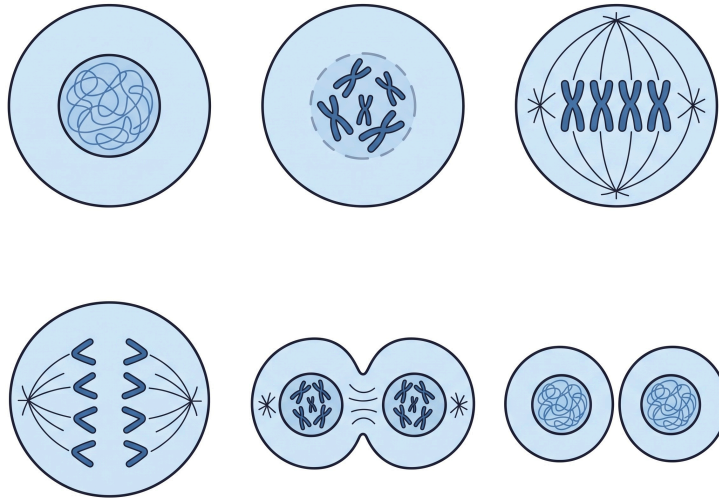


Mitosis

How one cell divides into two



7

printable sheets

17

pages

All

answer keys included

Mitosis Teaching Pack

How one cell divides into two

How to use this pack. The sheets are in a suggested teaching order: show the labeled diagram, have students label the blank one, then work through the practice sheets and finish with the quiz. Use them all over a week or pick the ones you need. The answer keys are together at the back.

What is inside

1. Teach

Mitosis Diagram 3

2. Label

Blank Mitosis Diagram 4

3. Match

Stages of Cell Division 5

4. Read

How One Cell Becomes Two 6

5. Connect

Which Stage Is It? 8

6. Review

Mitosis Crossword 9

7. Check

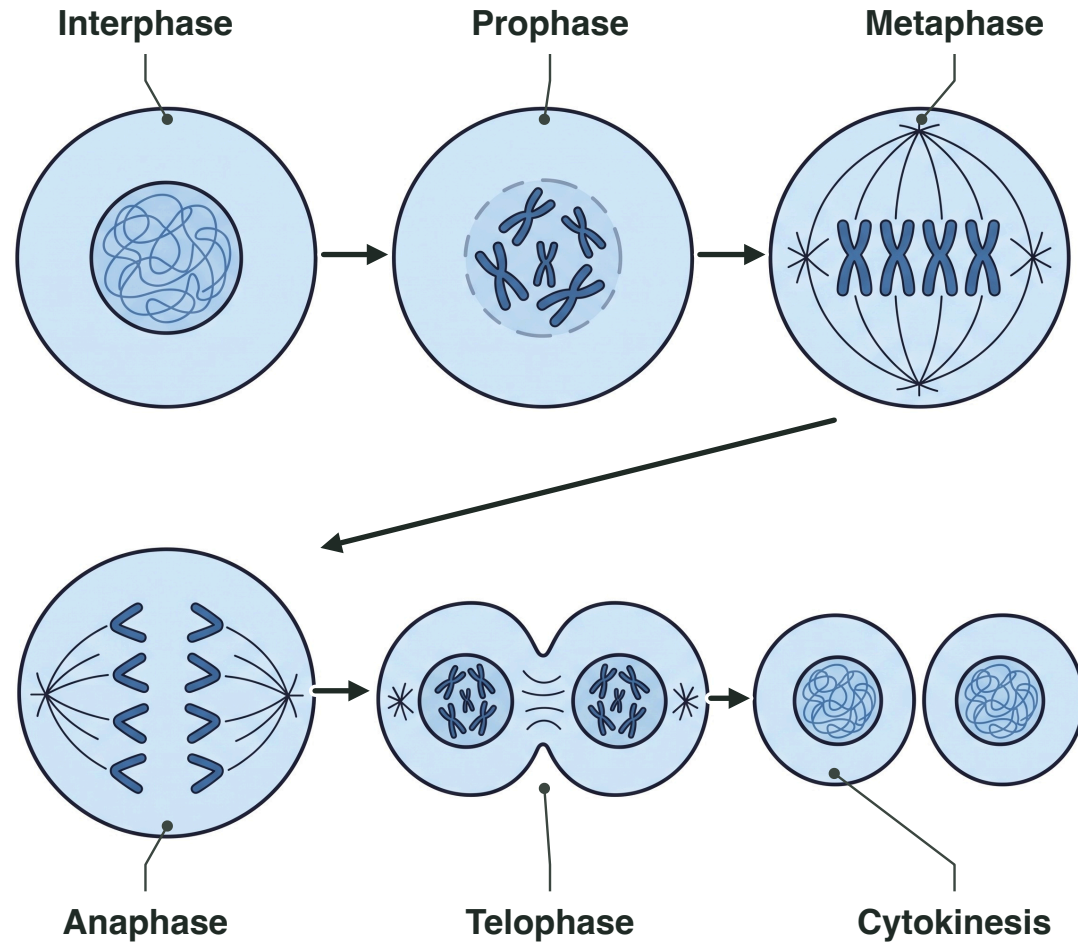
Mitosis Quiz 10

Answer keys

Every answer key, in the same order 12

More free teaching packs. Cells, The Microscope, DNA and more at printablescholar.com/teaching-packs/

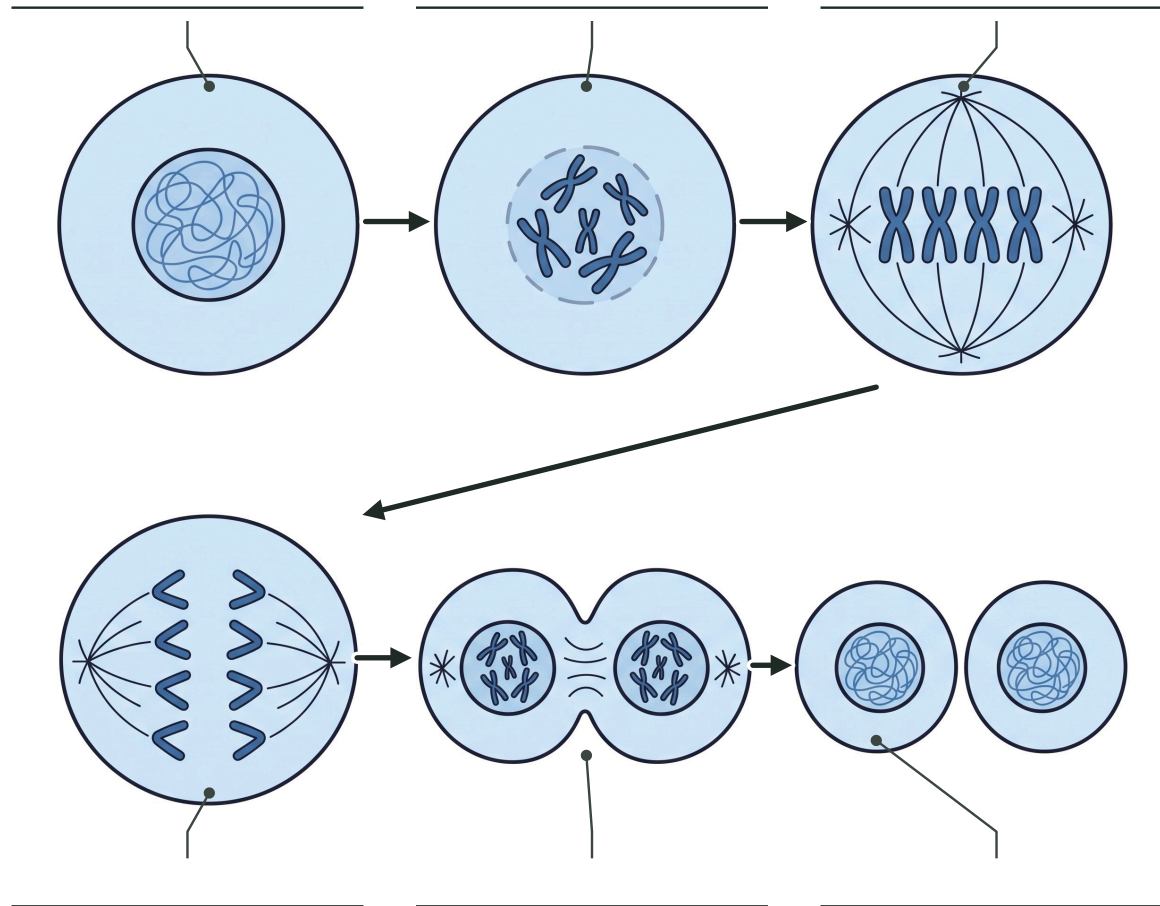
Mitosis



Mitosis

Name: _____

Write the name of each part on its line. Use the word bank.



Word bank

Anaphase

Cytokinesis

Interphase

Metaphase

Prophase

Telophase

Stages of Cell Division

Use the labeled mitosis diagram to help you.

Part A. Write the word that fits each description.

Word bank

Anaphase

Chromosome

Cytokinesis

Interphase

Metaphase

Mitosis

Nucleus

Prophase

Spindle fibers

Telophase

1. The chromosomes line up along the middle of the cell. _____
2. A tightly coiled package of DNA. _____
3. The cytoplasm divides and the cell splits in two. _____
4. The cell grows and copies its DNA to get ready to divide. _____
5. Thin threads that attach to the chromosomes and pull their copies apart. _____
6. A new nuclear envelope forms around each set of chromosomes. _____
7. The control center of the cell. It holds the DNA. _____
8. The DNA coils up into chromosomes that can be seen. The nuclear envelope breaks down. _____
9. The process that divides one nucleus into two identical nuclei. _____
10. The two copies of each chromosome are pulled apart to opposite ends of the cell. _____

Part B. Answer the questions.

1. Which stage comes right after metaphase? What happens in it?

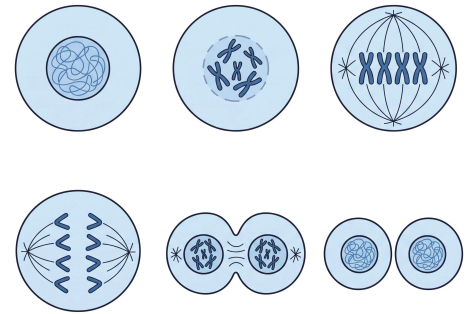
2. A cell copies its DNA before it divides. Why is that important?

3. Your body makes new cells by cell division. Give two reasons your body needs new cells.

How One Cell Becomes Two

Read the text. Then answer the questions on the next page.

- 1 You began life as a single cell. Today your body has trillions of cells. They all came from cell division. One cell, called the parent cell, splits into two new cells called **daughter cells**. Cell division lets living things grow. It also repairs injuries and replaces worn-out cells.
- 2 A cell spends most of its life in **interphase**, the time between divisions. During interphase the cell grows and does its normal work. Before it can divide, it copies all of its **DNA**, the instructions kept in the nucleus. Now there is a complete copy for each daughter cell.
- 3 Next the nucleus divides. This process is called **mitosis**. First, in **prophase**, the DNA coils up tightly into **chromosomes** that can be seen with a microscope. Each chromosome is made of two identical copies joined together, so it looks like an X. The **nuclear envelope**, the membrane around the nucleus, breaks down. Next, in **metaphase**, the chromosomes line up along the middle of the cell. Thin threads called **spindle fibers** have attached to them from both ends of the cell.
- 4 Then, in **anaphase**, the spindle fibers pull the two copies of each chromosome apart. One copy moves to each end of the cell. Last, in **telophase**, a new nuclear envelope forms around each set of chromosomes. The cell now has two nuclei, and each one holds the same DNA.
- 5 One step is left. In **cytokinesis**, the cytoplasm divides and the cell splits in two. An animal cell pinches in at the middle until it separates. A plant cell has a stiff cell wall and cannot pinch, so it builds a new wall across its middle. Either way, the result is two daughter cells with the same DNA as the parent cell.



Six stages of cell division. Read across the top row, then the bottom row.

How One Cell Becomes Two: Questions

Go back to the text to find each answer. The paragraphs are numbered to help you.

1. What is this text mostly about?

- ☐ How plant cells make food
- ☐ How one cell divides to make two cells
- ☐ How to see cells with a microscope
- ☐ Why animal cells have no cell wall

2. Give two reasons living things need cell division.

3. What does a cell do during interphase?

- ☐ It pinches in at the middle.
- ☐ It lines up its chromosomes.
- ☐ It grows and copies its DNA.
- ☐ It breaks down its nuclear envelope.

4. Why does a chromosome look like an X in prophase?

- ☐ It has been cut into four pieces.
- ☐ Spindle fibers are pulling on it.
- ☐ The nuclear envelope is wrapped around it.
- ☐ It is made of two identical copies joined together.

5. Number the steps 1, 2 and 3 to show what happens to the chromosomes (paragraphs 3 and 4).

- ☐ The two copies of each chromosome are pulled apart.
- ☐ The DNA coils up tightly into chromosomes.
- ☐ The chromosomes line up along the middle of the cell.

6. What pulls the two copies of each chromosome apart?

- ☐ Spindle fibers
- ☐ The nuclear envelope
- ☐ The cell wall
- ☐ The cytoplasm

7. What happens in cytokinesis?

8. How is cytokinesis different in an animal cell and a plant cell?

Which Stage Is It?

Each row tells what you could see in a cell and what is happening inside it. Write the stage. You will use two stages twice.

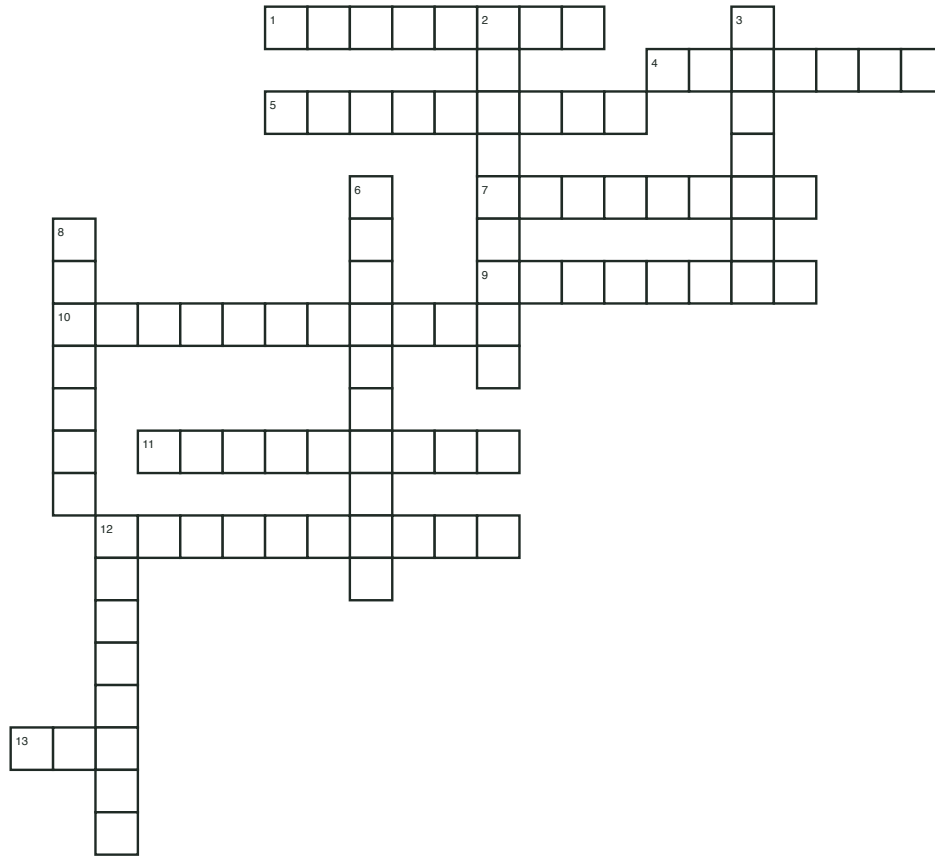
WHAT YOU SEE	WHAT IS HAPPENING	STAGE
1. X shapes in a row	The chromosomes have lined up along the middle of the cell.	_____
2. One round nucleus full of loose threads	The cell is growing and copying its DNA.	_____
3. V shapes moving apart	Spindle fibers are pulling the two copies of each chromosome to opposite ends of the cell.	_____
4. Two separate cells side by side	The cytoplasm has divided and the cell has split in two.	_____
5. X shapes in a fading nucleus	The DNA has coiled up into chromosomes. The nuclear envelope is breaking down.	_____
6. Two nuclei in one cell	A new nuclear envelope has formed around each set of chromosomes.	_____
7. A plant cell with a new wall across its middle	The cell cannot pinch in two, so it divides its cytoplasm another way.	_____
8. A cell getting bigger	The cell is doing its normal work. It has not started to divide.	_____
Word bank Anaphase Cytokinesis Interphase Metaphase Prophase Telophase		

Think about it

In metaphase each chromosome looks like an X. In anaphase you see V shapes. What happened to each X?

Mitosis Crossword

Read each clue. Write the answer in the puzzle, one letter in each box. Use the word bank if you get stuck.



ACROSS

1. The two new cells are called ____ cells.
4. The ____ fibers are thin threads that pull the chromosome copies apart.
5. The jelly-like fluid that fills the cell.
7. The stage when chromosomes can first be seen and the nuclear envelope breaks down.
9. The stage when the two copies of each chromosome are pulled apart.
10. The stage when the cell splits in two.
11. The stage when the chromosomes line up along the middle of the cell.
12. A tightly coiled package of DNA.
13. The instructions a cell copies before it divides.

DOWN

2. The stage when a new nuclear envelope forms around each set of chromosomes.
3. The process that divides one nucleus into two identical nuclei.
6. The stage when a cell grows and copies its DNA.
8. The control center of the cell.
12. A plant cell builds a new one across its middle when it divides (2 words).

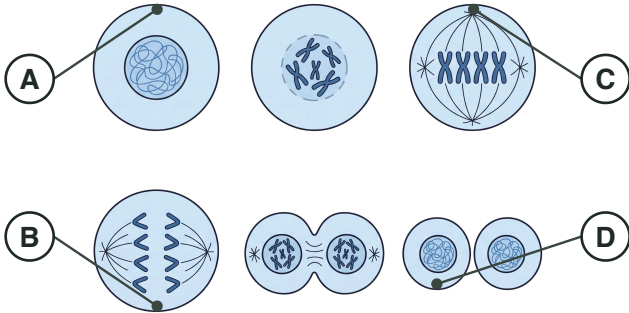
Word bank anaphase cell wall chromosome cytokinesis cytoplasm daughter DNA
interphase metaphase mitosis nucleus prophase spindle telophase

Mitosis Quiz

Score _____ / 12

Show what you know about how cells divide.

Part A. These pictures show a cell dividing. Write the name of each stage.



- A _____
B _____
C _____
D _____

Anaphase · Cytokinesis · Interphase · Metaphase

Part B. Choose the best answer.

- In which stage does a cell copy its DNA?**
 - ☐ Interphase
 - ☐ Prophase
 - ☐ Anaphase
 - ☐ Telophase
- In which stage do the chromosomes line up along the middle of the cell?**
 - ☐ Prophase
 - ☐ Metaphase
 - ☐ Telophase
 - ☐ Cytokinesis
- What happens in anaphase?**
 - ☐ The cell copies its DNA.
 - ☐ The chromosomes line up.
 - ☐ The chromosome copies are pulled apart.
 - ☐ A new nuclear envelope forms.
- What pulls the chromosome copies to opposite ends of the cell?**
 - ☐ The nuclear envelope
 - ☐ The cytoplasm
 - ☐ The cell membrane
 - ☐ Spindle fibers
- One cell divides one time. How many daughter cells are there?**
 - ☐ One
 - ☐ Two
 - ☐ Four
 - ☐ Eight
- What divides in cytokinesis?**
 - ☐ The nucleus
 - ☐ A chromosome
 - ☐ The cytoplasm
 - ☐ The DNA

Part C. Write your answer.

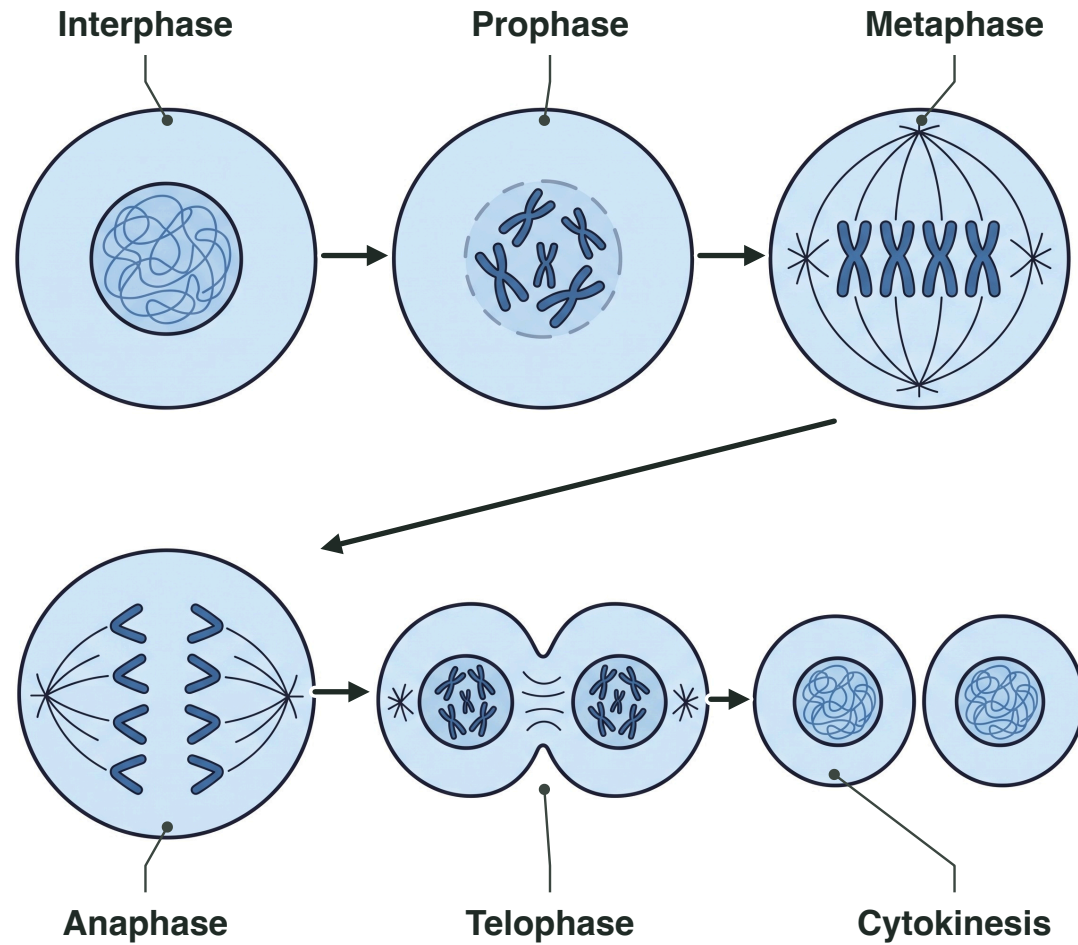
7. Why does a cell copy its DNA before it divides?

8. How does the DNA in the two daughter cells compare with the DNA in the parent cell?

Answer Keys

In the same order as the sheets.

Mitosis: Answer Key



Stages of Cell Division: Answer Key

Answers are in green. Written answers will vary; these are examples.

Part A. Write the word that fits each description.

Word bank

Anaphase Chromosome Cytokinesis Interphase Metaphase Mitosis Nucleus
Prophase Spindle fibers Telophase

- | | |
|--|-----------------------|
| 1. The chromosomes line up along the middle of the cell. | Metaphase |
| 2. A tightly coiled package of DNA. | Chromosome |
| 3. The cytoplasm divides and the cell splits in two. | Cytokinesis |
| 4. The cell grows and copies its DNA to get ready to divide. | Interphase |
| 5. Thin threads that attach to the chromosomes and pull their copies apart. | Spindle fibers |
| 6. A new nuclear envelope forms around each set of chromosomes. | Telophase |
| 7. The control center of the cell. It holds the DNA. | Nucleus |
| 8. The DNA coils up into chromosomes that can be seen. The nuclear envelope breaks down. | Prophase |
| 9. The process that divides one nucleus into two identical nuclei. | Mitosis |
| 10. The two copies of each chromosome are pulled apart to opposite ends of the cell. | Anaphase |

Part B. Answer the questions.

- Which stage comes right after metaphase? What happens in it?
Anaphase. The two copies of each chromosome are pulled apart to opposite ends of the cell.
- A cell copies its DNA before it divides. Why is that important?
So that each of the two new cells gets a complete copy of the DNA.
- Your body makes new cells by cell division. Give two reasons your body needs new cells.
Any two: to grow, to repair injuries, to replace worn-out cells.

How One Cell Becomes Two: Answer Key

Answers are in green. Written answers will vary; these are examples.

1. What is this text mostly about?

- ☐ How plant cells make food
- ☒ **How one cell divides to make two cells**
- ☐ How to see cells with a microscope
- ☐ Why animal cells have no cell wall

2. Give two reasons living things need cell division.

Any two: to grow, to repair injuries, to replace worn-out cells.

3. What does a cell do during interphase?

- ☐ It pinches in at the middle.
- ☐ It lines up its chromosomes.
- ☒ **It grows and copies its DNA.**
- ☐ It breaks down its nuclear envelope.

4. Why does a chromosome look like an X in prophase?

- ☐ It has been cut into four pieces.
- ☐ Spindle fibers are pulling on it.
- ☐ The nuclear envelope is wrapped around it.
- ☒ **It is made of two identical copies joined together.**

5. Number the steps 1, 2 and 3 to show what happens to the chromosomes (paragraphs 3 and 4).

- 3** The two copies of each chromosome are pulled apart.
- 1** The DNA coils up tightly into chromosomes.
- 2** The chromosomes line up along the middle of the cell.

6. What pulls the two copies of each chromosome apart?

- ☒ **Spindle fibers**
- ☐ The nuclear envelope
- ☐ The cell wall
- ☐ The cytoplasm

7. What happens in cytokinesis?

The cytoplasm divides and the cell splits in two.

8. How is cytokinesis different in an animal cell and a plant cell?

An animal cell pinches in at the middle. A plant cell cannot pinch, so it builds a new wall across its middle.

Which Stage Is It?: Answer Key

Answers are in green. The last answer will vary; one example is given.

WHAT YOU SEE	WHAT IS HAPPENING	STAGE
1. X shapes in a row	The chromosomes have lined up along the middle of the cell.	Metaphase
2. One round nucleus full of loose threads	The cell is growing and copying its DNA.	Interphase
3. V shapes moving apart	Spindle fibers are pulling the two copies of each chromosome to opposite ends of the cell.	Anaphase
4. Two separate cells side by side	The cytoplasm has divided and the cell has split in two.	Cytokinesis
5. X shapes in a fading nucleus	The DNA has coiled up into chromosomes. The nuclear envelope is breaking down.	Prophase
6. Two nuclei in one cell	A new nuclear envelope has formed around each set of chromosomes.	Telophase
7. A plant cell with a new wall across its middle	The cell cannot pinch in two, so it divides its cytoplasm another way.	Cytokinesis
8. A cell getting bigger	The cell is doing its normal work. It has not started to divide.	Interphase
Word bank Anaphase Cytokinesis Interphase Metaphase Prophase Telophase		

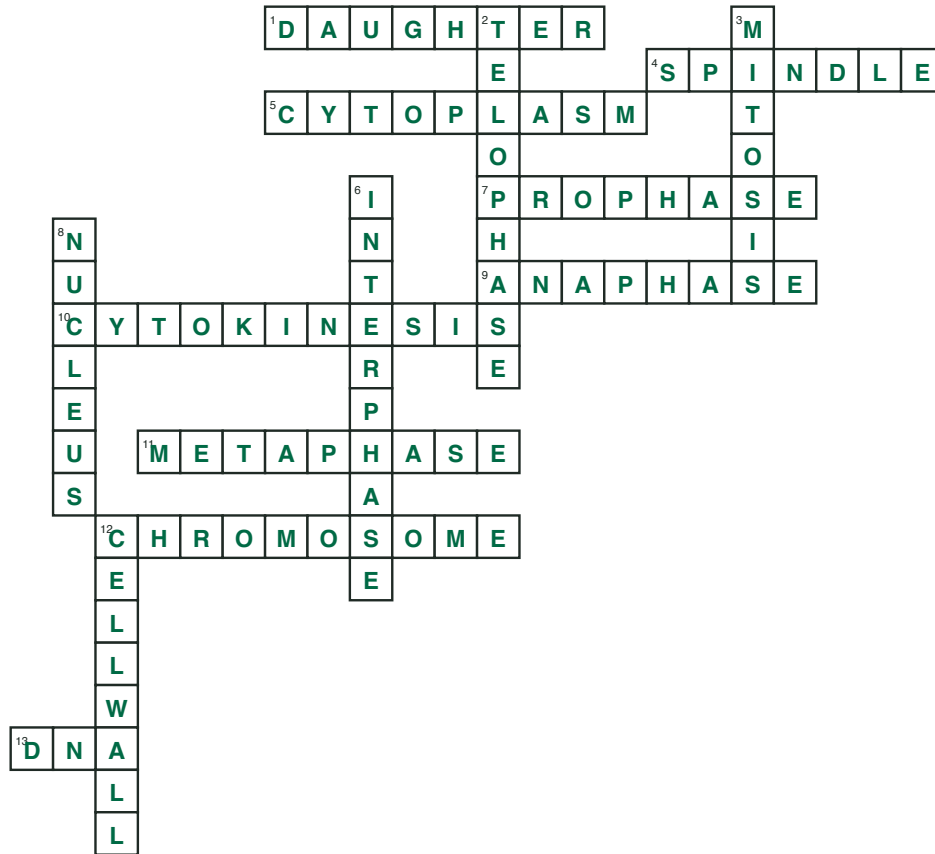
Think about it

In metaphase each chromosome looks like an X. In anaphase you see V shapes. What happened to each X?

Each X was two identical copies joined together. The spindle fibers pulled the two copies apart, and each copy looks like a V as it is pulled.

Mitosis Crossword: Answer Key

Answers are in green.



ACROSS

1. The two new cells are called ____ cells.
4. The ____ fibers are thin threads that pull the chromosome copies apart.
5. The jelly-like fluid that fills the cell.
7. The stage when chromosomes can first be seen and the nuclear envelope breaks down.
9. The stage when the two copies of each chromosome are pulled apart.
10. The stage when the cell splits in two.
11. The stage when the chromosomes line up along the middle of the cell.
12. A tightly coiled package of DNA.
13. The instructions a cell copies before it divides.

DOWN

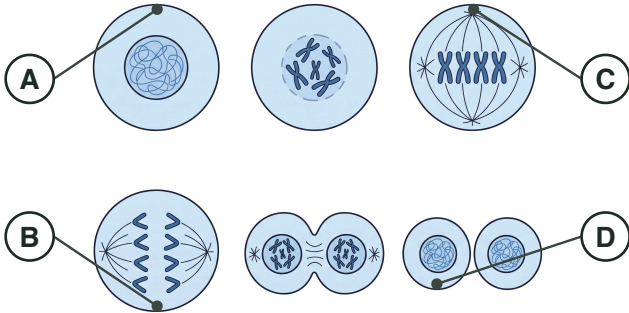
2. The stage when a new nuclear envelope forms around each set of chromosomes.
3. The process that divides one nucleus into two identical nuclei.
6. The stage when a cell grows and copies its DNA.
8. The control center of the cell.
12. A plant cell builds a new one across its middle when it divides (2 words).

Word bank anaphase cell wall chromosome cytokinesis cytoplasm daughter DNA
interphase metaphase mitosis nucleus prophase spindle telophase

Mitosis Quiz: Answer Key

Answers are in green. Written answers will vary; these are examples.

Part A. These pictures show a cell dividing. Write the name of each stage.



A **Interphase**

B **Anaphase**

C **Metaphase**

D **Cytokinesis**

Anaphase · Cytokinesis · Interphase · Metaphase

Part B. Choose the best answer.

1. In which stage does a cell copy its DNA?

☒ **Interphase**

☐ Prophase

☐ Anaphase

☐ Telophase

2. In which stage do the chromosomes line up along the middle of the cell?

☐ Prophase

☒ **Metaphase**

☐ Telophase

☐ Cytokinesis

3. What happens in anaphase?

☐ The cell copies its DNA.

☐ The chromosomes line up.

☒ **The chromosome copies are pulled apart.**

☐ A new nuclear envelope forms.

4. What pulls the chromosome copies to opposite ends of the cell?

☐ The nuclear envelope

☐ The cytoplasm

☐ The cell membrane

☒ **Spindle fibers**

5. One cell divides one time. How many daughter cells are there?

☐ One

☒ **Two**

☐ Four

☐ Eight

6. What divides in cytokinesis?

☐ The nucleus

☐ A chromosome

☒ **The cytoplasm**

☐ The DNA

Part C. Write your answer.

7. Why does a cell copy its DNA before it divides?

So that each daughter cell gets a complete copy of the DNA.

8. How does the DNA in the two daughter cells compare with the DNA in the parent cell?

It is the same. Each daughter cell has the same DNA as the parent cell.