

Science 9 Unit 2 Review Package

Cell Division review

1. State 3 functions of cell division? *Growth, Repair, Reproduction.*
2. Explain why cells are limited to a maximum size and can't keep growing to be huge. *Volume starts to inc. faster than surface Area.*
3. Provide an example of an organism that results in a clone due to cell division. *Inefficient. Bacteria*

Cell anatomy (Be able to correctly label animal and plant cells)

1. What is the function of the following organelles:
 - a. Nucleus - *Control center of the cell (contains genetic info)*
 - b. Nucleolus - *produces Ribosomes*
 - c. Rough endoplasmic reticulum - *transports proteins*
 - d. Smooth endoplasmic reticulum - *transports fats*
 - e. Golgi body - *MAKES structural changes to proteins*
 - f. Mitochondria - *Energy production*
 - g. Centrioles - *produces spindle fibers to separate chromosomes in cell division*
 - h. Chloroplasts - *Energy production in plants*
 - i. Cell membrane - *Controls what goes in/out of cell.*
 - j. Cell wall - *Rigid outer structure of plant cells*
 - k. Microtubules - *inner structure of cell & USED to move organelles*
 - l. Ribosomes - *reads genetic message to make protein*
 - m. Cytoplasm - *Jelly like surroundings of organelles*
 - n. Vacuole - *assists in transporting materials around cell.*

DNA Review

- DEOXYribonucleic Acid.*
1. Write out the full name for DNA.
 2. Describe what a gene is. - *A short section of DNA that codes for a protein*
 3. Where in the cell are chromosomes located? - *nucleus*
 4. What is the shape of DNA? - *Double helix*
 5. What are the 3 major components of a nucleotide? - *phosphate, sugar, base*
 6. Which part(s) of nucleotides make up the sides of a DNA molecule? *phosphate, sugar*
 7. What are the "rungs" of the DNA "ladder" made up of? - *Nitrogenous Bases*
 8. What is the sugar found in DNA? - *Deoxyribose*

Adenine — Thymine (A-T)
Cytosine — Guanine (C-G)

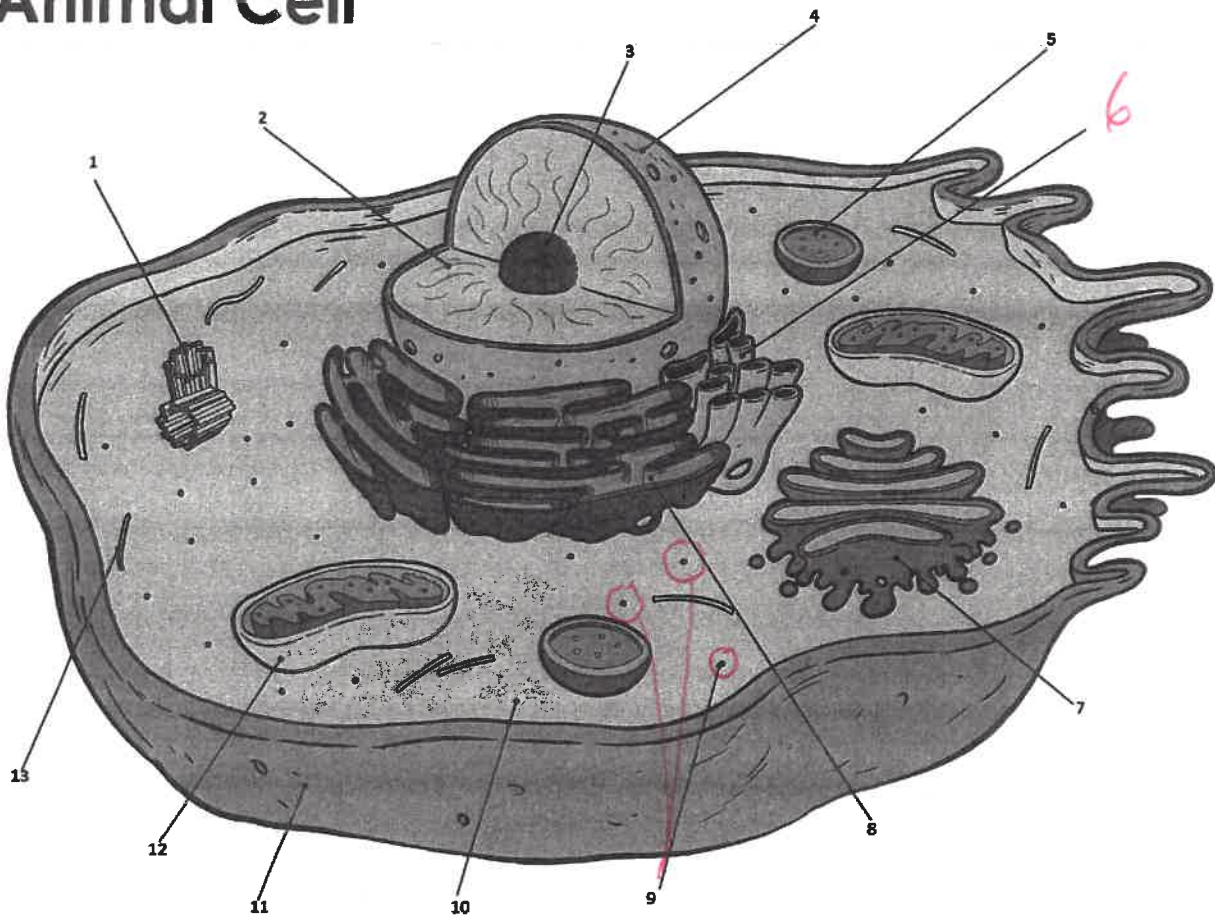
9. Describe which pairs of bases bond (connect together) in DNA. ↗
10. DNA is made of sub-units called Nucleotides?
11. Why is RNA necessary to act as a message for DNA? In other words, why can't DNA be used directly to code for protein? DNA is too large to leave the nucleus
12. Where are proteins made in the cell? — Rough ER at ribosomes or cytoplasm
13. Proteins are made of sub-units called Amino acids?
14. How do some cells become brain cells, muscle cells, stomach cells, and skin cells when they all contain identical DNA? Some genes are turned off.
15. Why is DNA often referred to as the blueprint of life? — It codes for the structure of an organism.
16. What organelle is responsible for "reading" the RNA message? — Ribosomes
17. State 2 locations in a cell where protein synthesis (i.e., protein making) occurs. always where ribosomes are located 1) Rough ER 2) cytoplasm
18. The type of amino acid used in protein synthesis is determined by groups of 3 bases called Codons?
19. How do DNA, chromatin and chromosomes differ? What's the same about all three?
20. What is the human genome? All of a human's genetic information
21. State 3 types of mutations and provide an example of each.
22. State several factors that increase risk for cancer.

19) DNA, chromatin, and chromosomes all contain the nucleotides that make up DNA. Chromatin contains DNA and histone proteins coiled up. Chromosomes are a more condensed version of chromatin and appear during cell division.

21) Beneficial mutation: — HbS protects against malaria
Neutral mutation: — freckles
Harmful mutation: cancer

22) smoking, drinking alcohol, UV, X-rays, age 65+, etc.

Animal Cell

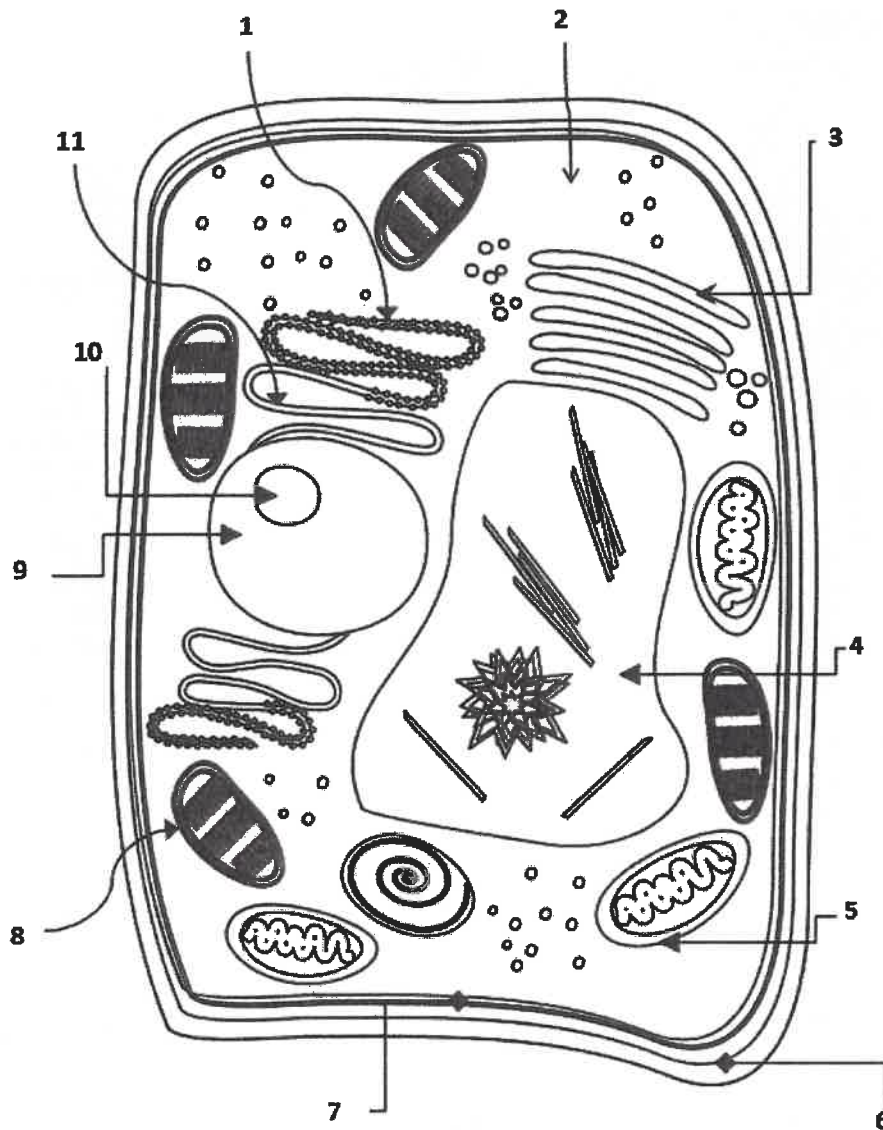


Label the animal cell using the numbers below

1. Centrioles
2. Nucleus
3. Nucleolus
4. Nuclear membrane
5. Vesicle or lysosome
6. Smooth ER
7. Golgi body
8. Rough ER

9. Ribosome
10. Cytoplasm
11. Cell membrane
12. Mitochondria
13. Microtubule

Plant Cell



1. Rough ER
2. Cytoplasm
3. Golgi body
4. Vacuole
5. mitochondria
6. Cell wall
7. cell membrane

8. chloroplast
9. Nucleus
10. Nucleolus
11. Smooth ER

MITOSIS WORKSHEET

Name: _____

Matching: match the term to the description

A. Prophase **B.** Interphase **C.** Telophase **D.** Metaphase **E.** Anaphase

- E 1. The sister chromatids are moving apart.
- A 2. The nucleolus begins to fade from view.
- C 3. A new nuclear membrane is forming around the chromosomes.
- C 4. The cytoplasm of the cell is being divided.
- A 5. The chromosomes become invisible.
- D 6. The chromosomes are located at the equator of the cell.
- A 7. The nuclear membrane begins to fade from view.
- C 8. The division (cleavage) furrow appears.
- E 9. The chromosomes are moving towards the poles of the cell.
- D 10. Chromatids line up along the equator.
- A 11. The spindle is formed.
- B 12. Chromosomes are not visible.
- B 13. Cytokinesis is completed.
- C/B 14. The cell plate is completed.
- B 15. Chromosomes are replicated.
- C 16. The reverse of prophase.
- B 17. The organization phase.

Fill in the blank: (drag/drop or write the word) Some will be used more than once.

- | | | | |
|---------------|---------------|----------------|------------------|
| A. Prophase | D. Metaphase | G. Chromatid | J. Spindle fiber |
| B. Interphase | E. Anaphase | H. Cytokinesis | K. Cell Plate |
| C. Telophase | F. Centromere | I. Mitosis | |

B

18. What phase are daughter cells in as a result of mitosis?

E

19. During what phase of mitosis do centromeres divide and the chromosomes move toward their respective poles?

A

20. What is the phase where chromatin condenses to form chromosomes?

F

21. What is the name of the structure that connects the two chromatids?

G

22. In a chromosome pair connected by a centromere, what is each individual chromosome called?

I

23. What are the two parts of cell division?

AND H

J

24. What structure forms in prophase along which the chromosomes move?

D

25. Which phase of mitosis is the last phase that chromatids are together?

B

26. Which phase of the cell cycle is characterized by a non-dividing cell?

J

27. What structure is produced when protein fibers radiate from centrioles?

K in plants

28. What forms across the center of a cell near the end of telophase?

B

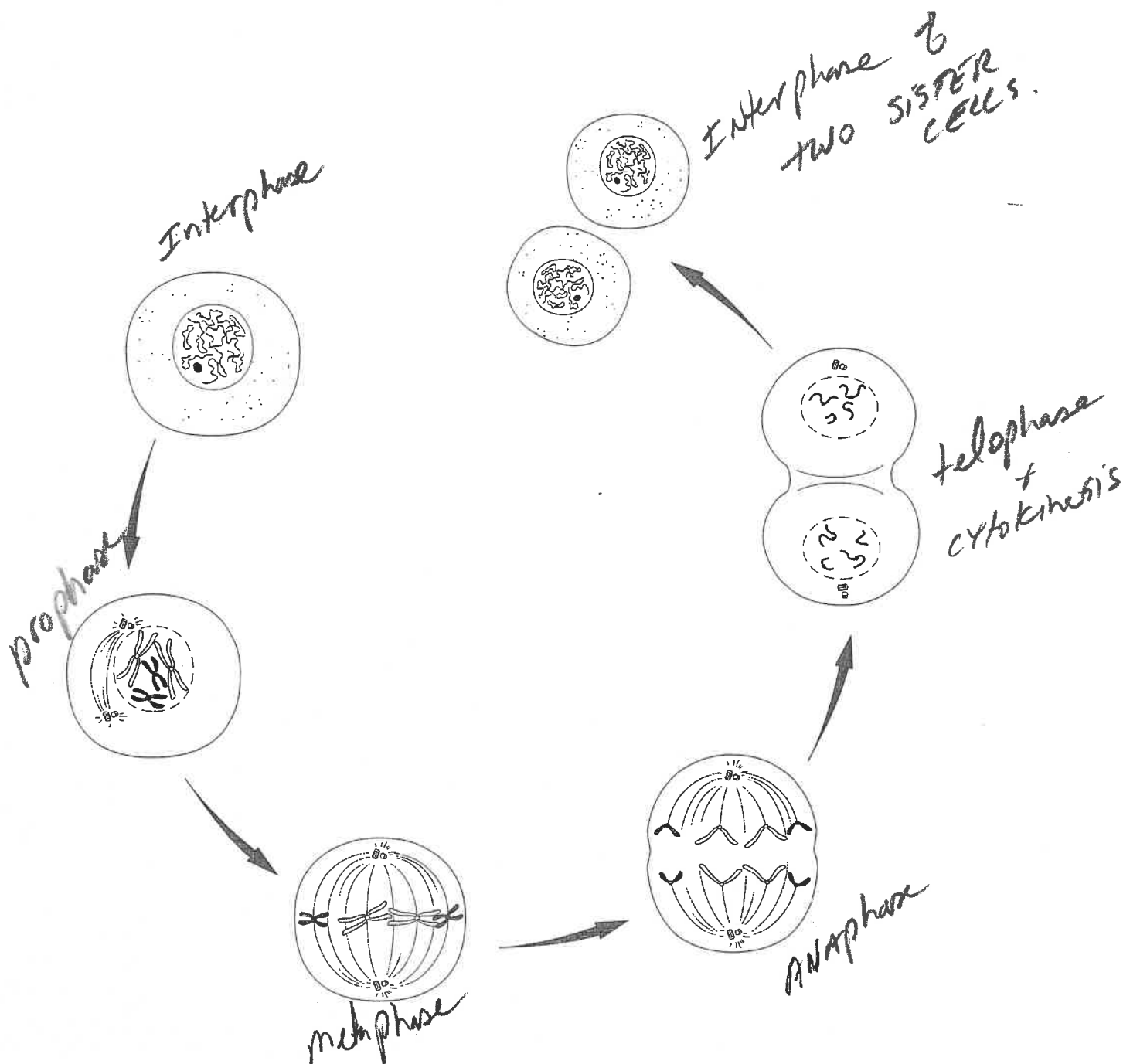
29. The period of cell growth and development between mitotic divisions?

C

30. What is the phase where cytokinesis occurs?

Stages of Cell Division

Note the stages of cell division and label them.



Chapter 2 Quiz : Practice**Part A: Modified True/False**

Indicate whether each statement is true or false. If false, change the underlined word or phrase to make the statement true.

- F 1. Multicellular organisms grow by increasing the size of their cells. number
- F 2. Instructions for all cell activities are coded for by proteins. DNA
- T 3. The stage of the cell cycle in which a cell is not actively dividing is known as interphase.
- F 4. A change in a cell's genes is known as a cancer. mutation
- T 5. A cancer tumour that does not interfere with the cells around it is known as a benign tumour.

Part B: Completion

Complete the following sentences.

6. If one cell undergoes division and continues to do so for five divisions, there will be 32 cells.
7. The part of the cell that contains all of the materials needed to make ribosomes is known as the nucleolus.
8. A chemical substance that can cause cancer is known as a Carcinogen.
9. A cancerous tumour may spread to other parts of the body by the process of metastosis.

Part C: Matching

Match each of these words to their correct description.

- | | |
|---------------------------|--|
| <u>C</u> 10. chromosomes | (a) provide energy for the cell |
| <u>A</u> 11. mitochondria | (b) location of most cell activity including absorbing, moving, and processing materials |
| <u>D</u> 12. ribosomes | (c) contain genes |
| <u>B</u> 13. cytoplasm | (d) produce proteins |

Chapter 2 Quiz (continued)

Part D: Multiple Choice

Circle the letter beside the answer that best completes the statement or answers the question.

14. Cell division is used for

(a) reproduction

(b) growth

(c) repair

(d) all of the above

15. Mitosis proceeds through a series of stages. These, in order, are

(a) interphase, metaphase, prophase, telophase

(b) prophase, metaphase, anaphase, telophase

(c) prophase, anaphase, metaphase, telophase

(d) metaphase, telekinesis, prophase, cytokinesis

16. The stage of mitosis during which the cytoplasm is divided into two parts is called

(a) cytokinesis

(b) telophase

(c) interphase

(d) binary fission

17. Some animals are able to replace lost limbs or other body parts. This ability is called

(a) fragmentation

(b) vegetative reproduction

(c) budding

(d) regeneration

18. Which of the following statements about DNA is **not** true?

(a) The DNA molecule can make a copy of itself.

(b) The DNA molecule looks like a twisted ladder (double helix).

(c) In DNA, adenine is always paired with guanine.

(d) There are only four nitrogenous bases available to form DNA.

Part E: Short Answer

Use sentences to answer the following questions.

19. At some time in your life, you cut yourself on a piece of glass or some other sharp object. In one or two sentences, explain why that cut is no longer bleeding, and the role of cell division in the process of healing.

Cells divide by mitosis & cytokinesis
to replace/repair damaged cells.

20. Explain what fragmentation is. Name one organism that can reproduce via fragmentation with regeneration.

Fragmentation is when a part of the
organism breaks/cut off and the

part grows into a new organism. The organism
that you started with can
grow a new part by regeneration

1.2 Assessment, pages 19–22

1. A

7. D

13. C

19. D

2. C

8. B

14. C

20. D

3. D

9. B

15. B

~~21. D~~

4. B

10. A

16. D

~~22. C~~

5. F

11. A

17. B

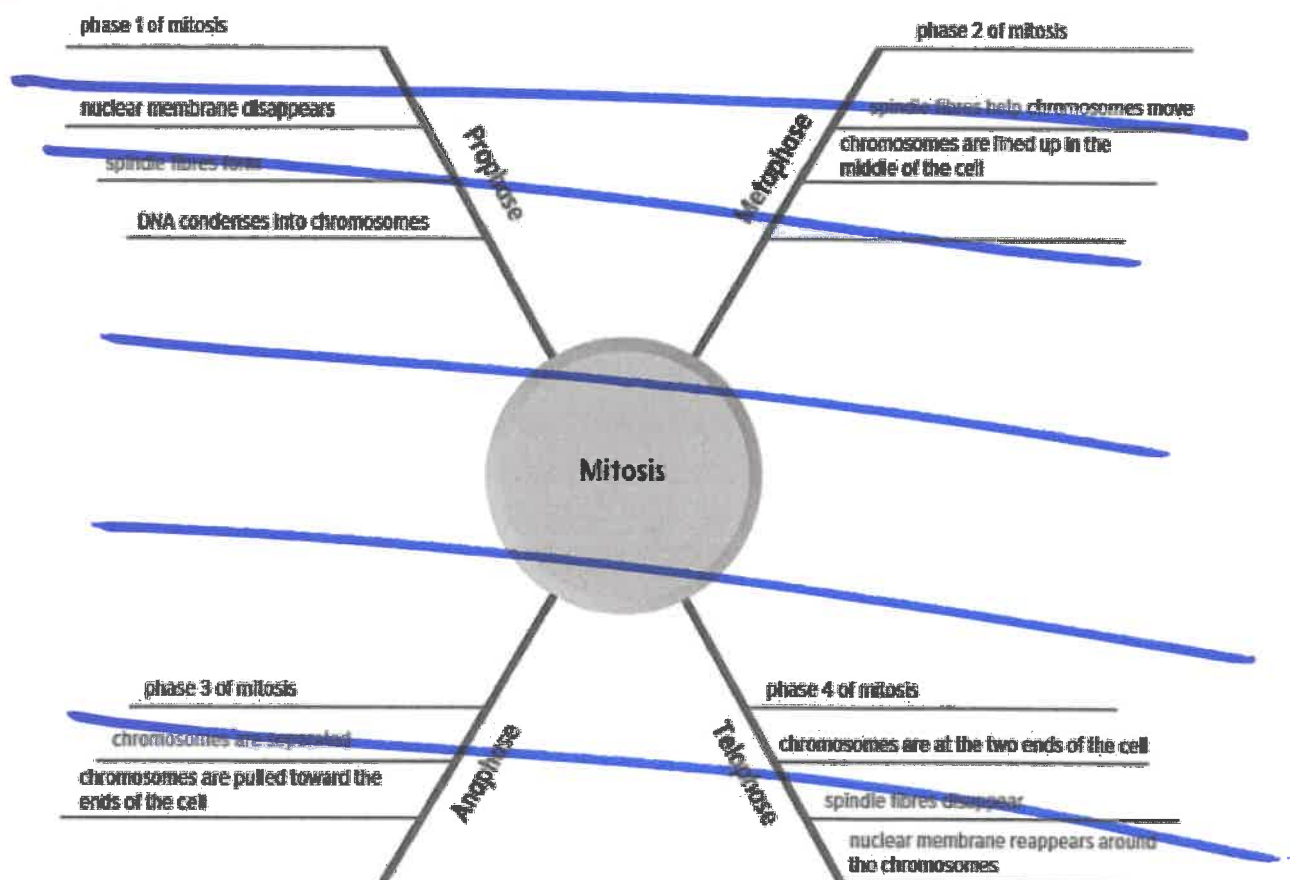
~~23. D~~

6. E

12. C

18. B

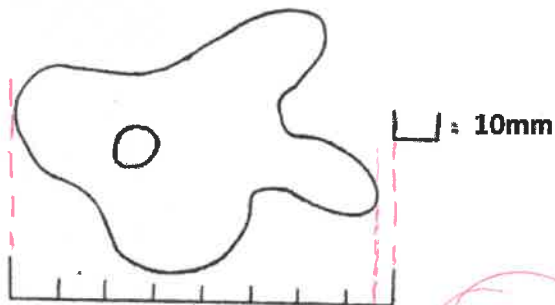
~~24.~~



Microscope worksheet

A student viewed an amoeba using a microscope.

She drew the following picture:



What is the size of the drawing? ~ 76 mm

Calculate the magnification of the drawing if:

The amoeba is observed under high power (40X objective lens) *High Power mag = (5x)(40x) = 200X*

The ocular lens = 5X

The low power objective lens = 4X with FOV = 4.2 mm *Low Power mag = (5x)(4x) = 20X*

The amoeba fits across the high power FOV 4.5 times.

1. First determine the magnification on low power and high power.

$$\text{Low} = 20X \quad \text{High} = 200X$$

2. Divide the high-power magnification by low power magnification.

$$200 \div 20 = 10X$$

3. Use the value in question #2 to determine the FOV on high power.

$$\text{Low Power FOV} = 4.2\text{mm} \div 10 = 0.42\text{mm}$$

4. Determine the actual size of the amoeba under high power (remember, it fits across the FOV 4.5 times.)

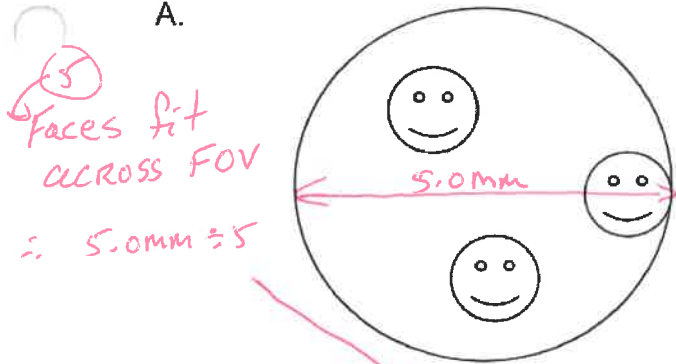
$$0.42\text{mm} \div 4.5 = 0.093\text{mm approximately}$$

5. Determine the magnification of the diagram by dividing this measurement by the actual size of the amoeba determined in question #4.

$$76\text{mm} \div 0.093\text{mm} = \sim 817X \text{ Magnification}$$

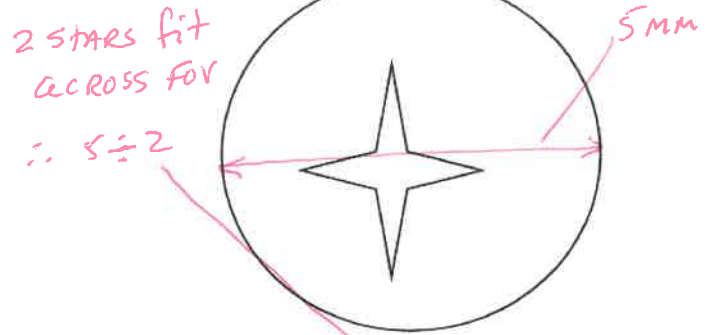
4. Calculate the actual size of one cell in each of the following microscope images, as seen on low power. Assume the FOV is 5.0 mm.

A.



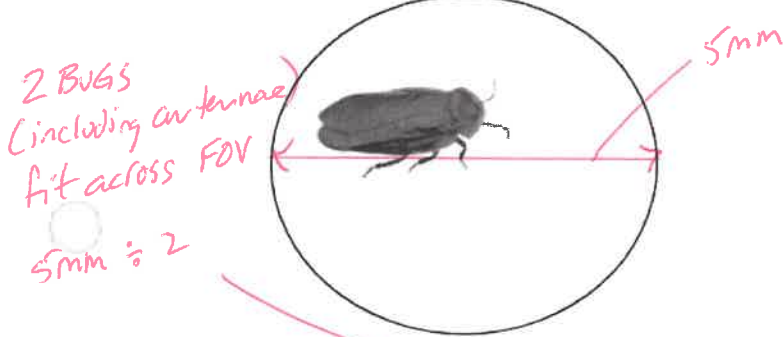
Actual size of one cell: 1 mm mm

B.



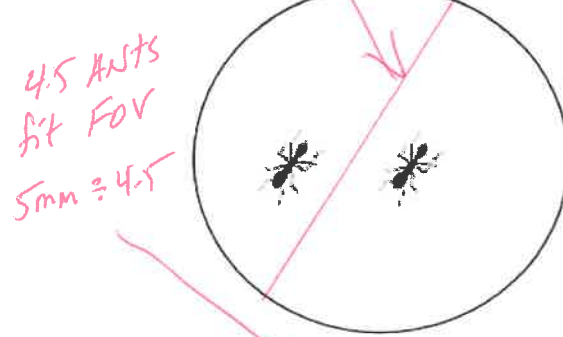
Actual size of one cell: 2.5 mm mm

C.



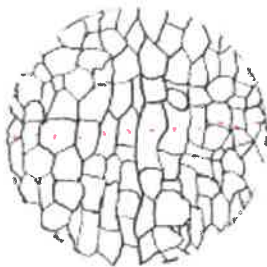
Actual size of one cell: 2.5 mm

D.



Actual size of one cell: 1.1 mm

5. Determine the diameter of ONE onion cell shown using the following microscope drawing where the diameter of the field of view is 3.7 mm on low power.



there are approximately 12 cells that fit across the FOV

$$\therefore 3.7 \div 12 =$$

0.308 mm
approximate cell width