**Cells and Photosynthesis**

## This unit is divided into 4 sections and should take nine weeks to complete

1. Cells
2. Animal Cells and Structures
3. Plant Cells and Structures
4. Photosynthesis

## Essential Questions/Big Ideas

* What is a cell? How do we see cells?
* What is mitosis? Meiosis?
* Explain cell theory and the cell cycle
* Recognize major components of plant and animal cells
* Understand that cells have functions
* Prokaryotic cells v eukaryotic cells
* Understand that animals give off carbon monoxide, which the plant needs, and plants give off oxygen, which animals need
* What is cellular respiration?
* What is photosynthesis?
* Identifying the parts of a plant and their function

## Standards and Access Points

[SC.912.L.14.1](http://www.cpalms.org/Public/PreviewStandard/Preview/1944) Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.

* SC.912.L.14.In.1 Identify that all living things are made of cells and cells function in similar ways (cell theory).
* SC.912.L.14.Su.1 Identify that the cell is the smallest basic unit of life and that all living things are made of cells.
* SC.912.L.14.Pa.1 Match parts of common living things to their functions.

[SC.912.L.14.3](http://www.cpalms.org/Public/PreviewStandard/Preview/1946) Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.

* SC.912.L.14.In.2 Identify the major parts of plant and animal cells, including the cell membrane, nucleus, and cytoplasm, and their basic functions.
* SC.912.L.14.Su.2 Recognize that cells have different parts and each has a function.
* SC.912.L.14.Pa.1 Match parts of common living things to their functions.

[SC.912.L.16.3](http://www.cpalms.org/Public/PreviewStandard/Preview/2015) Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.

* SC.912.L.16.In.3 Recognize that a substance called DNA carries genetic information in all organisms, and changes (mutations) in DNA can be helpful or harmful to an organism.
* SC.912.L.16.Su.2 Recognize that all organisms have a substance called DNA with unique information.
* SC.912.L.16.Pa.2 Recognize similarities in characteristics of plants and animals of the same type (species).

[SC.912.L.18.1](http://www.cpalms.org/Public/PreviewStandard/Preview/2044) Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.

* SC.912.L.18.In.1 Identify that carbohydrates, fats, proteins, and nucleic acids (macromolecules) are important for human organisms.
* SC.912.L.18.Su.1 Recognize that humans use proteins, carbohydrates, and fats.
* SC.912.L.18.Pa.1 Recognize that humans need different kinds of food.

[SC.912.L.18.12](http://www.cpalms.org/Public/PreviewStandard/Preview/2055) Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temp...

* SC.912.L.18.In.7 Identify that special properties of water, such as the ability to moderate temperature and dissolve substances, help to sustain living things on Earth.
* SC.912.L.18.Su.6 Identify the important role of water in sustaining life of plants and animals.
* SC.912.L.18.Pa.5 Recognize that plants and animals use water to live.

[SC.912.L.18.9](http://www.cpalms.org/Public/PreviewStandard/Preview/2052) Explain the interrelated nature of photosynthesis and cellular respiration.

* SC.912.L.18.In.4 Recognize that plants give off oxygen that is used by animals and animals give off carbon dioxide that is used by plants.
* SC.912.L.18.Su.4 Recognize that people and animals breathe in the oxygen that plants give off.
* SC.912.L.18.Pa.2 Recognize that plants need water, light, and air to grow.

[SC.912.L.16.17](http://www.cpalms.org/Public/PreviewStandard/Preview/2027) Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.

* SC.912.L.16.Su.6 Recognize that cells reproduce by dividing.
* SC.912.L.16.Pa.6 Recognize that living things produce offspring (reproduce).

Additional:

[SC.912.L.14.2](http://www.cpalms.org/Public/PreviewStandard/Preview/1945) Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).

* SC.912.L.14.In.2 Identify the major parts of plant and animal cells, including the cell membrane, nucleus, and cytoplasm, and their basic functions.
* SC.912.L.14.Su.2 Recognize that cells have different parts and each has a function.
* SC.912.L.14.Pa.1 Match parts of common living things to their functions.

[SC.912.L.16.14](http://www.cpalms.org/Public/PreviewStandard/Preview/2025) Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.

* SC.912.L.16.In.7 Recognize that cells reproduce by dividing to produce new cells that are identical (mitosis) or new cells that are different (meiosis).
* SC.912.L.16.Su.6 Recognize that cells reproduce by dividing.
* SC.912.L.16.Pa.6 Recognize that living things produce offspring (reproduce).

[SC.912.L.16.16](http://www.cpalms.org/Public/PreviewStandard/Preview/2026) Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.

* SC.912.L.16.In.7 Recognize that cells reproduce by dividing to produce new cells that are identical (mitosis) or new cells that are different (meiosis).
* SC.912.L.16.Su.6 Recognize that cells reproduce by dividing.
* SC.912.L.16.Pa.6 Recognize that living things produce offspring (reproduce).

[SC.912.L.18.7](http://www.cpalms.org/Public/PreviewStandard/Preview/2050) Identify the reactants, products, and basic functions of photosynthesis.

* SC.912.L.18.In.2 Identify the products and function of photosynthesis.
* SC.912.L.18.Su.2 Recognize that the function of photosynthesis is to produce food for plants.
* SC.912.L.18.Pa.2 Recognize that plants need water, light, and air to grow.

[SC.912.L.18.8](http://www.cpalms.org/Public/PreviewStandard/Preview/2051) Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.

* SC.912.L.18.In.3 Identify that cells release energy from food so the organism can use it (cellular respiration).
* SC.912.L.18.Su.3 Recognize that cells get energy from food.
* SC.912.L.18.Pa.3 Identify that food is a source of energy.

[SC.912.L.18.10](http://www.cpalms.org/Public/PreviewStandard/Preview/2053) Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.

* SC.912.L.18.In.5 Recognize that energy is stored in cells.
* SC.912.L.18.Su.3 Recognize that cells get energy from food.
* SC.912.L.18.Pa.3 Identify that food is a source of energy.

[SC.912.L.18.11](http://www.cpalms.org/Public/PreviewStandard/Preview/2054) Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and ...

* SC.912.L.18.In.6 Recognize that enzymes break down food molecules during the digestive process.
* SC.912.L.18.Su.5 Recognize that food is broken down in digestion (use of enzymes).
* SC.912.L.18.Pa.4 Recognize that saliva helps people eat when they chew.

**Key Vocabulary**

| Cell wall | Cytoplasm | Amyloplast | Smooth ER | Rough ER |
| --- | --- | --- | --- | --- |
| Centrosome | Cell Membrane | Vacuole | Nucleus | Nucleolus |
| Nuclear membrane | Ribosomes | Chloroplast | Golgi body | Microtubules |
| Endoplasmic Reticulum | Mitochondrion | Lysosome | Prokaryotic | Eukaryotic |
| Photosynthesis | Cell | Microscope | Cell Theory | Mitosis |
| Meiosis | Cell Cycle | Cellular Respiration |  |  |

# 1. Cells

1a. Vocabulary

1b. Vocabulary websites

1c. What are cells?

1d. Mitosis

1e. Meiosis

## Introduce Vocabulary

* 1a. Cells and Photosynthesis Vocabulary [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1a._cells_and_photosynthesis_vocab.pptx)
* 1b. Cells and Photosynthesis Vocabulary Websites [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1b._cells_and_photosynthesis_vocab_websites.pptx)

## Power Point

1c. What are cells? [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1c._what_are_cells.pptx)

## Worksheets and activities

* 1c. Cell worksheet
* 1c. animal cell diagram
* 1c. Cell maze worksheet [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1c._cell_maze_ws.docx)
* Activity on cells refer to 1c. cells foldable (plant and animal) and 1c. Plant and Animal Cell Foldable Check List and Rubric
* 1c. Characteristics of cells [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1c._characteristic-of-cells.pdf)
* 1c. Venn diagram for Prokaryote and eukaryote [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1c._venn_diagram_for_prokaryote_and_eukaryote.docx)
* 1c. Acrostic poem on cells [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1c._acrostic_poem_on_cells.docx)
* Facts about Cells and All the Cells in the Human Body NewsELA sign up for free account [click here](https://newsela.com/text-sets/35627)
* Cell printing- [click here](https://www.dogonews.com/2014/2/22/new-breakthrough-in-cell-printing-inspired-by-ancient-chinese-woodblocks)
* Growing Bacteria- [click here](http://www.sciencekids.co.nz/experiments/breedingbacteria.html)
* Making a karyotype [click here](http://www.classzone.com/cz/books/bio_12_fl/resources/htmls/animated_biology/unit3/bio_ch07_0217_ab_humchrom.html)
* Cells [click here](https://tarheelreader.org/2015/05/05/cells-9/)
* Cells [click here](https://tarheelreader.org/2015/05/05/cells-9/)
* Cell parts [click here](https://tarheelreader.org/2016/03/08/the-cell/)

## Video/online links

* What is a cell video- [click here](https://www.youtube.com/watch?v=Tfy1mOT-gEQ)
* Prokaryotic v Eukaryotic cells video- [click here](https://www.youtube.com/watch?v=RQ-SMCmWB1s)
* Intro to cells video- [click here](https://www.youtube.com/watch?v=8IlzKri08kk)
* Cell structure video- [click here](https://www.youtube.com/watch?v=URUJD5NEXC8)
* Introduction to Cells: The Grand Cell Tour /9:26 minutes [click here](https://www.youtube.com/watch?v=8IlzKri08kk)
* [click here](https://www.youtube.com/watch?v=zrKdz93WlVk)
* Organelles of the Cell (updated)/29:51 minutes- [click here](https://www.youtube.com/watch?v=RKmaq7jPnYM)
* Cell Membranes/11:03 minutes- [click here](https://www.youtube.com/watch?v=y31DlJ6uGgE)
* inside the cell- [click here](https://publications.nigms.nih.gov/insidethecell/)
* cells- [click here](http://www.biology4kids.com/files/cell_main.html)
* cell organelles- [click here](https://kidsbiology.com/biology-basics/cell-organelles/)
* cytoplasm- [click here](https://kidsbiology.com/biology-basics/cytoplasm/)
* Cell rap- [click here](https://www.youtube.com/watch?v=_x2RksGrzyE)
* Cell’s rap- [click here](https://www.youtube.com/watch?v=-zafJKbMPA8)
* Cell rap- [click here](https://www.youtube.com/watch?v=Yu21ShnKhHk)
* The cell song- [click here](https://www.youtube.com/watch?v=rABKB5aS2Zg&list=RD-zafJKbMPA8&index=2)

## PowerPoint

1d. Mitosis [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1d._mitosis.pptx)

## Worksheets and activities

* 1d. Mitosis worksheet [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1d._cell_cycle_mitosis.pdf)
* 1d. Mitosis phases [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1d._mitosisphases.pdf)
* 1d. Mitosis quiz- [click here](https://www.syvum.com/cgi/online/mult.cgi/squizzes/biology/mitosis.tdf?0)
* Mitosis and cell division [click here](http://floridastudents.org/PreviewResource/StudentResource/167667)
* Mitosis [click here](https://tarheelreader.org/2016/10/22/mitosis-3/)

## Video/online links

* Mitosis video- [click here](https://www.youtube.com/watch?v=f-ldPgEfAHI)
* Mitosis rap- [click here](https://www.youtube.com/watch?v=pOsAbTi9tHw)

## PowerPoint

1e. Meiosis [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1e._meiosis.pptx)

## Worksheets and activities

* 1e. Meiosis phases worksheet [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1e._meiosisphases_ws.pdf)
* 1e. Meiosis [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/1e._meiosis_ws.pdf)
* 1e. Meiosis quiz- [click here](https://www.syvum.com/cgi/online/mult.cgi/squizzes/biology/celldiv.tdf?0)

## Video/online links

* Meiosis video [click here](https://www.youtube.com/watch?v=VzDMG7ke69g)
* Meiosis- [click here](http://www.sciencekids.co.nz/videos/biology/meiosis.html)
* Mitosis vs. Meiosis: Side by Side Comparison /6:34 minutes [click here](https://www.youtube.com/watch?v=zrKdz93WlVk)

# 2. Animal Cells and Structures

## PowerPoint

2. Animal cells [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/2._animal_cells.pptx)

## Worksheets

* 2a. Animal cell diagram [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/2.__animal_cell_diagram.docx)
* 2b. Label the animal cell [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/2._label_the_animal_cell.docx)
* 2c. Drawing an animal cell [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/2._drawing_an_animal_cell.docx)
* 2d. Label and worksheets on cells at [click here](https://www.teacherspayteachers.com/Product/Animal-Cell-Color-Page-Worksheet-and-Quiz-Ce-3-136372)
* 2e. The Incredible Edible Cell [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/2._the_incredible_edible_cell_activity.docx)

## Videos and Articles

* The animal cell- [click here](https://www.youtube.com/watch?v=cj8dDTHGJBY)
* The Golgi Apparatus [Click here](https://www.youtube.com/watch?v=TYyo9VwOnlg)
* What is the ER [Click here](https://www.youtube.com/watch?v=eH5k8XYKycs)
* All about animal cells- [click here](https://www.activewild.com/animal-cells/)
* Animal Cells Structure & Functions Animation Video [Click here](https://www.youtube.com/watch?v=MfopLilIOeA)
* Plant Cell and Animal Cell: Comparison- [click here](http://mocomi.com/plant-cell-and-animal-cell/)
* ATP Fuel for Cells [Click here](http://www.cpalms.org/Public/PreviewResourceStudentTutorial/Preview/120816)
* What is ATP [Click here](https://www.youtube.com/watch?v=NN5Y57NbnrU)

# 3. Plant Cells and Structures

## PowerPoints

3. Plant Cell Power Point [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/3.__plant_cells.pptx)

## Worksheets

* 3a. Plant cell diagram [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/3._plant_cell_diagram.docx)
* 3b. Blank plant cell template [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/3._label_the_plant_cell.docx)
* 3c. Drawing a plant cell [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/3._drawing_a_plant_cell.docx)
* 3d. Word search [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/4.___cells_and_photosynthesis_word_search.docx)
* 3e. Mitochondria diagram [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/3e._label_the_mitochondria.docx)
* Golgi Apparatus- [click here](https://kidsbiology.com/biology-basics/golgi-apparatus/)
* Vacuoles- [click here](https://kidsbiology.com/biology-basics/vacuole/)
* Cells foldable- [click here](file:///C%3A%5CUsers%5CA040624%5CAppData%5CRoaming%5CMicrosoft%5CWord%5Ccells%20foldable%20%28plant%20and%20animal%29.docx)
* Plant cell- [click here](https://www.syvum.com/cgi/online/mult.cgi/squizzes/biology/plantcell.tdf?0)
* Color changing plants- [click here](https://www.science4us.com/elementary-science-projects/color-changing-plants/)

## Videos and Articles

* Bill Nye the Science Guy- cells- [click here](https://www.youtube.com/watch?v=7bDpYZsC8mQ)
* Plant cell rap- [click here](https://www.youtube.com/watch?v=CfvbEeunnp4)
* Plant cell video- [click here](https://www.youtube.com/watch?v=9UvlqAVCoqY)
* Plant life cycle- [click here](https://sciencing.com/plant-life-cycle-kids-6382324.html)
* chloroplast- [click here](https://kidsbiology.com/biology-basics/chloroplast/)
* lysosomes- [click here](https://kidsbiology.com/biology-basics/lysosomes/)
* GA- [click here](https://kidsbiology.com/biology-basics/golgi-apparatus/)
* plants- [click here](https://www.thenakedscientists.com/articles/features/how-do-plants-develop)
* Cells, Cells, Cells [Click here](https://tarheelreader.org/2009/10/23/cells/)

# 4. Photosynthesis

## PowerPoints

4a. Photosynthesis [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/4a._photosynthesis.pptx)

4b. Cellular respiration [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/4b._cellular_respiration.pptx)

## Worksheets

* 4a. Cells and photosynthesis vocabulary [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/4._cells_and_photosynthesis_matching_vocab_ws_1__1_.docx)
* 4b. Photosynthesis worksheet [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/4._photosynthesis_worksheet.doc)
* 4d. Cellular respiration worksheet 1 [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/4._cellular_respiration_worksheet.docx)
* 4e. Cellular respiration worksheet 2 [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/4._cellular_respiration_worksheet_2.docx)
* Reproduction in Plants- [click here](http://mocomi.com/reproduction-in-plants/)
* NewsELA article on photosynthesis [Click here](https://accesstoflsresources.weebly.com/uploads/2/3/7/3/23739164/4._photosynthesis_article_and_questions.pdf)
* Photosynthesis [click here](http://floridastudents.org/PreviewResource/StudentResource/109219)
* Cellular Respiration [click here](http://floridastudents.org/PreviewResource/StudentResource/107103)

## Videos and resources

* Photosynthesis 1- [click here](https://www.youtube.com/watch?v=yHVhM-pLRXk)
* Photosynthesis 2- [click here](https://www.youtube.com/watch?v=D1Ymc311XS8)
* Photosynthesis 3- [click here](https://www.youtube.com/watch?time_continue=7&v=PL9CRhRsy5A)
* Cellular respiration video- [click here](https://www.youtube.com/watch?v=eBl3U-T5Nvk)
* Cellular Respiration/2:10 minutes- [click here](https://www.youtube.com/watch?v=VjEydFYr9tI)
* A Leaf in Time book [Click here](http://www.saps.org.uk/primary/teaching-resources/129-a-leaf-in-time-a-popular-introduction-to-photosynthesis)
* ATP: Fuel for Cells [click here](http://floridastudents.org/PreviewResource/StudentResource/120816)
* Chloroplast YouTube [Click here](https://www.youtube.com/watch?v=jTnNGIx5-P8)
* What is photosynthesis? [Click here](https://www.ducksters.com/science/photosynthesis.php)