

**A. PLANT AND ANIMAL MITOSIS**

1. Make representative drawings of the various distinct mitotic stages from both prepared slides of the onion root tip and whitefish blastula. **Label** (at least once) in both plant and animal cells, if present: nucleus, chromosomes, chromatid, centrioles or asters, spindle fibers, cleavage furrow, cell plate, cytokinesis, karyokinesis.

PLANT

ANIMAL

Interphase

Prophase

Metaphase

Anaphase

Telophase

2. List several major differences you have observed between plant and animal mitosis.

**B. MITOTIC STAGE FREQUENCY**

3. Data Table 1: Individual mitotic stage frequency for onion root tip.

Stage	# Observed - Tally	Total # Observed	Frequency
Interphase			
Prophase			
Metaphase			
Anaphase			
Telophase			

**RECORD YOUR GROUP'S DATA ON THE COMPUTER**

Have your instructor sign you off – **Instructor's initials:** \_\_\_\_\_

4. Data Table 2: Duration of mitotic stages.

Phase	Student Pair		Lab Section		All Sections	
	Frequency	Duration (min)	Frequency	Duration (min)	Frequency	Duration (min)
Interphase						
Prophase						
Metaphase						
Anaphase						
Telophase						

5. Estimate the duration of each stage based on your raw data, the mean lab section and the mean data for all lab sections. The duration of each mitotic stage may be estimated using the following equation:

$$\text{Time/mitotic stage} = \frac{\text{number of cells/stage}}{\text{total number of cells}} \times \frac{24 \text{ hr} \times 60 \text{ min}}{\text{mitotic 1 hr}}$$

6. **Using Excel**, graph the frequency of cells observed in each mitotic phase for your group's data, your cumulative lab section's data and the entire cumulative data for all lab sections **on the same graph**.
7. Based upon the data in Table 2 on the number of cells undergoing mitosis, what phase or stage of active mitosis is the **longest** for:
- student pair \_\_\_\_\_
  - lab section \_\_\_\_\_
  - all sections \_\_\_\_\_

8. Based upon the class data on the number of cells undergoing mitosis, what phase or stage of active mitosis is the **shortest** for:
- student pair \_\_\_\_\_
  - lab section \_\_\_\_\_
  - all sections \_\_\_\_\_
9. The nuclear envelope/membrane disappears during what stage of mitosis? **Explain why.**

**C. Chromosome Staining Technique**

10. Were you able to determine the different mitotic stages in your slide? If you could not see any chromosomes, what should you do?
11. Data Table 3: Mitotic stage frequency for the fresh onion root tip.

**Instructor's initials:** \_\_\_\_\_

Stage	Total # Observed	Frequency
Interphase		
Prophase		
Metaphase		
Anaphase		
Telophase		

12. How does your data compare with section A?
13. List several other types of stains that are used to stain chromosomes?