

PRACTICAL 1 PRE-LAB WORKSHEET

Mitosis and Meiosis

Complete before attending Practical 1

1. Read the Practical 1 instructions. 2. Watch: https://youtu.be/h8j_vl0ph2A 3. Answer every question.

Learning preparation

This worksheet prepares you to recognise the principal stages of mitosis and meiosis, use a compound microscope systematically and apply the required laboratory safety controls.

Section A: Scientific preparation

1. Why is the onion root-tip meristem suitable for observing mitosis?

- A. It contains cells undergoing frequent cell division.
- B. It contains only haploid cells.
- C. It contains cells that have no nuclei.
- D. It prevents chromosomes from staining.

2. Match each stage with its characteristic microscopic appearance. Write the correct letter in the final column.

Stage	Microscopic appearance	Letter
Interphase	A. Sister chromatids move towards opposite poles	
Prophase	B. Chromosomes align at the cell equator	
Metaphase	C. Chromatin is diffuse; individual chromosomes are not distinct	
Anaphase	D. Chromosomes reach the poles and new nuclear membranes begin to form	
Telophase	E. Chromatin condenses into visible chromosomes	

3. Place these stages in the correct sequence: anaphase, interphase, telophase, prophase and metaphase.

1.	2.	3.	4.	5.
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Section A: Scientific preparation (continued)

4. What is the diploid chromosome number of an onion cell?
 - A. 4
 - B. 8
 - C. 16
 - D. 46
5. What is the purpose of treating the root tips with 1 M hydrochloric acid?
 - A. To increase the chromosome number.
 - B. To soften the tissue and help the cells separate.
 - C. To remove the chromosomes.
 - D. To neutralise the stain.
6. What is the purpose of acetic orcein?
 - A. To stain chromosomal material.
 - B. To dissolve the cell wall.
 - C. To fix the coverslip to the slide.
 - D. To prevent mitosis.
7. Which region of the stained onion root should be placed on the microscope slide?
 - A. The longest and most transparent region.
 - B. The root-cap cells only.
 - C. The darker, opaque meristematic region near the root tip.
 - D. Any part of the root.
8. Which is the correct way to examine the preparation?
 - A. Begin with the 100x objective and use coarse focus.
 - B. Begin with the lowest-power objective and increase magnification gradually.
 - C. Add immersion oil before locating the root tip.
 - D. Use only the highest-power objective.
9. Tick all precautions that apply when using the 100x oil-immersion objective.
 - ☐ Complete lower-power observations first.
 - ☐ Use the 100x objective only if instructed.
 - ☐ Rotate a dry objective through the immersion oil.
 - ☐ Use fine focus at high magnification.
 - ☐ Clean the 100x objective with lens tissue after use.
10. Why are most cells in a root-tip preparation normally observed in interphase?
 - A. Interphase is usually the longest part of the cell cycle.
 - B. Cells cannot be stained during mitosis.
 - C. Interphase occurs only in plant cells.
 - D. All chromosomes disappear during mitosis.