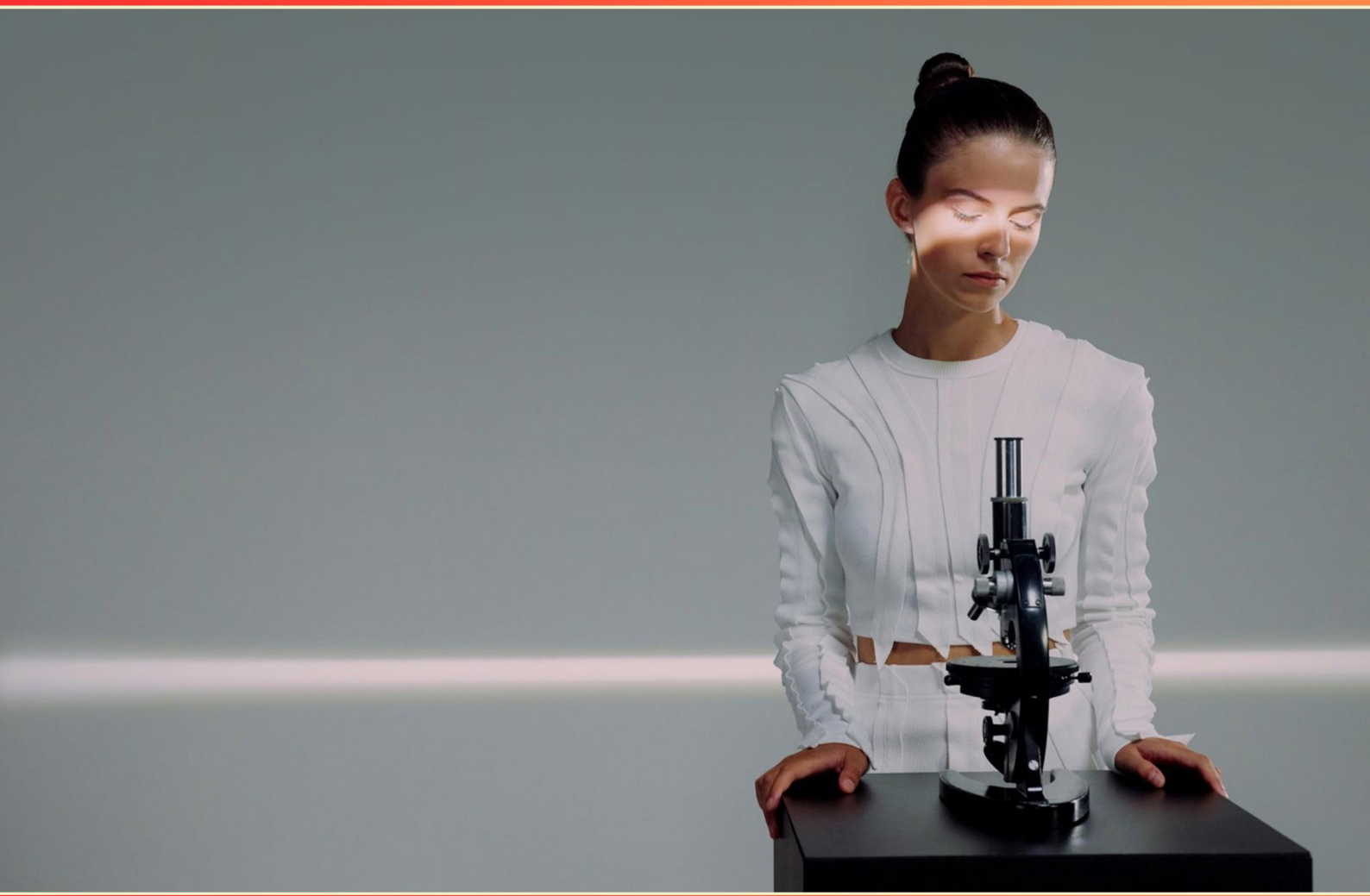
ALBERTA BIOLOGY 30 CELL DIVISION PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

1. What is a biological clock?

A. It regulates the number of cell divisions; immature cells always complete 50 divisions no matter how long it had been frozen or what stage cell division was suspended

B. It tracks the age of the organism

C. It controls the rate of DNA replication only

D. It signals cells to stop dividing after a fixed lifespan

2. Edwards syndrome corresponds to trisomy of chromosome which number?

A. 21

B. 18

C. 13

D. 17

3. Cytokinesis in plant cells is characterized by which feature?

A. Cleavage furrow forms and the cell membrane pinches in

B. Cytoplasm divides but without a clear cell plate

C. No centrosomes, cell plate forms and becomes wider to form a new cell wall

D. The chromosomes separate and move to opposite ends

4. Fertilization produces a zygote that is haploid or diploid.

A. Haploid

B. Triploid

C. Polyploid

D. Diploid

5. Do transcription factors directly regulate cell division, and if so, how?

A. No; they do not affect the cell cycle.

B. Yes; they regulate expression of genes including cyclins and CDKs, influencing progression through the cell cycle.

C. They only control metabolism outside the cell cycle.

D. They only affect DNA replication enzymes.

6. The presence of three copies of chromosome 21 is called

A. Trisomy 21

B. Monosomy 21

C. Polyploidy 21

D. Nondisjunction 21

7. Which chromosomal abnormality involves the absence of one chromosome from the diploid set?

A. Monosomy

B. Trisomy

C. Polyploidy

D. Nondisjunction

8. What is Binary Fission?

A. A form of asexual reproduction in single-celled organisms by which one cell divides into two cells of the same size

B. A form of sexual reproduction in single-celled organisms

C. The process of meiosis

D. The fusion of two cells into one

9. Which statement best describes how cytokinesis differentiates between animal and plant cells?

A. Plant cells form a cleavage furrow via a contractile ring; animal cells form a cell plate.

B. Animal cells form a cleavage furrow via a contractile ring; plant cells form a cell plate from vesicles.

C. Animal cells do not undergo cytokinesis.

D. Plant cells divide by forming a cleavage furrow instead of a cell plate.

10. What occurs with homologous chromosomes during prophase I of meiosis?

A. They pair up and may undergo crossing over

B. They remain unpaired and do not exchange segments

C. They duplicate and align in independent assortment

D. They separate into two chromatids without crossing over

Answers

1. A
2. B
3. C
4. D
5. B
6. A
7. A
8. A
9. B
10. A

Explanations

1. What is a biological clock?

A. It regulates the number of cell divisions; immature cells always complete 50 divisions no matter how long it had been frozen or what stage cell division was suspended

B. It tracks the age of the organism

C. It controls the rate of DNA replication only

D. It signals cells to stop dividing after a fixed lifespan

Biological clocks in cells reflect a limited number of times a normal cell can divide, governed by telomere shortening and cell cycle controls. This finite replication potential, often called the Hayflick limit, means cells typically stop dividing after a certain number of divisions—around fifty for many somatic cells. The clock is intrinsic to the cell and doesn't reset if the cell is paused or frozen; when division resumes, the remaining number of possible divisions is still based on that built-in limit. This aligns with the idea that the division count, not the organism's calendar age or a fixed time lifespan, regulates how long a cell can keep proliferating. The other ideas—tracking age, controlling only the rate of DNA replication, or stopping after a fixed time—don't capture that the key feature is a finite number of divisions before senescence, rather than a clock tied to calendar time or a simple rate limit. Some cells, like germ or certain stem cells, can bypass this limit with telomerase, which is an important exception to keep in mind.

2. Edwards syndrome corresponds to trisomy of chromosome which number?

A. 21

B. 18

C. 13

D. 17

Edwards syndrome occurs when there are three copies of chromosome 18 in every cell (trisomy 18). The extra chromosome disrupts multiple developmental processes, leading to severe congenital abnormalities and a poor prognosis, with most affected individuals not surviving beyond infancy. This condition is specifically tied to trisomy 18, while trisomy 21 causes Down syndrome and trisomy 13 causes Patau syndrome, each involving a different chromosome.

3. Cytokinesis in plant cells is characterized by which feature?

A. Cleavage furrow forms and the cell membrane pinches in

B. Cytoplasm divides but without a clear cell plate

C. No centrosomes, cell plate forms and becomes wider to form a new cell wall

D. The chromosomes separate and move to opposite ends

Cytokinesis in plant cells relies on building a cell plate that will become the separating cell wall, rather than pinching the membrane inward. Plant cells have rigid cell walls, so they can't form a cleavage furrow like animal cells do. After mitosis, vesicles derived from the Golgi migrate to the center of the cell and fuse to form a cell plate. This plate then grows outward, fusing with the existing cell membranes and maturing into a separating cell wall that divides the two daughter cells. The absence of centrosomes as in many animal cells fits with this setup, since the division machinery guides vesicle fusion to create the new cell wall rather than a contractile ring pinching the membrane. The step described here is distinct from chromosomes moving to opposite ends, which is part of mitosis, not cytokinesis.

4. Fertilization produces a zygote that is haploid or diploid.

A. Haploid

B. Triploid

C. Polyploid

D. Diploid

Fertilization involves two gametes, each with one complete set of chromosomes. When these haploid sets fuse, the zygote ends up with two sets, making it diploid. This two-set state combines genetic material from both parents and is the normal outcome of sexual reproduction. A zygote with a single set would be haploid and is not produced by typical fertilization; zygotes with three or more sets arise only from unusual events like polyspermy or genome duplication, not standard fertilization.

5. Do transcription factors directly regulate cell division, and if so, how?

A. No; they do not affect the cell cycle.

B. Yes; they regulate expression of genes including cyclins and CDKs, influencing progression through the cell cycle.

C. They only control metabolism outside the cell cycle.

D. They only affect DNA replication enzymes.

Transcription factors regulate cell division by controlling which genes are turned on or off. They bind to DNA and influence the production of key cell-cycle regulators, especially cyclins and CDKs. Cyclins partner with CDKs to form active enzymes that phosphorylate target proteins, driving the cell cycle forward through the G1/S, S, G2/M transitions, and mitosis. Because the levels of cyclins rise and fall in a timed way, transcription factors help set the order and timing of these transitions. They also coordinate the production of inhibitors or checkpoint proteins that can pause the cycle if DNA is damaged, ensuring division only proceeds when conditions are right. So transcription factors directly influence cell division by regulating the expression of genes like cyclins and CDKs, shaping the progression through the cell cycle.

6. The presence of three copies of chromosome 21 is called

A. Trisomy 21

B. Monosomy 21

C. Polyploidy 21

D. Nondisjunction 21

Having three copies of chromosome 21 is a form of aneuploidy called trisomy 21. In normal human cells, chromosomes come in pairs, but when one chromosome is present in three copies, that extra copy can disrupt development and is linked to Down syndrome. Monosomy 21 would mean only one copy of chromosome 21, which is typically not viable. Polyploidy refers to having an extra full set of all chromosomes, not just a single chromosome. Nondisjunction is the error that can cause trisomy 21 by failing to separate chromosomes during meiosis, but the condition itself is called trisomy 21.

7. Which chromosomal abnormality involves the absence of one chromosome from the diploid set?

A. Monosomy

B. Trisomy

C. Polyploidy

D. Nondisjunction

Monosomy is when one chromosome from the normal diploid set is missing, so the chromosome count is 2n−1. This creates aneuploidy, an abnormal number of chromosomes, and in humans it most famously appears as monosomy X (Turner syndrome), where there is only one sex chromosome instead of a pair. The other terms describe different situations. Trisomy means having an extra chromosome, giving 2n+1 (like Down syndrome with an extra chromosome 21). Polyploidy involves more than two complete sets of chromosomes (such as 3n or 4n), not just a missing one. Nondisjunction is the error in which chromosomes fail to separate properly during meiosis, which can produce monosomy or trisomy, but it refers to the mechanism rather than the specific chromosomal abnormality.

8. What is Binary Fission?

A. A form of asexual reproduction in single-celled organisms by which one cell divides into two cells of the same size

B. A form of sexual reproduction in single-celled organisms

C. The process of meiosis

D. The fusion of two cells into one

Binary fission is asexual reproduction used by many single-celled organisms. The cell copies its DNA, grows, and then divides into two genetically identical daughter cells of roughly equal size. There's no fusion with another cell and no gamete formation, so no genetic mixing occurs. This process is common in bacteria and other unicellular organisms, enabling rapid population growth. It's different from meiosis, which creates gametes with half the chromosome number, and from the fusion of two cells to form one.

9. Which statement best describes how cytokinesis differentiates between animal and plant cells?

A. Plant cells form a cleavage furrow via a contractile ring; animal cells form a cell plate.

B. Animal cells form a cleavage furrow via a contractile ring; plant cells form a cell plate from vesicles.

C. Animal cells do not undergo cytokinesis.

D. Plant cells divide by forming a cleavage furrow instead of a cell plate.

Cytokinesis differs because the cell's structure influences how the cytoplasm splits. In animal cells, a contractile ring of actin quickly forms a band around the center of the cell. As this ring tightens, it creates a cleavage furrow that pinches the plasma membrane inward, splitting the cell into two daughter cells. In plant cells, the rigid cell wall prevents the membrane from pinching in. Instead, vesicles derived from the Golgi apparatus coalesce at the center to form a cell plate. This plate grows outward to separate the two new cells, eventually developing into separating cell walls. So the best description is that animal cells form a cleavage furrow via a contractile ring, while plant cells form a cell plate from vesicles. The other statements don't fit because plant cells rely on building a cell plate due to their cell wall, animal cells do undergo cytokinesis, and plant cytokinesis is not accomplished by a cleavage furrow.

10. What occurs with homologous chromosomes during prophase I of meiosis?

A. They pair up and may undergo crossing over

B. They remain unpaired and do not exchange segments

C. They duplicate and align in independent assortment

D. They separate into two chromatids without crossing over

During prophase I of meiosis, homologous chromosomes come together and pair up, a process called synapsis, to form a paired structure called a bivalent or tetrad. This pairing brings corresponding chromatids from each chromosome into close contact so they can exchange genetic material. While paired, crossing over can occur between non-sister chromatids, producing recombined chromatids at points called chiasmata. This combination of pairing and potential crossing over is unique to prophase I and sets the stage for genetic variation and proper chromosome segregation later in meiosis. The other ideas don't fit this stage: homologues don't stay unpaired and non-exchanging, because pairing and possible crossing over characterize prophase I; duplication happens earlier during the cell cycle (S phase) and metaphase events involve alignment rather than the pairing seen in prophase I; and strands don't separate into two chromatids during prophase I—sister chromatids separate later, at anaphase II, after crossing over may have occurred.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

https://albertabio30celldivision.examzify.com

We wish you the very best on your exam journey. You've got this!