Nelson

B.C. Science PROBE 9

Student Workbook

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UNIT A

Reproduction

Contents

Chapter 2 Cell Growth and Reproduction

Name: _____ Date: _____

CHAPTER 2

Study Guide Outline

Use this outline to write notes as you progress through the Chapter.

Five key ideas of chapter	
functions of cell division	
growth	
repair	
reproduction	
eukaryotic cells	
definition and example organisms	
prokaryotic cells	
definition and example organisms	
structures in cell division	
nucleus	
chromosomes	
nucleolus	
ribosomes	
endoplasmic reticulum	
cytoplasm	

Name: _____ Date: _____

CHAPTER 2

Study Guide Outline (continued)

DNA to protein
- DNA structure (description)
- nucleotide
- nitrogenous bases

genetic code
- gene
- genome
- RNA

protein synthesis (description of process)
- enzymes
- hormones

variation
- between species
- within a species
- traits

cell cycle
- interphase
- sister chromatids

cell division
- stages of mitosis (labelled sketch)

Name: _____ Date: _____

CHAPTER 2

Study Guide Outline (continued)

- prophase
  - sister chromatids
  - spindle fibres
  - spindle
- metaphase
- anaphase
- telophase
- cytokinesis

changes in DNA

- mutation
- cancer
  - tumours (benign and malignant)
  - metastasis
  - causes of cancer
  - treatment of cancer

asexual reproduction

- binary fission
- budding
- vegetative reproduction
- fragmentation
- characteristics

Name: _____ Date: _____ 2.1

The Importance of Cell Division

Key Question: What are the functions of cell division?

Before You Read

1. Preview the section. Look at the headings. Read the first and last sentence in each paragraph. Study the figures and read the captions. As you preview the section, complete the chart below.

What Information Is Provided?	What Questions Do You Have?
Figure 1:	
Figure 2a:	
Figure 2b:	
Figure 3:	

2. On the lines below, predict what you will learn by reading this section.

_____

_____

While You Read

Use information from the section to complete the following graphic organizer. In each box, explain why each function is important to cell division.

Functions of Cell Division

Growth is important because	**Repair** is important because	**Reproduction** is important because

Name: _____ Date: _____ 2.1

The Importance of Cell Division (continued)

After You Read

1. In the space below, make notes or a sketch with labels of what you have learned about the importance of cell division.

2. Use your notes or sketch to explain to another student why each of the three functions is important to cell division.

Name: _____ Date: _____ 2.1

Try This: From One Cell to Trillions

Number of Divisions	Number of Cells
0	1
1	2
2	4
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	

Number of Divisions	Number of Cells
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	

Name: _____ Date: _____ 2.2

Cell Structures Involved in Cell Division

Key Question: What role do cell structures play in cell division?

Before You Read

Study Figures 1 and 2. Complete the chart below.

	Purpose of the Graphic	What Questions Do You Have?
Figure 1(a)		
Figure 1(b)		
Figure 2		

While You Read

Complete the following chart to summarize cell structure involvement in cell division.

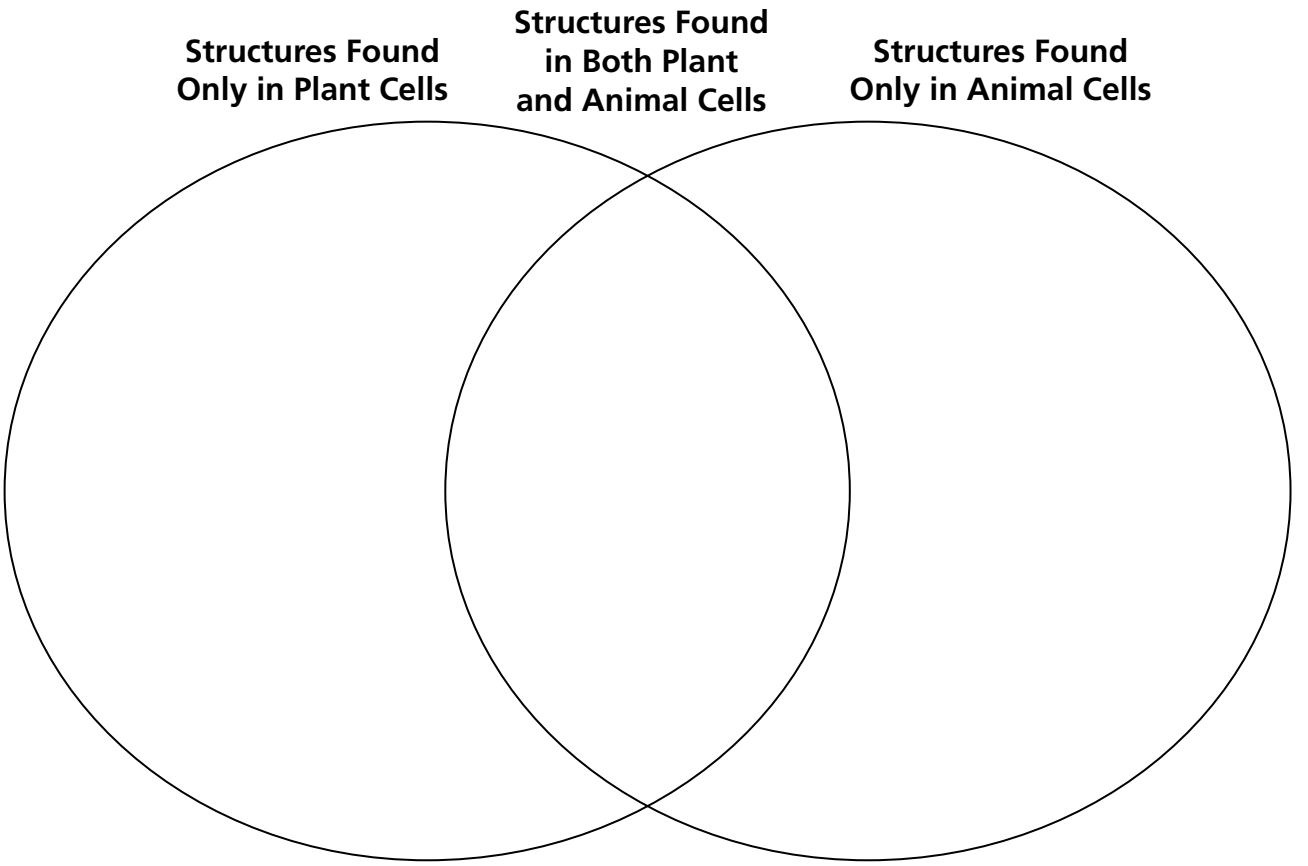
Structure	What Is It?	What Is Its Role (Job) in Cell Division?
nucleus		
chromosome		
nucleolus		
ribosome and endoplasmic reticulum		
cytoplasm		

Name: _____ Date: _____ 2.2

Cell Structures Involved in Cell Division (continued)

After You Read

1. Complete the following graphic organizer to compare the similarities and differences between the functions of plant and animal cells.



2. Use your completed graphic organizer to explain to a partner how plant and animal cells are similar and different.

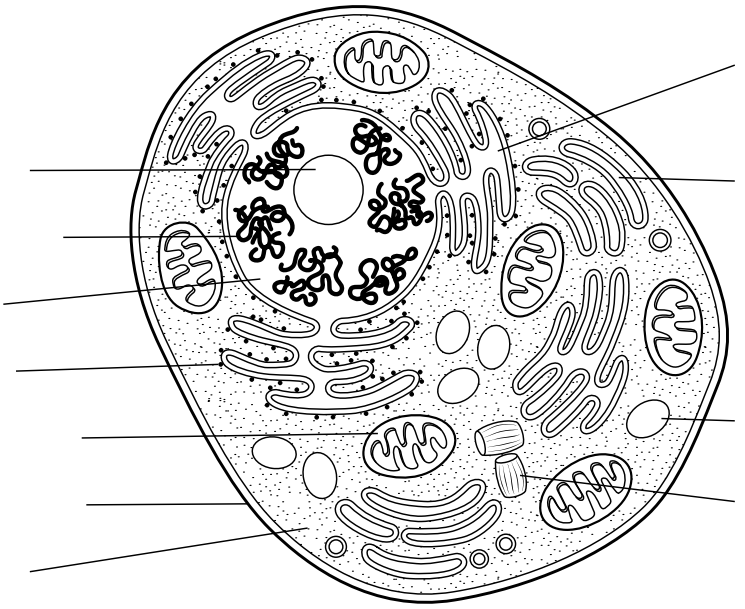
   Note: Use the following terms in your explanation: chromosomes, DNA, nucleolus, ribosomes, endoplasmic reticulum, cytoplasm.

Name: _____ Date: _____ 2.2

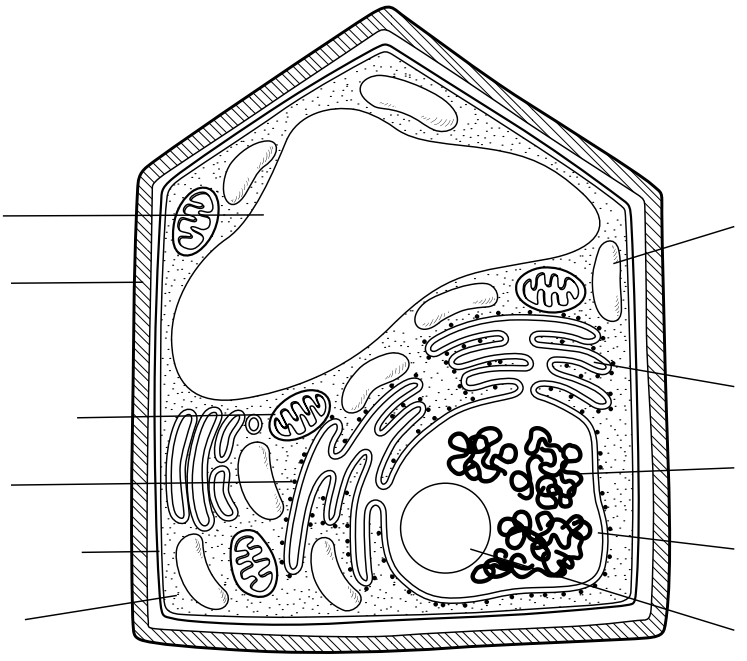
Animal Cell and Plant Cell

Label the following diagrams.

Animal Cell



Plant Cell



Name: _____ Date: _____ 2.2

Comparing a Plant Cell to a Factory

In a small group read and discuss the task and complete the chart. Be prepared to share your comparison with the class.

Task

Choose a factory or company that produces a product familiar to you, for example, a guitar factory, an automobile factory, or a computer company. Identify the part of the factory that corresponds to each cell part in the chart below. In the third column explain your comparison.

Cell Part	Factory Equivalent	Reason for Comparison
nucleus		
mitochondria		
cell membrane		
nuclear membrane		
Golgi apparatus		
ribosomes		
endoplasmic reticulum		
chloroplasts		

Name: _____ Date: _____ 2.3

From DNA to Proteins

Key Question: What functions do DNA and proteins play in the making, maintaining, and repairing of cells?

Before You Read

Preview the section. Look at the headings. Read the first and last sentence in each paragraph. Study the figures and read the captions. On the lines below, predict what you will learn by reading this section.

_____

_____

_____

While You Read

As you read, make jot notes about the interesting facts you find out about DNA and proteins.

How to Make Jot Notes

- Use the headings of the section to guide your note writing.
- After reading each paragraph, write down what you find interesting and want to remember.
- When completed, compare your notes with those of another student. (Have you included the most important facts?)

Name: _____ Date: _____ 2.3

From DNA to Proteins (continued)

After You Read

1. How accurate was the prediction you made before you read the section? Explain.

_____

_____

_____

2. Explain to another student in your own words the role DNA and proteins play in the making, maintaining, and repairing of cells. Use the space below to organize the ideas for your explanation. You may sketch or make notes.

Name: _____ Date: _____ 2.4

The Cell Cycle

Key Question: What are the stages of cell division?

Before You Read

Preview the section. Look at the headings. Read the first and last sentence in each paragraph. Study the figures and read the captions. On the lines below, predict what you will learn by reading this section.

_____

_____

_____

While You Read

Make notes from the section. Turn the headings into questions and use them to guide your note taking.

Note-Taking Hints

- Develop your own system of abbreviations (e.g., use "CD" for cell division).
- Look for key words.
- Write page numbers beside important points.
- Draw pictures to help you remember.

Name: _____ Date: _____ 2.4

The Cell Cycle (continued)

After You Read

1. Review the diagrams and captions to help you summarize your learning.

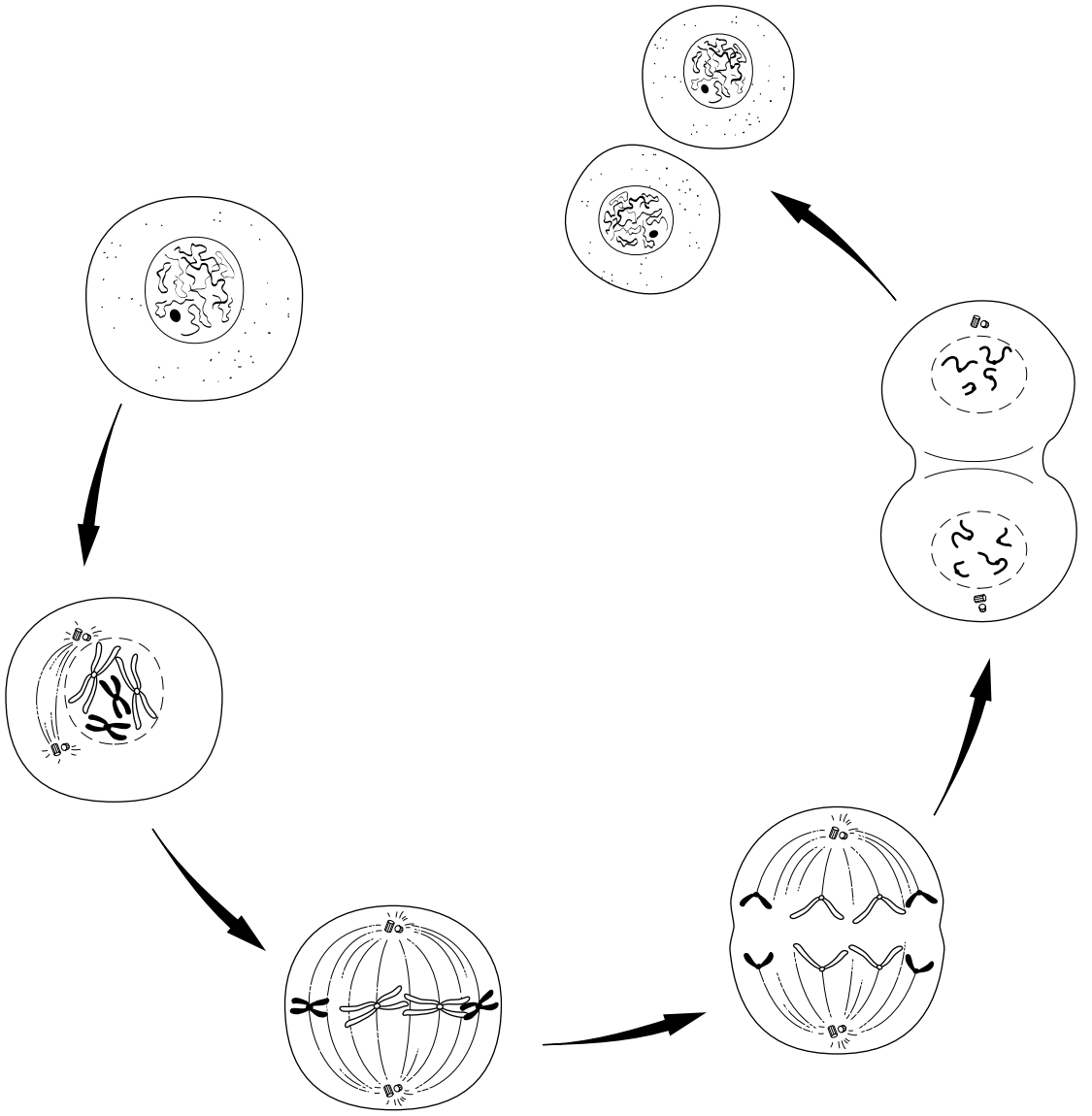
	Purpose of the Graphic	How Did This Graphic Add to Your Learning?
Figure 1: The Cell Cycle		
Figure 2: Mitosis and Cytokinesis in an Animal Cell		
Figure 3: Single Duplicated Chromosome		
Figure 4: Plant Cells		

2. Explain to another student how cell division is a continuous process. Use your chart as a guide for your explanation.

Name: _____ Date: _____ 2.4

Stages of Cell Division

Note the stages of cell division and label them.



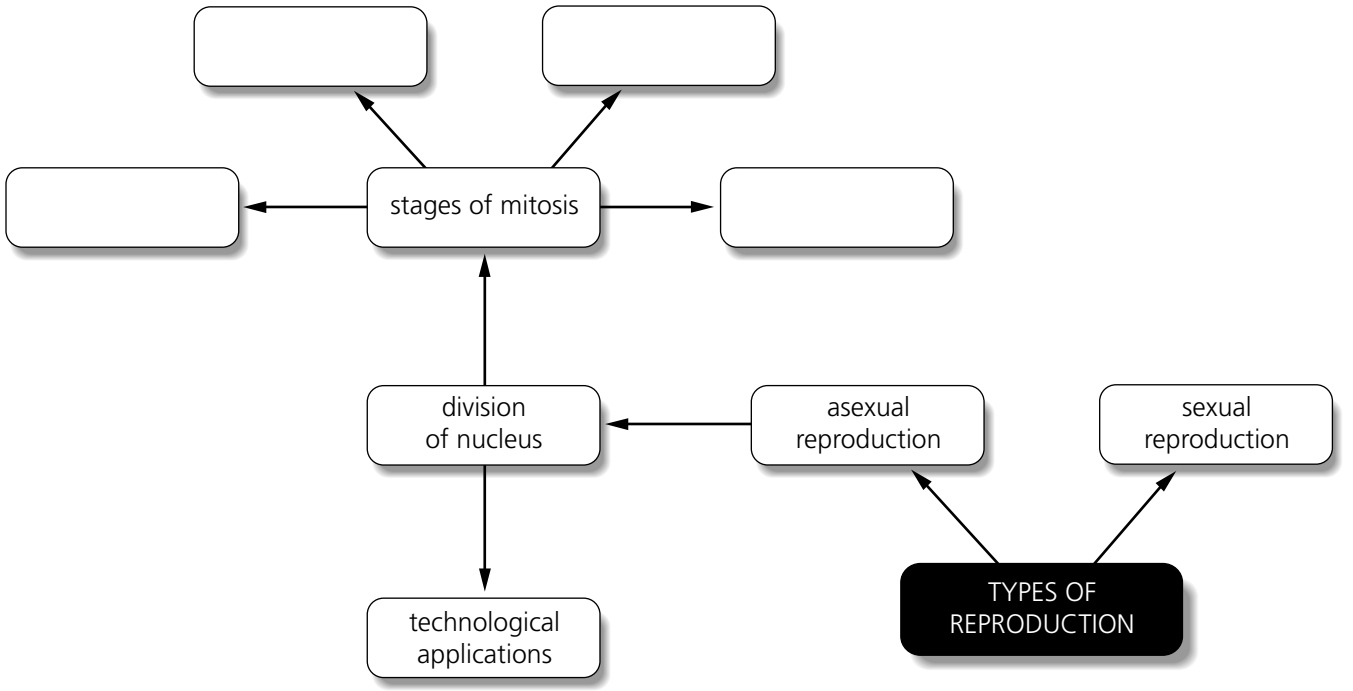
Name: _____ Date: _____

CHAPTER 2

Concept Map, Cell Division

Complete the following concept map. Place the appropriate terms in the empty cells. Draw in additional cells where needed. Use the following words:

prophase	telophase	cancer research
metaphase	cloning	
anaphase	tissue transplants	



Name: _____ Date: _____

Chapter 2 Quiz

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.

____ 1. Multicellular organisms grow by increasing the <u>size</u> of their cells. _____

____ 2. Instructions for all cell activities are coded for by <u>proteins</u>. _____

____ 3. The stage of the cell cycle in which a cell is not actively dividing is known as <u>interphase</u>. _____

____ 4. A change in a cell's genes is known as a <u>cancer</u>. _____

____ 5. A cancer tumour that does not interfere with the cells around it is known as a <u>benign</u> tumour. _____

Part B: Sentence Completion
Complete the following sentences.

6. If one cell undergoes division and continues to do so for 5 divisions, there will be_____ cells.

7. The part of the cell that contains all of the materials needed to make ribosomes is known as the _____.

8. A chemical substance that can cause cancer is known as a _____.

9. A cancerous tumour may spread to other parts of the body by the process of _____.

Part C: Matching
Match each of these words to their correct description.

____10. chromosomes

____11. mitochondrion

____12. ribosomes

____13. cytoplasm

(a) provides energy for the cell

(b) location of most cell activity including absorbing, moving, and processing materials

(c) contain genes

(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.

    _____

    _____

    _____

20. Imagine that you saw a greenhouse operator cutting a shrub and putting the cut branches in water. Explain what he or she is doing and what he or she hopes to accomplish.

    _____

    _____

    _____