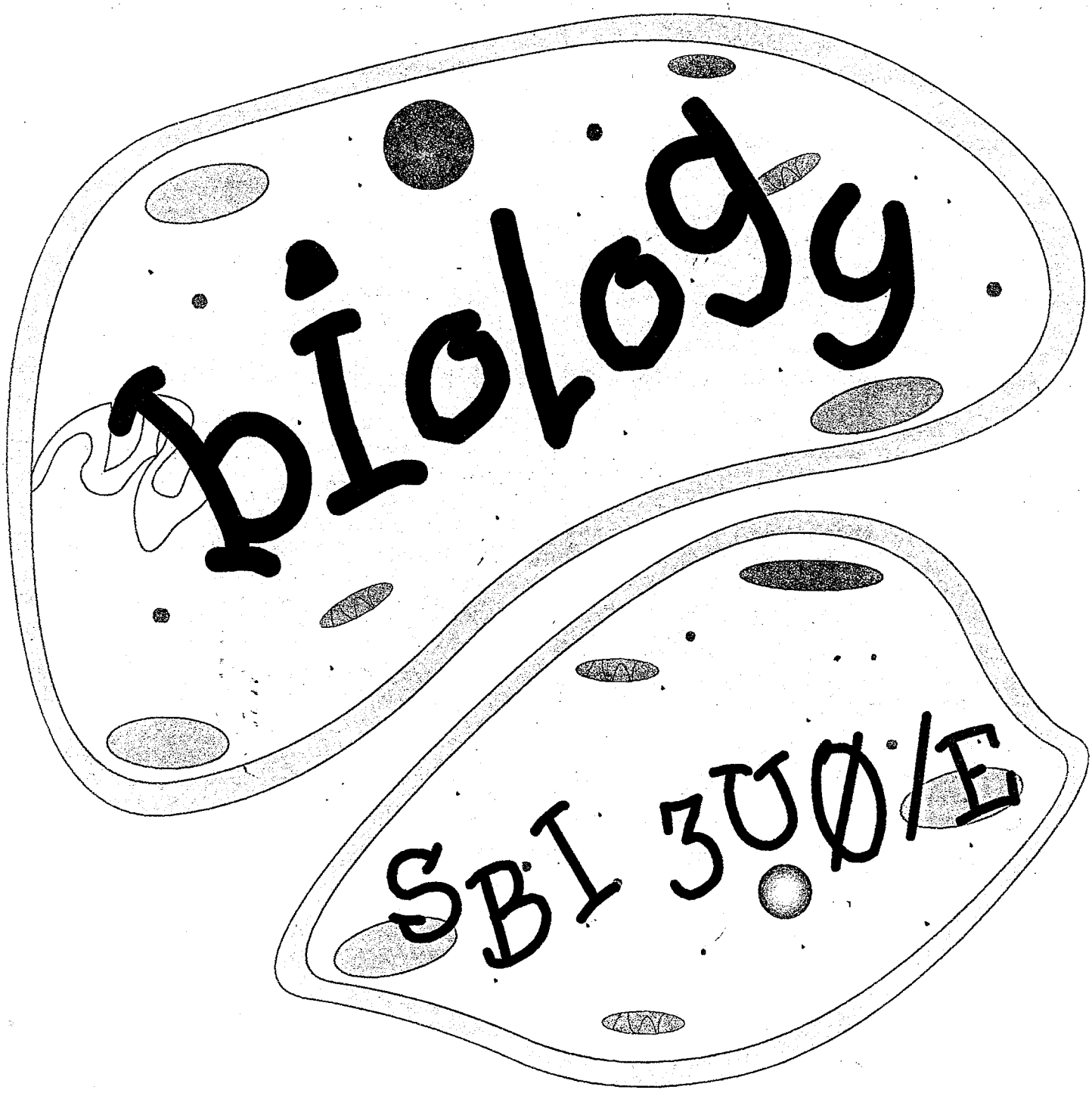

Biology
SBI 3UØ/E

Course Name SBI 3UO / E

Prerequisite: SNC 2DO/E

Text: Nelson 11 Biology

Replacement cost: $100

Course Description

Students will study cellular functions, genetic continuity, internal systems and regulation, the diversity of living organisms and the function of plants. The course focuses on the theoretical aspects of the topics understudy and assists their skills related to scientific inquiry

Assessments and Evalulation ... based on the following 2 categories

Formative assessments are learning practices that provide important feedback to student progress. Examples include: homework and quizzes.

Summative assessments form the foundation for final mark allotment at the end of a unit, term and exam. The following breakdown of types and weightings per assessment category are listed below

Student Requirements/ skills

- demonstrate the understanding of scientific models
- use investigations to develop and design scientific skills
- recognize relationships between science and technology
- apply and use scientific literacy

Assessment Breakdown

Category	Summative types	% allotments
Knowledge	Tests	40%
Application	assignments	20%
Communication	projects / presentations	20%
Inquiry	lab assessments	20%
Term		70%
Exam		30%

Term Exam Components

Two exam components will be carried out during the term:

(1) dissection assessment for the inquiry component. Students work in groups to dissect fetal pigs and then experience a formal exam on the structures analyzed

(2) unit presentation for the communication component. Students carry out a group presentation on a given unit of their choice

Unit	Unit breakdown	Summative Assessments / approximate types
Cytology	• biochemical introduction • cell components • microscope use and analysis	• nutrient lab (I) • microscope lab (C) • unit test (K)
Genetics	• nucleic acids • mitosis and meiosis • genetic problem solving and chromosome abnormalities	• genetics assignment (A) • nucleic acid assignment (C) • unit test (K)
Internal Systems	• digestive system • cardiovascular system • renal system	• digestive assignment (A) • cardiovascular lab (I and C) • unit tests X 2 (K)
Diversity of Living Things	• kingdom classification • vertebrate classification	• taxonomy activity (A) Combined test for these units (K) • plant lab (I)
Plants	• physiological components of plants • vascular tissues • comparison of monocot and dicot types	

Parent Signature	Student Signature	Date

Department Policy on Missed Assignments

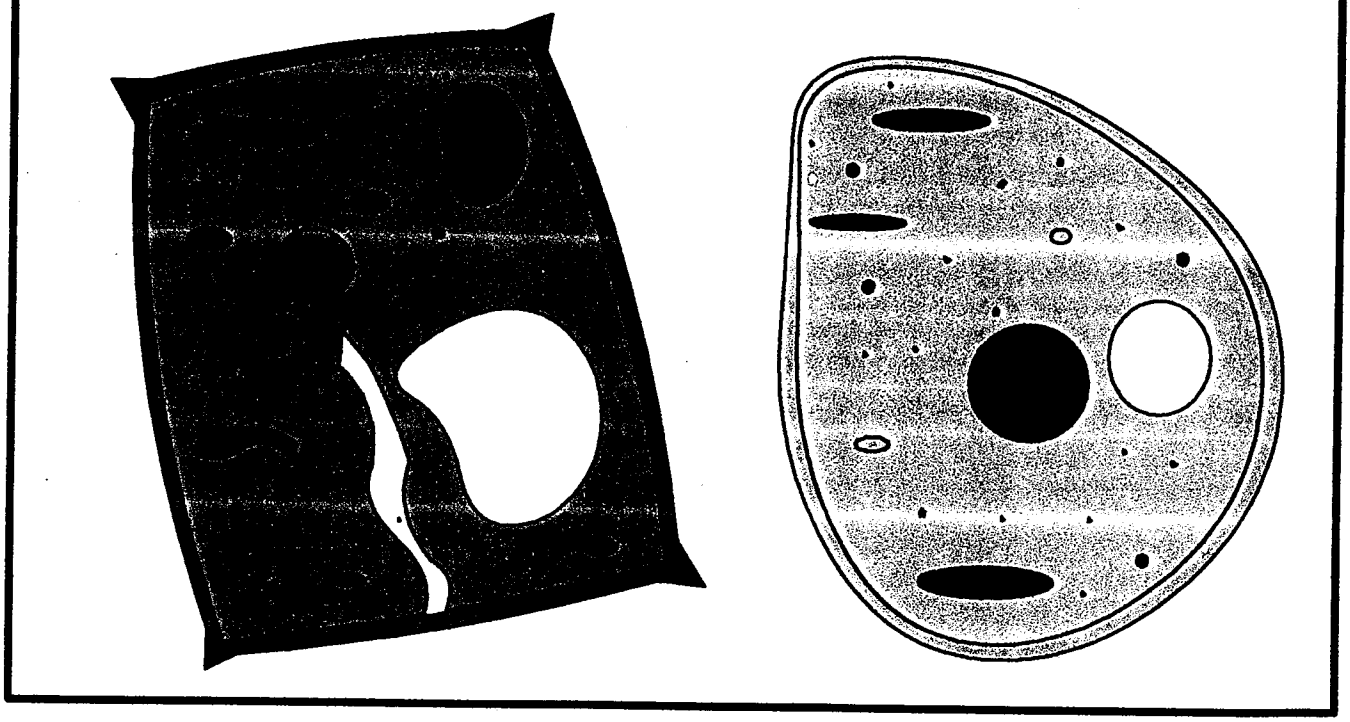
All assignments in communication, application and inquiry based categories (column 3 above) include negotiated time lines. Failure to meet these deadlines once the assessment is returned as a marked entry to the other students will result in a remedial mark that expresses the students participation (not a skill) in the assessment.

Plagiarism and Cheating

Refer to the student hand book

Unit 1

Cellular Functions



VIDEO --- HISTORY OF THE MICROSCOPE

1. **Describe the first type of microscope ever used?**

2. **What property of light was important when the microscope was first discovered?**

3. **What was the name used for single celled organisms in the video?**

4. **List some specific types of protists?**

5. **Who was very instrumental in these early discoveries?**

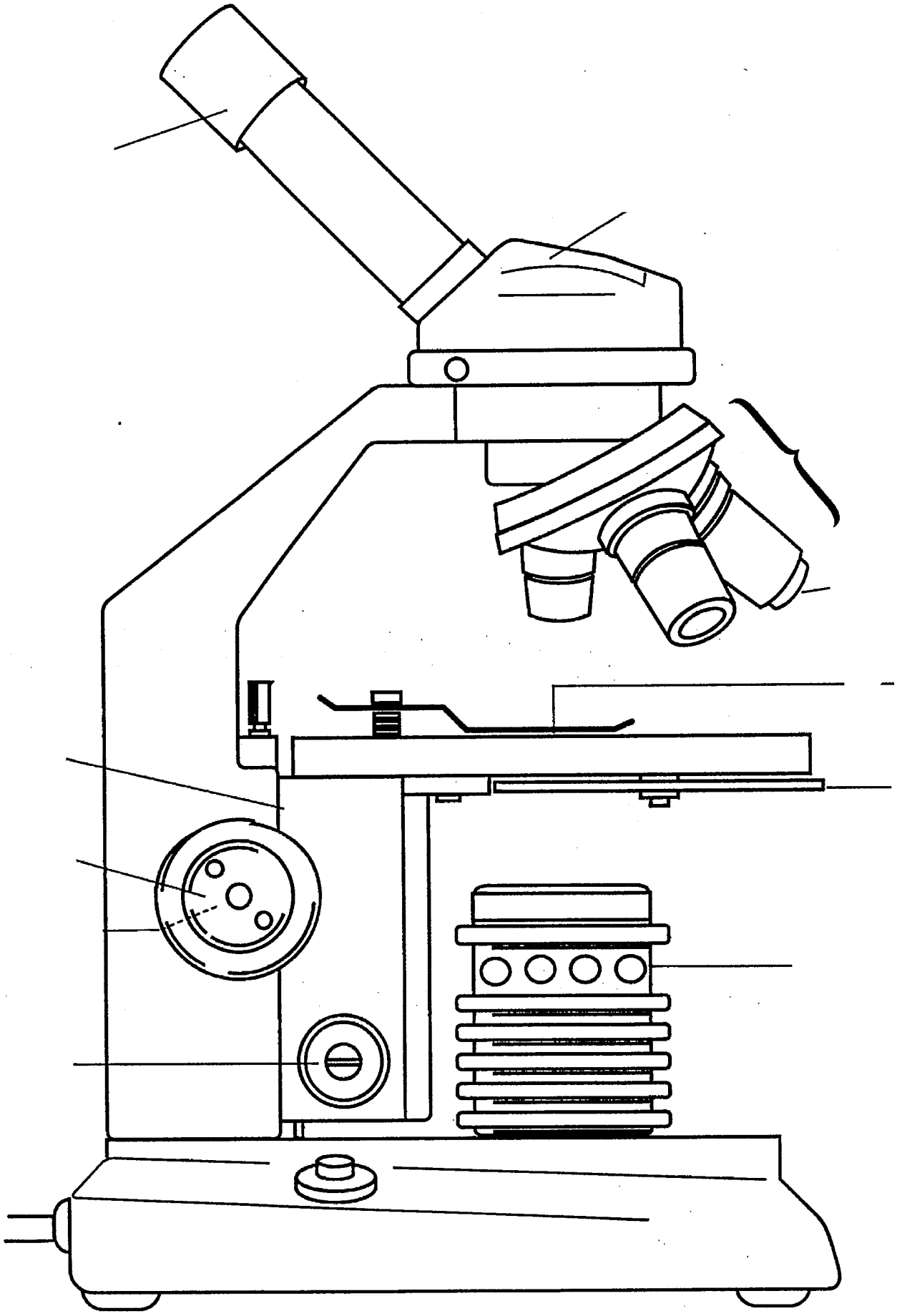
6. **How was magnification soon improved?**

7. **Why is it necessary to finely grind the lens glass before using it in a microscope?**

8. **What else can be done by scientists to increase the specimen clarity without changing the microscope itself?**

9. **Where was the first electron microscope invented and by who? How much was its magnification?**

Standard Microscope



Science Kit® & Boreal® Laboratories

SBI 3U0 Measuring With The Microscope Name_____

Procedures:

1. Set up your ruler and microscope as shown by teacher. Record the measurement of the low power field diameter in millimeters. _____
2. Convert the measurement in millimeters to micrometers (mm), by multiplying by 1000. _____um.
3. Calculate the medium and high power field diameters.
   Low mag divided by medium mag or high mag multiplied by FOV of low.
   Show your calculations:

   Medium FOV = _____ High FOV = _____

4. Under low power, focus on a prepared slide of corn stem, Zea or Monocot. Observe the large pith cells, empty cells in the middle of the stem, how many pith cells would fit across the diameter of the low power field? _____
   Calculate the diameter of a pith cell by dividing the diameter of the low power FOV by the number of cells that fit across the FOV. _____
5. Switch to high power and focus with fine adjustment. Count how pith cells would fit across the high power FOV. _____ Calculate the diameter of the pith cell by dividing the diameter of the high power FOV by the number of cells that fit across the FOV. _____.
6. Compare your calculations of the size of a pith cell on low and high power. Are they the same, slightly different or very different? _____
7. Observe a Hydra tentacle on a prepared slide. These are the arm like structures that extend out from the top of this small animal. Estimate how many tentacles would fit across the low power FOV. _____ Calculate the size of one tentacle from your estimate. _____
8. Observe your Hydro tentacle on high power. Estimate how many tentacles would fit across on the High power FOV. _____ Calculate the size of one tentacles from your estimate. _____
9. Focus the Red Blood cell slide on low, medium and finally high power. Calculate the diameter of an average red blood cell _____.

Analysis and Interpretation

1. Compare your estimates and calculations on low power and high power. Which do you think is more accurate and why?

2. Find the diameter of the high power field of view of a microscope with a low power objective of 10X and a high power objective of 40X, and a low power field of view of 1600 micrometers.

PART B: ESTIMATING CELL SIZE

Once you know the field diameter, you can estimate cell size very easily. Simply determine (estimate) how many cells would fit across the diameter of the circular field of view. Then divide the field diameter by this estimated number.

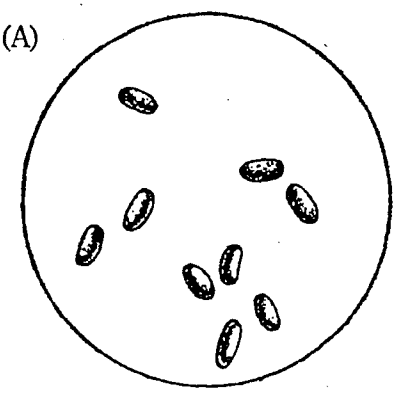
$$\text{Estimated cell size} = \frac{\text{Diameter of the field of view}}{\text{number of cells that fit across}}$$

Questions:

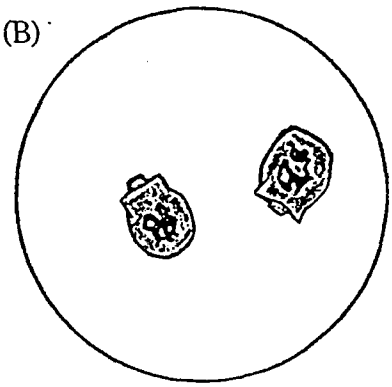
1. Now that you know the size of the field of view, you should be able to estimate the sizes of objects viewed. Try to estimate the sizes of the objects in drawings (A) and (B), viewed under low power (40X) when the field of view is 2500 µm.

Hint: Estimate how many of the objects could fit along the diameter of the circular field of view. Suppose you find that 8 objects could be placed close together along the diameter. Then divide 2500 µm by 8 to see how many micrometres in length each object would be.

(A)

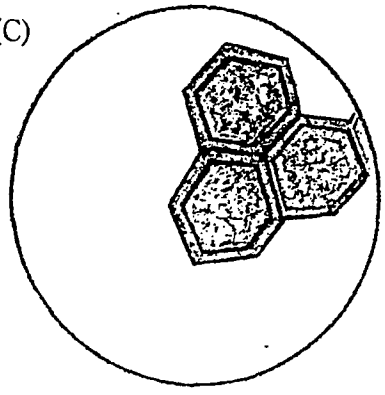


(B)

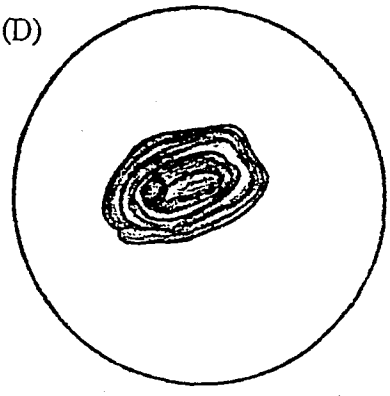


2. What would be the diameter of the high power (400X) field of view of this same instrument? Now estimate the sizes of the objects in drawings (C) and (D), using high power.

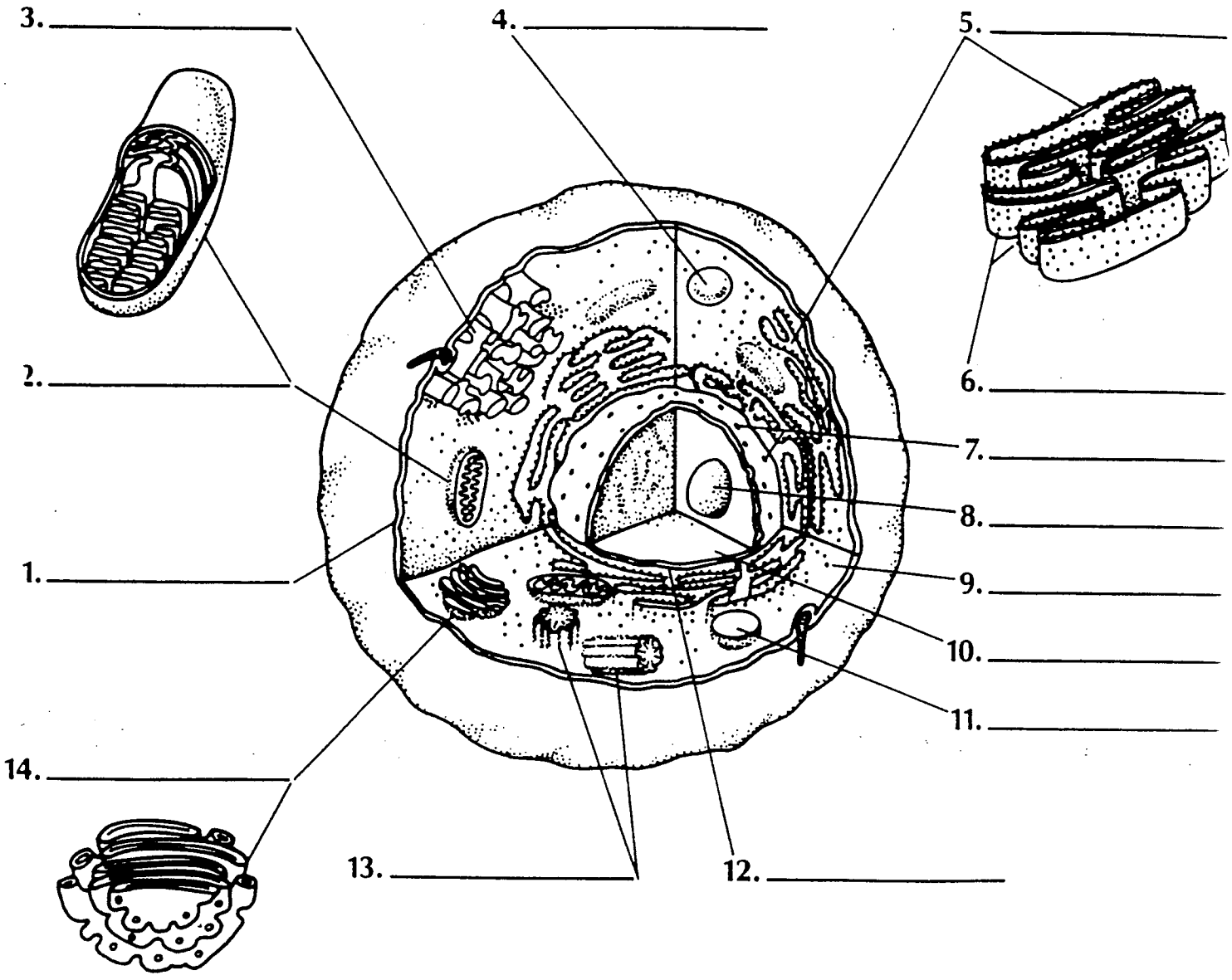
(C)



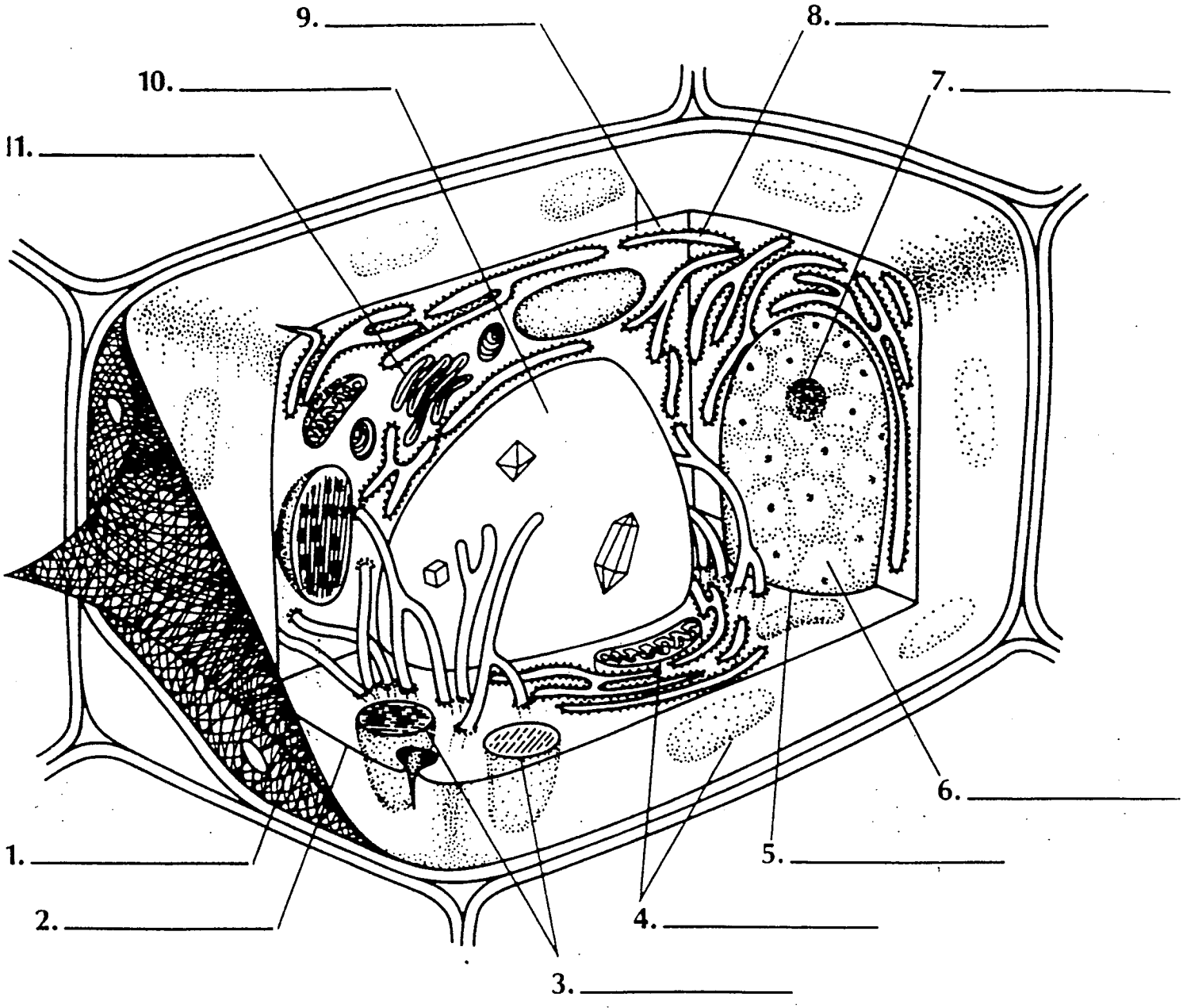
(D)



Generalized Structure of an Animal Cell



Generalized Structure of a Plant Cell



1. What is the difference between the protoplasm and the cytoplasm?
2. How is a cell classified as eukaryotic or prokaryotic?
3. How does a chromosome and a gene differ?
4. What is the function of the nucleolus?
5. Why is the cell membrane called a selectively permeable membrane?
6. Why does the nuclear envelope have pores?
7. Why can the cytoplasm be compared to the blood in your body?
8. Explain the difference between a flagella and a cilium.
9. What is a limitation of the electron microscope?
10. Describe cell fractionation and what information is gained from it.
11. How is energy produced in the mitochondria and how is it stored for later use in the cell?
12. Where are the enzymes for cell respiration located?
13. What is the function and composition of the small organelles called ribosomes?
14. What is the function of the endoplasmic reticulum (ER)?
15. What is the difference between RER and SER and where are they commonly found?
16. What is the role of the Golgi apparatus?
17. Describe the process of secretion involving the Golgi apparatus and vesicles?
18. How do lysosomes perform their function in the human body's defence mechanism?
19. How do microfilaments and microtubules differ?
20. What is the function of plastids in general and chloroplasts in particular?
21. Describe chromoplasts and amyloplasts.
22. What is the composition and function of a plant cell wall?

Nutrients Carbohydrates and Lipids Page 32

1. What are the three major groups of nutrients that we eat?
2. What nutrient makes up the largest components in most diets?
3. What is the most common simple sugar?
4. Why is fructose an ideal sugar for many diet foods?
5. What are three sources of sucrose?
6. What do simple carbohydrates such as monosaccharides have in common with polysaccharides?
7. How are starch and cellulose alike? How do they differ?
8. Complete the following table:

Name of Disaccharide	Component
Maltose	
Sucrose	
Lactose	

9. What are 3 functions of lipids?
10. What are the two structural components of triglycerides?
11. How does a phospholipid differ from a triglyceride?
12. What vital function does cholesterol perform?
13. Given the difference between saturated and unsaturated fats, which do you think would be easier to digest?

Nutrients Proteins and Nucleic Acids Page 41

1. What are the two main functions of proteins?
2. How many RBC's do you produce each second?
3. What is the composition of proteins?
4. How is the sequence or order of these building blocks determined?
5. The pattern of genes in DNA are used to build a molecule which travels to the ribosomes, what is this molecule?
6. What is this process called?
7. Where does translation take place?
8. How do the amino acids become linked together?
9. What is a polypeptide?
10. What are the 4 chemical components of DNA?
11. How do the nitrogeneous bases of DNA always pair?
12. What causes the differences between various life forms on earth?
13. What determines the sequence of amino acids in a protein molecule?
14. What is the meaning of the one gene, one protein hypothesis?
15. Why can a DNA molecule code for a great variety of proteins?
16. If a nucleotide triplet contains A, T and C how many different arrangements can you obtain?