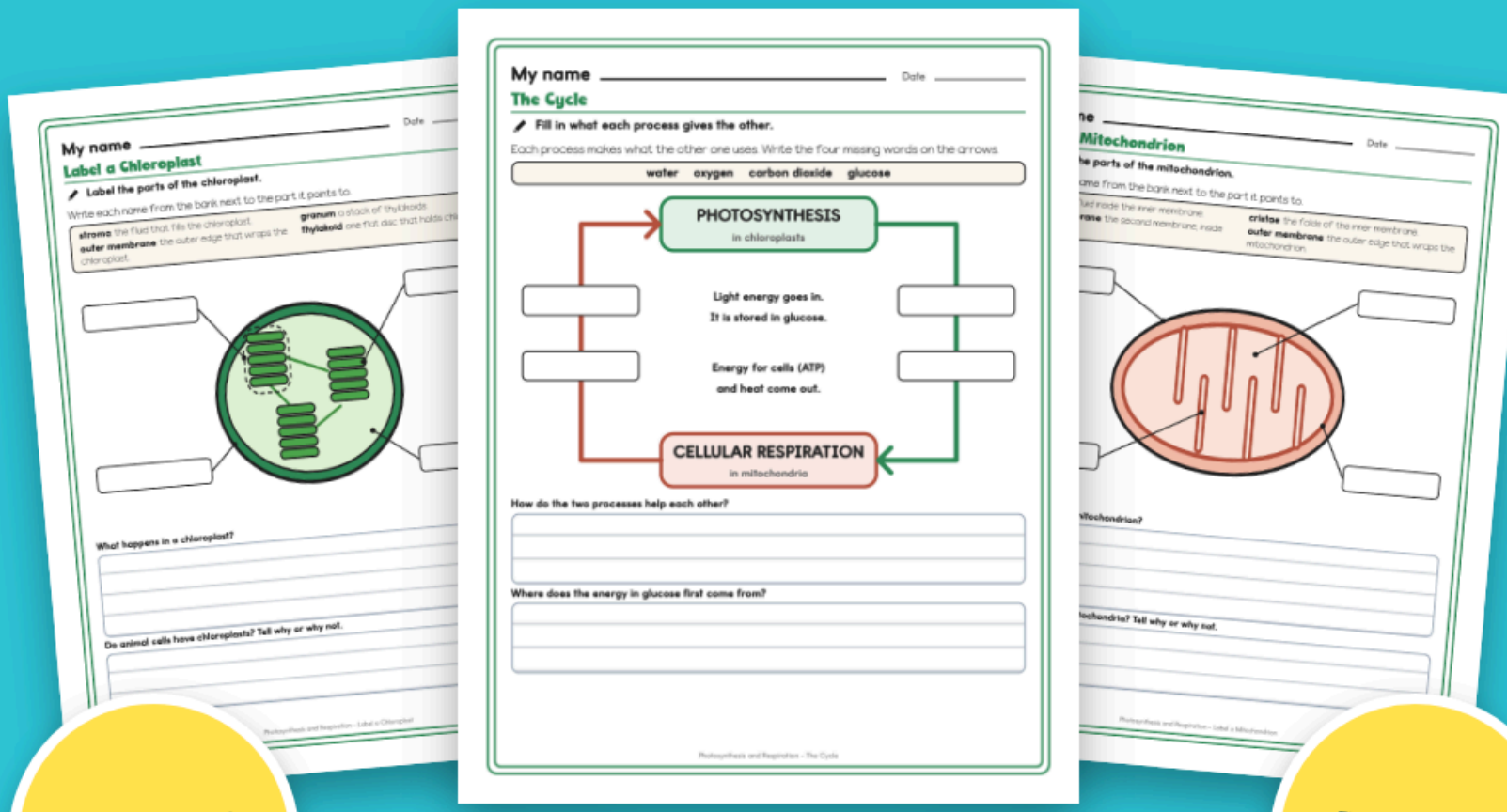
# PHOTOSYNTHESIS & CELLULAR RESPIRATION

WORKSHEETS · COMPARE · SORT · GRADES 6-8




41 PAGES

117 ITEMS

Bright Path Sped

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Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart. Every student page is black and white inside a colored border, so it still reads when copied in black and white.

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PREVIEW

# How To Read a Page

The parts of a student page, then the page types in the order they come.

## The parts of a page

- **The answer box.** A bordered box for a letter, a number or a word. Click it to type, or print and write in it.
- **The ruled work box.** Lines 0.34 inch apart for sentences. Write one idea to a line.
- **The check box.** True or false, yes or not yet: click or mark.
- **The word bank.** A box of words to use. Some words are used once, some are used twice.
- **The cut line.** Six pieces in a 3 by 2 grid, each 2.4 by 1.25 inches, edge to edge: one cut across and two down.

| Page type | What it looks like | What the student does |
|---|---|---|
| Readings and words | 3 pages | Read, answer, then match six words to what they mean. |
| Compare chart and Venn | 2 pages, 10 chart boxes | Fill in a side-by-side chart, then write a Venn diagram. |
| Equations | 2 pages, 31 items | Fill in each equation in words and formulas, then count atoms. |
| Diagrams | 3 pages, 12 labels | Label a chloroplast and a mitochondrion, then complete the cycle. |
| Who does what, true or false, mistakes | 4 pages, 22 items | Check each living thing, check sentences, find Dev's mistakes. |
| Writing | 3 pages, 6 questions | Answer in sentences, then fill in three exit tickets. |
| Quizzes and sorts | 12 items, 18 pieces | Two quizzes and three cut-and-paste mats. |

## Untimed, unscored on the page

No student page has a timer or a score on it. The keys and the tracker are for you. The answer keys are on pages 28 to 32.

## Short answers

The short-answer keys (page 31) say what to look for, not one right sentence. Accept any answer that uses a fact from the readings.

## Printing and the type-in fields

Every page prints clean in black and white. The name line, every answer box, every ruled box and every check box are type-in fields in any PDF reader: click one, type, then save. This is a fillable PDF, not a slideshow or a word-processor file.

## Room to work

Work boxes hold three or more lines. If a student needs more room, hand over one page a day, or let students write on scrap paper and copy their best sentences into the box.

PREVIEW

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My name _____ Date _____

# Reading 1: Photosynthesis

**Read about photosynthesis. Then answer.**

## Making food from light

Plants, algae and some bacteria can make their own food. They do it by **photosynthesis**. In a plant, photosynthesis happens in **chloroplasts**, tiny parts inside the cells of leaves. Chloroplasts hold **chlorophyll**, a green pigment that captures energy from sunlight. The plant takes in carbon dioxide from the air and water from the soil. Using the energy of light, the chloroplast changes the carbon dioxide and water into **glucose**, a sugar, and oxygen. The glucose stores the energy that came from the light. The plant uses the glucose to grow and to get energy, and it lets the oxygen go into the air. In words: carbon dioxide + water + light energy makes glucose + oxygen.

**Main idea: What is this reading mostly about?**

**Check what you read. Write the letter in the box.**

1. Where does photosynthesis happen in a plant cell?
   - **A** In chloroplasts
   - **B** In the nucleus
   - **C** In mitochondria

   [ ]

2. What does chlorophyll do?
   - **A** Captures energy from sunlight
   - **B** Stores the glucose
   - **C** Pulls water up from the soil

   [ ]

3. Which two things does photosynthesis make?
   - **A** Carbon dioxide and water
   - **B** Glucose and oxygen
   - **C** Light and heat

   [ ]

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My name _____ Date _____

## Science Words

**Match each word to what it means.**

Write the letter of the meaning in the box. Use the readings to help you.

| | | | | |
|---|---|---|---|---|
| 1 | **photosynthesis** | | **A** | A sugar that stores energy. |
| 2 | **cellular respiration** | | **B** | The part of a plant cell where photosynthesis happens. |
| 3 | **chloroplast** | | **C** | The green pigment that captures energy from light. |
| 4 | **mitochondrion** | | **D** | The process that releases the energy in glucose, using oxygen. |
| 5 | **glucose** | | **E** | The part of a cell where most cellular respiration happens. |
| 6 | **chlorophyll** | | **F** | The process that uses light to make glucose and oxygen from carbon dioxide and water. |

**Use two of the words in one sentence about a leaf.**

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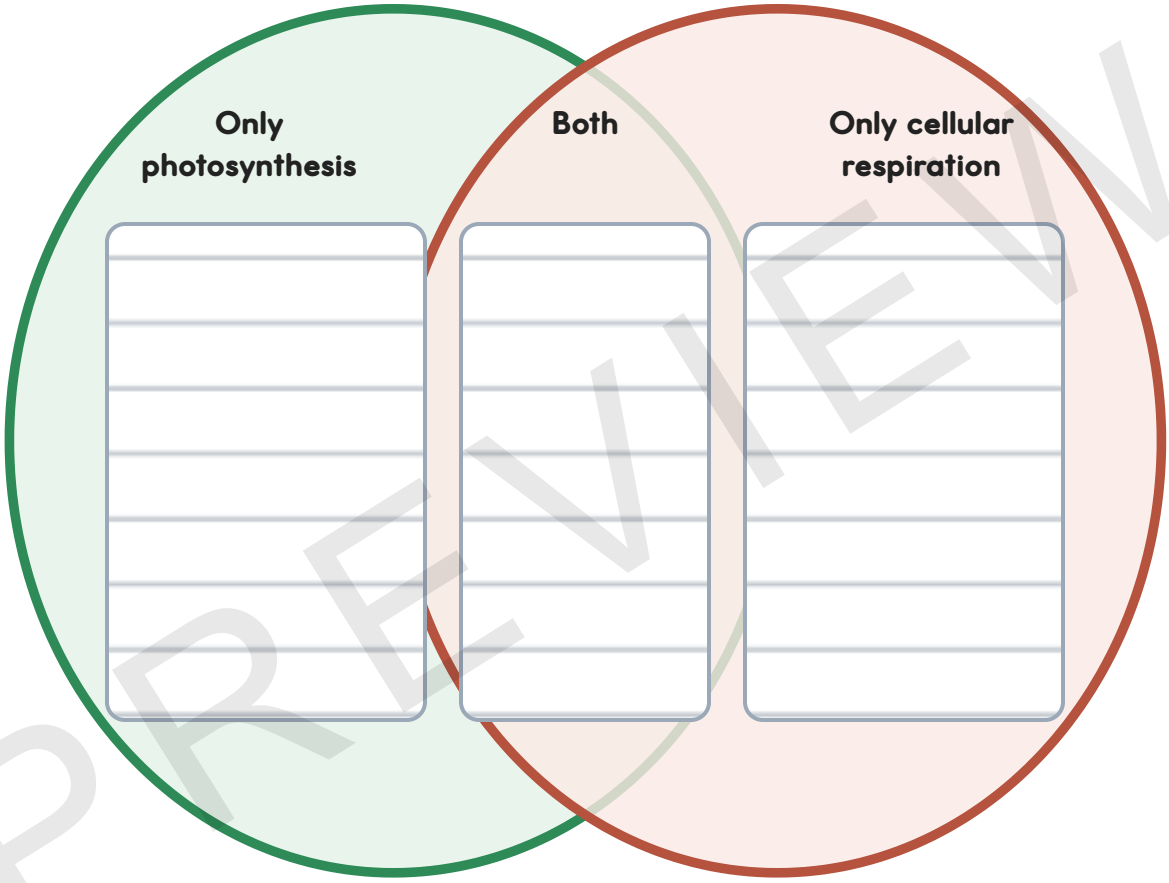
My name _____ Date _____

# Venn Diagram

**Write how they are different and alike.**

Write each hint in the part where it belongs. Then add one idea of your own to each part.

**uses glucose** **happens in plant cells** **makes oxygen** **releases the energy in glucose** **uses light energy** **changes energy from one form to another** **uses oxygen** **makes glucose**




PREVIEW

**What connects the two processes?**

**Which difference matters most? Why?**

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# Respiration Equation

**Fill in the equation for cellular respiration.**

## 1. In words

**water glucose carbon dioxide oxygen**

goes in [ ] + [ ]

↓ makes

comes out [ ] + [ ] + energy

## 2. With formulas

$H_2O$ $O_2$ $CO_2$ $C_6H_{12}O_6$

Write the number of molecules in each small box. Leave a 1 out.

goes in [ ] + [ ] [ ]

↓ makes

comes out [ ] [ ] + [ ] [ ] + energy

## 3. Count the atoms on each side

Hint: one $C_6H_{12}O_6$ has 6 carbon atoms, 12 hydrogen atoms and 6 oxygen atoms.

| | Left side (goes in) | Right side (comes out) |
|---|---|---|
| Carbon (C) | | |
| Hydrogen (H) | | |
| Oxygen (O) | | |

**Are the two sides the same?** ☐ **yes** ☐ **no**

**Write the whole equation on one line:**

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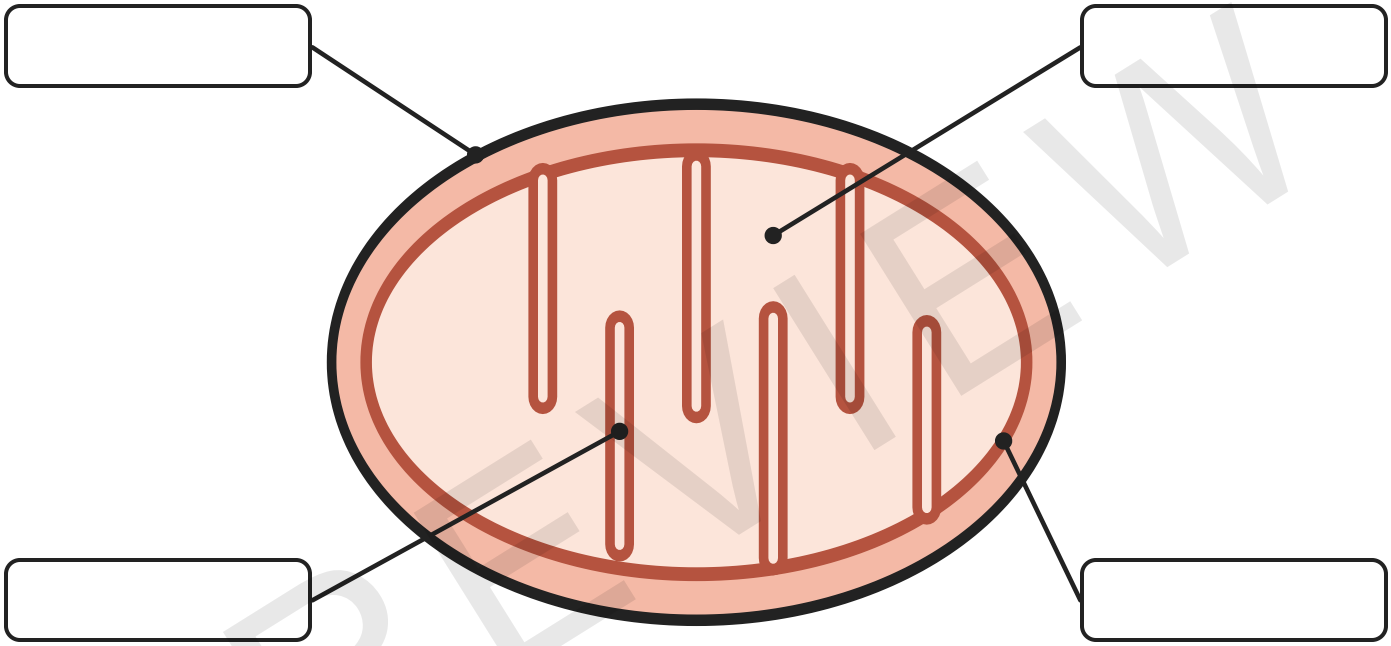
My name _____ Date _____

# Label a Mitochondrion

**Label the parts of the mitochondrion.**

Write each name from the bank next to the part it points to.

**matrix**: the fluid inside the inner membrane.
**inner membrane**: the second membrane, inside the first.
**cristae**: the folds of the inner membrane.
**outer membrane**: the outer edge that wraps the mitochondrion.



**What happens in a mitochondrion?**

**Do plant cells have mitochondria? Tell why or why not.**

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My name _____ Date _____

# Who Does What?

**Check what each living thing does.**

Check every process that each one does. Some do both.

1. An oak tree — ☐ photosynthesis ☐ cellular respiration
2. A rabbit — ☐ photosynthesis ☐ cellular respiration
3. Green algae in a pond — ☐ photosynthesis ☐ cellular respiration
4. A mushroom — ☐ photosynthesis ☐ cellular respiration
5. A student — ☐ photosynthesis ☐ cellular respiration
6. Grass — ☐ photosynthesis ☐ cellular respiration

**Do plants do cellular respiration? Explain your answer.**

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My name _____ Date _____

# Short Answers 1

**Answer each question in sentences.**

Use facts from the readings. Write in sentences.

1. What goes into photosynthesis, and what comes out? Where does the energy come from?

2. Why do plants need chlorophyll?

3. A plant is kept in a dark closet for a week. Why does it stop making glucose?

PREVIEW

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My name _____ Date _____

# Find the Mistake

**Find the mistake. Then fix it.**

Dev is made up for practice. Each sentence has one mistake.

**1** **Dev wrote:**

"Photosynthesis happens in the mitochondria."

**What is wrong?**

**Write it the right way.**

**2** **Dev wrote:**

"Cellular respiration makes glucose from sunlight."

**What is wrong?**

**Write it the right way.**

**3** **Dev wrote:**

"Plants only do photosynthesis, and animals only do cellular respiration."

**What is wrong?**

**Write it the right way.**

**4** **Dev wrote:**

"Photosynthesis uses oxygen and gives off carbon dioxide."

**What is wrong?**

**Write it the right way.**

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My name _____ Date _____

## Quiz B

**Pick the best answer. Write its letter.**

Take your time. Guess if you are not sure.

7 What goes into cellular respiration?

A Carbon dioxide and water
B Glucose and oxygen
C Light and water

8 Where does most cellular respiration happen?

A In mitochondria
B In chloroplasts
C In the cell wall

9 What does breaking down glucose release?

A Chlorophyll
B Soil nutrients
C Energy that cells can use

10 Which living things do cellular respiration?

A Plants and animals
B Only animals
C Only plants

11 Which statement is true of both processes?

A Both need light
B Both change energy from one form to another
C Both make glucose

12 Which pair does cellular respiration give off?

A Glucose and oxygen
B Oxygen and water
C Carbon dioxide and water

PREVIEW

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My name _____ Date _____

## Check My Own Work

**Check your own work. Mark yes or not yet.**

| | | | |
|---|---|---|---|
| 1 | I can say what photosynthesis does and where it happens. | ☐ yes | ☐ not yet |
| 2 | I can say what cellular respiration does and where it happens. | ☐ yes | ☐ not yet |
| 3 | I can name what goes in and what comes out of each process. | ☐ yes | ☐ not yet |
| 4 | I can fill in the equation for each process. | ☐ yes | ☐ not yet |
| 5 | I can label a chloroplast and a mitochondrion. | ☐ yes | ☐ not yet |
| 6 | I can explain how the two processes make a cycle. | ☐ yes | ☐ not yet |
| 7 | I know that plants do both processes. | ☐ yes | ☐ not yet |
| 8 | I can sort a fact as photosynthesis, cellular respiration or both. | ☐ yes | ☐ not yet |

**The part I can explain now is...**

**The part I still need help with is...**

PREVIEW

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My name _____ Date _____

# Cut and Paste 2

**Cut out the six pieces. Paste each one in the right box.**

Read each piece. Is it the chloroplast, the mitochondrion or both?

| Chloroplast | Mitochondrion | Both |
| --- | --- | --- |
| | | |

PREVIEW

**Cut on the dashed lines: six pieces, one cut across and two cuts down.**

| | | |
| --- | --- | --- |
| Is found in plant cells. | Contains chlorophyll. | Most cellular respiration happens here. |
| Has a folded inner membrane. | Has two membranes. | Has stacks of thylakoids. |

**Which piece told you the most? Why?**

# Answer Key: Venn, Equations, Diagrams

Accept any correct wording. The Venn hints belong in the part shown; other correct ideas of the student's own are fine.

## Venn Diagram page 9

| Hint | Part |
|---|---|
| uses glucose | Only cellular respiration |
| happens in plant cells | Both |
| makes oxygen | Only photosynthesis |
| releases the energy in glucose | Only cellular respiration |
| uses light energy | Only photosynthesis |
| changes energy from one form to another | Both |
| uses oxygen | Only cellular respiration |
| makes glucose | Only photosynthesis |

## Labels pages 12, 13

| Page: box | Label |
|---|---|
| 12: bottom left | outer membrane |
| 12: top left | granum |
| 12: top right | thylakoid |
| 12: bottom right | stroma |
| 13: top left | outer membrane |
| 13: bottom left | cristae |
| 13: bottom right | inner membrane |
| 13: top right | matrix |

## The Cycle page 14

| Place | Answer |
|---|---|
| Right arrow (down) | glucose and oxygen |
| Left arrow (up) | carbon dioxide and water |
| Energy | Light energy comes in; the energy in glucose first came from light. |

## Equations pages 10, 11

| Page | Answer (words in a side may be in either order) |
|---|---|
| 10 words | carbon dioxide + water + light energy makes glucose + oxygen |
| 10 formulas | 6 $CO_2$ + 6 $H_2O$ + light energy makes $C_6H_{12}O_6$ + 6 $O_2$ |
| 10 atoms | Left C 6, H 12, O 18. Right C 6, H 12, O 18. The sides are the same: yes. |
| 10 one line | 6CO2 + 6H2O + light energy makes C6H12O6 + 6O2 |
| 11 words | glucose + oxygen makes carbon dioxide + water + energy |
| 11 formulas | $C_6H_{12}O_6$ + 6 $O_2$ makes 6 $CO_2$ + 6 $H_2O$ + energy |
| 11 atoms | Left C 6, H 12, O 18. Right C 6, H 12, O 18. The sides are the same: yes. |
| 11 one line | C6H12O6 + 6O2 makes 6CO2 + 6H2O + energy |

### Writing on these pages

- What connects the two processes (page 9): the products of each are the things the other uses.
- What happens in a chloroplast (page 12): photosynthesis, making glucose and oxygen from carbon dioxide and water using light. Animal cells have no chloroplasts.
- What happens in a mitochondrion (page 13): most cellular respiration, releasing energy from glucose. Plant cells have mitochondria too.

PREVIEW

# Answer Key: Quizzes and Short Answers

Short answers say what to look for, not one right sentence.

## Quizzes pages 21, 22

| Item | Letter | Answer |
|---|---|---|
| 21.1 | A | In chloroplasts |
| 21.2 | B | Glucose and oxygen |
| 21.3 | C | Light energy |
| 21.4 | A | Carbon dioxide |
| 21.5 | C | $C_6H_{12}O_6$ |
| 21.6 | A | A green pigment that captures light |
| 22.1 | B | Glucose and oxygen |
| 22.2 | A | In mitochondria |
| 22.3 | C | Energy that cells can use |
| 22.4 | A | Plants and animals |
| 22.5 | B | Both change energy from one form to another |
| 22.6 | C | Carbon dioxide and water |

## Short answers: what to look for pages 18, 19

| Item | Look for |
|---|---|
| 18.1 | Carbon dioxide and water go in; glucose and oxygen come out. The energy comes from light (sunlight). |
| 18.2 | Chlorophyll captures energy from sunlight so the chloroplast can use it to make glucose. |
| 18.3 | Photosynthesis needs light energy. With no light the plant cannot make glucose. |
| 19.1 | Glucose and oxygen go in; carbon dioxide and water come out, and energy is released (ATP and heat). Cells use the ATP to do their work. |
| 19.2 | The glucose and oxygen made by photosynthesis are used in cellular respiration. The carbon dioxide and water made by cellular respiration are used in photosynthesis. |
| 19.3 | Making glucose only stores energy. Plant cells still need cellular respiration to release that energy, and plant cells have mitochondria. |

### Exit tickets

- Page 23: ticket 1 is one of the two equations written on one line (6CO2 + 6H2O + light energy makes C6H12O6 + 6O2, or C6H12O6 + 6O2 makes 6CO2 + 6H2O + energy) with the right name; ticket 2 names one difference and one connection; ticket 3 is open.

PREVIEW

# Photosynthesis and Respiration Tracker

One student, every scored page. Filled example: page 37.

Student _____ Teacher _____ Month _____

| Page | Page type and set | Items | Right | Date | Notes |
|---|---|---|---|---|---|
| 5 | Reading 1: Photosynthesis | 3 | | | |
| 6 | Reading 2: Cellular Respiration | 3 | | | |
| 7 | Science Words | 6 | | | |
| 8 | Compare Chart | 10 | | | |
| 10 | Photosynthesis Equation | 14 | | | |
| 11 | Respiration Equation | 17 | | | |
| 12 | Label a Chloroplast | 4 | | | |
| 13 | Label a Mitochondrion | 4 | | | |
| 14 | The Cycle | 4 | | | |
| 15 | Who Does What? | 6 | | | |
| 16 | True or False 1 | 6 | | | |
| 17 | True or False 2 | 6 | | | |
| 20 | Find the Mistake | 4 | | | |
| 21 | Quiz A | 6 | | | |
| 22 | Quiz B | 6 | | | |
| 25 | Cut and Paste 1 | 6 | | | |
| 26 | Cut and Paste 2 | 6 | | | |
| 27 | Cut and Paste 3 | 6 | | | |

PREVIEW

## How to fill this in

Write how many items the student got right with no prompt, and the date. A blank means not tried yet, never wrong. There are 117 items on the 18 scored pages. Answer keys: pages 28 to 32. Filled example: page 37.

This month we are working on (your own standard or wording)

# Team Note

Use this page between team meetings or when a student moves classes, to hand off what changed without writing a note from scratch. Everything below is observable, with a blank for the number or the wording your team already uses.

Student _____ Team member _____ Date _____

| Page type | Covered since last note (Y/N) | Items right | Still blank |
|---|---|---|---|
| Readings and words | | | |
| Compare chart and Venn | | | |
| Equations | | | |
| Diagrams | | | |
| Who does what | | | |
| True or false | | | |
| Find the mistake | | | |
| Quizzes | | | |
| Sorts | | | |

## What I saw (observable, not a conclusion)

- Filled in ___ of 10 compare-chart boxes without a prompt (page 8).
- Got ___ of 31 equation items right (pages 10, 11).
- Got ___ of 12 true or false sentences right (pages 16, 17).
- Explained how the two processes depend on each other in a complete sentence: yes / no / with a reminder.

## Next step

- Next page or set: ___, because ___ (what you saw).
- What to try in another class or at home: ___.
- What to keep doing because it is working: ___.
- Anything for the team meeting to decide: ___ (this page records what happened, never a label or a plan).

Summary, in one or two sentences, for whoever reads this next

## A filled-in line, for reference

"Got 4 of 6 true or false sentences right on 10/16. Next step: reread Reading 2 and ask whether plants do cellular respiration." That is the level of detail this page is built for. It matches the filled example on page 37.

PREVIEW

# Maya's Tracker (Invented Student)

Maya R. is invented; nothing on this page describes a real student. The blank tracker is on page 33.

| Student | Teacher | Month |
|---|---|---|
| Maya R. (an invented student) | Mr. Okafor (invented) | October |

| Page | Page type and set | Items | Right | Date | Notes |
|---|---|---|---|---|---|
| 5 | Reading 1: Photosynthesis | 3 | 3 | 10/6 | - |
| 6 | Reading 2: Cellular Respiration | 3 | 2 | 10/7 | Missed where cellular respiration happens |
| 7 | Science Words | 6 | 5 | 10/8 | Mixed up chloroplast and mitochondrion |
| 8 | Compare Chart | 10 | 8 | 10/9 | Swapped the two Energy boxes |
| 10 | Photosynthesis Equation | 14 | 11 | 10/13 | Oxygen atom counts |
| 11 | Respiration Equation | 17 | - | - | - |
| 12 | Label a Chloroplast | 4 | 3 | 10/14 | Mixed up granum and thylakoid |
| 13 | Label a Mitochondrion | 4 | - | - | - |
| 14 | The Cycle | 4 | - | - | - |
| 15 | Who Does What? | 6 | - | - | - |
| 16 | True or False 1 | 6 | 4 | 10/16 | Thought only animals do cellular respiration |
| 17 | True or False 2 | 6 | - | - | - |
| 20 | Find the Mistake | 4 | - | - | - |
| 21 | Quiz A | 6 | 5 | 10/20 | Mixed up chlorophyll and glucose |
| 22 | Quiz B | 6 | - | - | - |
| 25 | Cut and Paste 1 | 6 | 6 | 10/21 | - |
| 26 | Cut and Paste 2 | 6 | - | - | - |
| 27 | Cut and Paste 3 | 6 | - | - | - |

## How to read it

Maya R. has done **9 of 18** scored pages and got **47 of 58** items right with no prompt. **2** pages were all right and **7** carry a note. Every number comes from the table.

## What the table points to

The lowest pages are Reading 2: Cellular Respiration (2 of 3) and True or False 1 (4 of 6). Those are where the next practice goes. The 9 pages left blank are not tried yet, never wrong.

PREVIEW

# Binder Cover

Slide this into the front of a binder. Type a name in the two fields or write it by hand. The divider tabs and a spine label to cut out are on the next page (page 40).

Science - Life Science

# PHOTOSYNTHESIS AND CELLULAR RESPIRATION

## Compare, Label and Practice

**Chloroplast** | **Glucose** | **Oxygen**

**Mitochondrion** | **Energy**

Teacher _____

Class or student _____

PREVIEW