Take learners through "Cell division and chromosomes" (key ideas on the next page), explaining as you go. Use charts and animations of mitosis and meiosis, models of chromosomes (pipe cleaners, wool, beads or plasticine), manila paper and marker pens. Ask learners to predict what comes next before you show it.	Watch, predict the next step, ask questions and note the key steps in their exercise books.
Step 2: Guided practice	10	Give questions 1 and 2. Move round the groups, ask "How do you know?" and correct errors kindly on the spot.	Work in pairs or small groups, explain each step to a partner and check one another's answers.
Step 3: Independent practice	9	Set questions 3 and 4 for individual work. Mark as you walk round and note who needs help in the next lesson.	Work on their own, then swap books with a partner to check.
Summary and conclusion	6	Ask two or three learners to state the key idea in their own words. Give this exit question and check the answers: "What is cytokinesis?"	Say the key idea in their own words and answer the exit question in the exercise book.

KEY IDEAS

Cell division and chromosomes

CELL DIVISION is the process by which a parent cell divides to form daughter cells. It involves division of the nucleus (mitosis or meiosis) followed by division of the cytoplasm (CYTOKINESIS).

CHROMOSOMES are thread-like structures in the nucleus made of DNA and protein; they carry GENES (units of inheritance). Before division each chromosome copies itself to form two identical CHROMATIDS joined at a CENTROMERE. Body cells have pairs of HOMOLOGOUS chromosomes (one from each parent) - the DIPLOID number (2n); humans have 46 (23 pairs). Gametes have one set - the HAPLOID number (n); humans 23.

Activity: use pipe cleaners or wool to model a chromosome, a duplicated chromosome (two chromatids and a centromere) and a homologous pair; present to peers.

PRACTICE QUESTIONS - WITH ANSWERS FOR THE TEACHER

No.	Question	Answer
1	What are chromosomes made of?	**DNA and protein.**
2	What is a chromatid?	**One of the two identical copies of a duplicated chromosome, joined at the centromere.**
3	State the diploid and haploid numbers in humans.	**Diploid 46; haploid 23.**
4	What is cytokinesis?	**Division of the cytoplasm after nuclear division.**

WATCH OUT FOR

Learners count chromatids as chromosomes. Two chromatids joined at a centromere are one chromosome.

ASSESSMENT RUBRIC - THE FOUR CBC LEVELS

Level	What the learner can do
Exceeds expectations (EE)	Can explain the meaning of cell division confidently and accurately, explain the method used, and apply the idea to new or unfamiliar problems.
Meets expectations (ME)	Can explain the meaning of cell division accurately in familiar situations; notices and corrects slips without help.
Approaches expectations (AE)	Can partly explain the meaning of cell division, or does so with prompts from the teacher or a partner; makes some errors.
Below expectations (BE)	Cannot yet explain the meaning of cell division without direct help; needs the idea taught again with concrete objects.

SUPPORT AND EXTENSION

Learners who need support	Give a labelled diagram of a duplicated chromosome.
Learners ready for more	Why are homologous chromosomes called a "pair"? (Answer: They carry genes for the same characteristics in the same positions, one from each parent)
Inclusion	Seat learners with low vision near the board and read aloud whatever you write; use large, clear, tactile materials; allow extra time; pair with a patient partner; use gestures or Kenyan Sign Language for the key words.

HOMEWORK AND FOLLOW-UP

Redo questions 3 and 4 neatly in the exercise book. Then tell someone at home what you learned about "meaning of cell division; structure of chromosomes" and bring one question of your own to ask next lesson.

TEACHER SELF-CHECK

- Did every learner get a turn to handle materials or explain their thinking?
- Did most learners meet the outcome? Write down the names of those who did not.
- Was the pace right — did any step take too long or too short a time?
- Which competency and value did I see learners showing?
- What will I change the next time I teach this lesson?

REFLECTION ON THE LESSON / SELF-REMARKS

Write this after teaching - what worked, what to change, which learners need follow-up.

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Mitosis: interphase and prophase

Strand 1.0 Cell Biology and Biodiversity > Sub-strand 1.4 Cell Division | Lesson 2 of 12 | 40 minutes

SCHOOL	TEACHER	DATE
CLASS / STREAM	TIME	ROLL (B / G)

SPECIFIC LEARNING OUTCOME(S)

By the end of the lesson, the learner should be able to: a) describe what happens in interphase and prophase; b) identify these stages in diagrams

KEY INQUIRY QUESTION(S)

- How is cell division important?

CORE COMPETENCIES, VALUES AND PCIS IN THIS LESSON

COMPETENCY	**Creativity and imagination**	Learners make up their own examples, patterns or ways of showing the idea.
COMPETENCY	**Digital literacy**	Learners use a phone, tablet or the class computer to explore or check the idea.
VALUE	**Unity**	Learners share materials fairly and work as one team.
VALUE	**Respect**	Learners listen while others explain and accept correction politely.
PCI	**Safety and security**	Learners follow safety rules when using materials and moving about.
PCI	**Communicable diseases**	Developed through the activities in this lesson.

LEARNING RESOURCES

Charts and animations of mitosis and meiosis | Models of chromosomes (pipe cleaners, wool, beads or plasticine) | Manila paper and marker pens | Notebooks and pencils

ORGANISATION OF LEARNING

Pairs at microscopes; groups of four for chromosome models; whole class for animations and summaries.

KEY WORDS

chromosome | chromatid | centromere | gene | diploid | haploid | mitosis | meiosis | spindle | crossing over | cytokinesis | binary fission | budding | tissue culture

THE LESSON AT A GLANCE

Introduction	Teacher models	Guided practice	On their own	Wrap-up
6 min	9 min	10 min	9 min	6 min

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LESSON FLOW

Stage	Minutes	The teacher	The learners
Introduction	6	Greet the class and ask: "Before a cell divides, what must it copy so that each daughter cell is complete?" Take two or three answers, link them to earlier work, then state today's outcome.	Answer the starter question, recall what they already know and read the outcome aloud.
Step 1: Teacher models	9	Take learners through the key ideas on the next page, explaining as you go. Use charts and animations of mitosis and meiosis, models of chromosomes (pipe cleaners, wool, beads or plasticine), manila paper and marker pens. Ask learners to predict what comes next before you show it.	Watch, predict the next step, ask questions and note the key steps in their exercise books.
Step 2: Guided practice	10	Give questions 1 and 2. Move round the groups, ask "How do you know?" and correct errors kindly on the spot.	Work in pairs or small groups, explain each step to a partner and check one another's answers.
Step 3: Independent practice	9	Set questions 3 and 4 for individual work. Mark as you walk round and note who needs help in the next lesson.	Work on their own, then swap books with a partner to check.
Summary and conclusion	6	Ask two or three learners to state the key idea in their own words. Give this exit question and check the answers: "Where do centrioles move in prophase?"	Say the key idea in their own words and answer the exit question in the exercise book.

KEY IDEAS

MITOSIS produces two daughter cells, each with the SAME number and type of chromosomes as the parent (diploid -> diploid). It is a continuous process described in stages.
INTERPHASE (before division): the cell grows, makes new organelles and proteins, stores energy, and DNA REPLICATES so each chromosome becomes two chromatids; chromosomes are not visible as distinct threads.
PROPHASE: chromosomes shorten, thicken and become visible, each made of two chromatids; the nucleolus disappears; the nuclear membrane breaks down; centrioles (in animal cells) move to opposite poles and spindle fibres begin to form.
Activity: watch an animation of mitosis and pause at interphase and prophase; draw the two stages.

PRACTICE QUESTIONS - WITH ANSWERS FOR THE TEACHER

No.	Question	Answer
1	What happens to DNA during interphase?	**It replicates (copies itself).**
2	Give two events of prophase.	**For example: chromosomes become visible, nuclear membrane breaks down, nucleolus disappears, spindle forms.**
3	Why is interphase not called a "resting" stage today?	**The cell is very active: growing, making proteins and copying DNA.**
4	Where do centrioles move in prophase?	**To opposite poles of the cell.**