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| **Subject:** Science | **Grade:** 6 | | **Unit ID:** |
| **Unit 3:** Cells and Organisms | | | **Length:** |
| ***Stage 1: Desired Results*** | | | |
| **Standards:** **Content Standards:**  **6.MS-LS1-1**  Provide evidence that all organisms (unicellular and multicellular) are made of cells.  Clarification Statement: Evidence can be drawn from multiple types of organisms, such as plants, animals and bacteria.  **6.MS-LS1-2**  Develop and use a model to describe how parts of cells contribute to the cellular functions of obtaining food, water, and other nutrients from its environment, disposing of wastes, and providing energy for cellular processes.  Clarification Statements: Parts of plant and animal cells include (a) the nucleus, which contains a cell’s genetic material and regulates its activities, (b) chloroplasts, which produces necessary food (sugar) and oxygen through photosynthesis (in plants); (c) mitochondria, which release energy from food through cellular respiration; (d) vacuoles, which store materials, including water, nutrients and waste; (e). the cell membrane, which is a selective barrier that enables nutrients to enter the cell and wastes to be expelled; and (f) the cell wall which provides structural support (in plants).  **6.W.1,** Write arguments to support claims with clear reasons  a. Introduce claim(s) and organize the reasons and evidence clearly.  b. Support claim(s) with clear reasons and relevant evidence and demonstrating an understanding of the topic.  c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.  d. Establish and maintain a formal style.  e. Provide a concluding statement or section that follows from the argument presented.  **Practice Standards/Concepts & Skills:**  1.Asking questions and making claims  2.Developing and using models  6.Constructing explanations  7.Engaging in argument from evidence | | | |
| **Overview:** All living things have a cellular organization, contain similar chemicals, use energy, respond to their surroundings, grow and develop, and reproduce.  **FOCUS LANGUAGE GOALS:**  Students will be able to:   * Differentiate the characteristics of animal and plant cells * Identify and name at least 6 organelles in the cell * Match effectively the function to the organelles on a cell model * Build a three-dimensional model of a plant or animal cell | | | |
| **Understandings**  * All living things are made of cell(s). * Cells are made of parts that help them to survive by obtaining nutrients and water from their environment. * Structure of the parts of the cell relate to the jobs and functions that allow the organism to survive | | **Essential Questions**  * How does each kind of cell structure have a different function within a cell? * In multi-cellular organisms, how are cells organized? * How is the cell the basic unit of life? | |
| **Knowledge:** *Students will ...*  **Content:**   * organisms are made of cells * parts of cells contribute to key cellular functions   + diffusion and osmosis   + photosynthesis and respiration * the structure and functions of the following cell parts:   + nucleus   + chloroplasts   + mitochondria   + cell membrane   + vacuoles   + cell wall * plant and animal cells have different organelles * scale and proportions of visual representation   **Language:**   * list language knowledge  **Vocabulary:** [**(see definition of CCSS tiered vocabulary)**](https://drive.google.com/open?id=0B1oO5U3iU008Q1ZGaEpFeFpLVnc)  |  |  |  | | --- | --- | --- | | **Tier 1** | **Tier 2** | **Tier 3** | | Everyday words introduced | Words that differ by context | Words specific to content area |   Chapter 4: Introduction to Living Things (Pearson):   * organism - organismo * cell - célula * unicellular - unicelular * multicellular - multicelular * metabolism - metabolismo * stimulus - estímulo * response - resposta * development - desenvolvimento * asexual reproduction - reprodução assexuada * sexual reproduction - reprodução sexuada * spontaneous generation - geração expontânea * controlled experiment - experiência controlada * autotroph - autotrófico * heterotroph - heterotrófico * homeostasis - homeostase * classification - clarificação * taxonomy - taxonomia * binomial nomenclature - nomenclatura binominal * genus - gênero * species - espécie * prokaryote - procariota * nucleus - núcleo * eukaryote - eucariota   Chapter 5: Introduction to Cells (Pearson)   * cell - célula * microscope - microscópio * cell theory - teoria celular * cell wall - parede celular * cell membrane - membrana celular * nucleus - núcleo * organelle - organela * ribosome - ribossomo * cytoplasm - citoplasma * mitochondria - mitocôndria * endoplasmic reticulum - retículo endoplasmático * Golgi apparatus - aparato de Golgi * vacuole - vacúolo * chloroplast - cloroplasto * lysosome - lisossomo * multicellular - multicelular * unicellular - unicelular * tissue - tecido * organ- órgão * organ system - sistema de órgão * element - elemento * compound - composto * carbohydrate - carbohidrato * lipid - lípide * protein - proteina * enzyme - enzima * nucleic acid - ácido nucleico * DNA * double helix - hélice dupla * selectively permeable - permeável seletiva * passive transport - transporte passivo * diffusion - difusão * osmosis - osmose * active transport - transporte ativo * endocytosis - endocitose * exocytosis - exocitose | | **Skills**: *Students can ...*  **Content:**   * using various resources explain how key organelles function (6.MS-LS1-2(MA)) * developing and using a model to describe cell organelles and their functions as well as the relationship between the organelles within a cell (6.MS-LS1-2(MA)) * constructing models to explain and understand diffusion, osmosis, photosynthesis and cellular respiration (6.MS-LS1-2(MA)) * compare and contrasting plant and animal cells (6.MS-LS1-1(MA) * writing arguments to support claims with clear reasons (6.W.1) * explaining how a cells structure relates to its function (6.MS-LS1-2(MA)   **Language:**   * list language knowledge | |
| ***Stage 2: Assessments*** | | | |
| Assessments administered in this unit  Choice 1:  Cell Project: **MS-ETS1-5(MA)**   * Students will demonstrate their knowledge of essential cell parts. Each task requires students to create a model that compares a cell to a school, town, or factory. Student models must relate cell organelles to their functions.   [Link to Cell Project](https://docs.google.com/document/d/1tpSVefBx0W_Q8NvJ3MRJqVheWflt7yFQHIXqkRxM4A4/edit?usp=sharing)  [Link for Cell Project Rubric](https://docs.google.com/document/d/1yl9WVB0ToJ0uUuz0-Eq8g_ag-_Pc-2x3Xipf6ggtCfg/edit?usp=sharing)  Choice 2:  Cell Part Game: **MS-ETS1-5(MA)**   * Students will create a board game that will require them to answer questions about the cell parts and their functions.   + [Cell Game](https://www.cabarrus.k12.nc.us/site/handlers/filedownload.ashx?moduleinstanceid=48025&dataid=95190&FileName=Creating%20a%20Cell%20Board%20Game.pdf)   + [Cell Parts Quiz](https://docs.google.com/document/d/1mI-R0Q1CkLNNNOwXyJUvWh1RrIX6Jiu3qRwlBLP8djU/edit?usp=sharing)   + Formative assessment about cell part functions   + Cell samples task- observing cells under microscope   + Scientific notebook   + [Cell Review Stations](https://docs.google.com/document/d/1qUeN1csrF-tpe2t7iaLNP5lXX8RgkID3HVcbcm7pY4w/edit?usp=sharing)   + [Cell Journal Questions](https://docs.google.com/document/d/1j0HpnaN2LTKzyPRrFLEB7VG8E7UPSgw6hmfGpZcWvTM/edit?usp=sharing) * Cell Model: **MS-ETS1-5(MA)** * Create a cell model with appropriate placement and scale that demonstrates cell parts and their functions.   + This may include: 3D model, movie, 2D model or other visual representation   + Cell model needs to include:     - appropriate cell parts     - correct description of each cell part function     - appropriate scale and proportion and placement of cell parts   Summative Exam   * + Unit test   [Self Assessment](https://docs.google.com/document/d/1IA6gGzY6kKKNMyiN2Wi76Hkw8M7lcpw806Khu69KcRk/edit?usp=sharing)  **MCAS Practice Questions**   * **Multiple Choice**   + [**http://www.doe.mass.edu/mcas/2016/release/Gr8-Sci.pdf - question 17**](http://www.doe.mass.edu/mcas/2016/release/Gr8-Sci.pdf)   + [**http://www.doe.mass.edu/mcas/2017/release/Gr8-Sci.pdf - question 17**](http://www.doe.mass.edu/mcas/2017/release/Gr8-Sci.pdf)   + [**http://www.doe.mass.edu/mcas/2015/release/Gr8-Sci.pdf - question 16**](http://www.doe.mass.edu/mcas/2015/release/Gr8-Sci.pdf) * **Open Response Question** | | | |
| ***Stage 3: Learning Plan*** | | | |
| **Summary of Key Learning Events and Instructions:** **Pre-Assessments of Requisite Knowledge, Possible Pre- or Mis-conceptions**  **Pre-Assessment**   * [Intro to Cells PreTest](https://docs.google.com/document/d/1ir7IbUQXn1zDSNCy5rAypxStRAY4iYaANj6MvYl8Hns/edit?usp=sharing)   **Possible misconceptions**   * Nonliving things, such as fire and water, are living. * All cells are the same and contain the same genes.   **Learning Events:**  **Hook Question-**  What might you have in common with a robot?  [Introduction to Cells Video (2:54)](http://safeyoutube.net/w/o2Db)  **Exploring Life**  **(Suggested length = 2-3 Days (55 minutes a day)**   * **Background Knowledge**   Engage students with activities to discriminate between living and nonliving things. This is a prerequisite for learning about cells.  Resources for Lesson 1:  [Living vs. Non-Living Sorting Cards](http://static.nsta.org/connections/elementaryschool/201111IsItLiving.pdf)  [Student Sheet-Living vs. Non-Living](https://docs.google.com/document/d/1yXy_ZW-SzteDJAmtfJxEyNo21dx8Bfe7hqorHM0YER0/edit?usp=sharing)  Science Court Activity (Living vs. Non-Living)  [Living Things-Science Court Youtube clip](http://safeyoutube.net/w/BvDb)  [Science Court Activity Sheet](https://docs.google.com/document/d/1uXJD_AalWqrIW7-n4v7C3SKM5Gw5j9drf_1q_X4DHGg/edit?usp=sharing)  [Science Court Question Sheet](https://docs.google.com/document/d/1_mSTMwttPA5j7Iov9gShbU35f3hp2tkR8JD3ra62upw/edit?usp=sharing)  Students will learn the characteristics of life.  [Characteristics of Life Note Sheet](https://docs.google.com/document/d/1BG9j0iNB1TlozUZSQq8NIY_NXmLeAY0CjGTUR6Xbopc/edit?usp=sharing)  **Discovering Cells- (Suggested length = 2 days (55 minutes a day)**  Engage students with a variety of activities to help students understand what cells are and that they are the basic unit of life.  All living things are made of cells **6.MS-LS1-1, 6.W.1**  Resources for Lesson 2:  Unicellular and Multicellular Organisms- Students will learn that living organisms can be unicellular or multicellular and will learn the differences between the two organisms.  [Unicellular vs. Multicelluar Video (2:26)](http://safeyoutube.net/w/O2Db)  [The Wacky History of Cell Theory](http://safeyoutube.net/w/pKDb)  Prokaryotic vs. Eukaryotic-Students will compare and contrast both types of cells with a Venn Diagram  **Looking inside Cells (Suggested length = 2 Weeks (55 minutes a day X 5)**  Engage students with activities, including using microscopes and developing and using models to describe the functions of cell structures and organelles. **6.MS-LS1-2, MS-ETS2-3(MA)**  Resources for Lesson 3:  Students will learn how to use a microscope and then use the microscope to look at individual cells/major parts.  [Letter “e” Lab](https://docs.google.com/document/d/1xUyJ5XzBTkbhK39DhmvRU24nDePRLacu5NVECPHpXtQ/edit?usp=sharing)  Looking at Onion Cells and Cheek cells under the microscope (Plant vs. Animal Cell)  [Onion Lab](https://docs.google.com/document/d/13QrcGurO9beqezuTZHnwYpUyr9ZUFB4fVcfw5Hm1cQE/edit?usp=sharing)  [Cheek Cell Lab](https://docs.google.com/document/d/1WJTioWTbaA50VyTb6A8VakXwdikgB2gn1L0z2McPvwM/edit?usp=sharing)  Eukaryotic cells are complex and are made up of various organelles (parts).   * nucleus, chloroplasts, mitochondria, cell membrane, vacuoles, cell wall   + [Suggested project ideas/resources for cell parts](http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Special-Education-Services/Documents/IDEAS%202014%20Handouts/Cell-ebrate%20Science%20without%20Worksheets.pdf)   + Create a Eukaryotic Cell Parts flipbook   + Go on a tour of your school building comparing the parts of the cell to the different parts of the school. * Differences between Plant and Animal Cells **(MS-LS1-2)**   Students discuss what organelles plant cells have that animal cells do not.  [Writing Prompt-Differences between Plant and Animal Cells](https://docs.google.com/document/d/16pfVQdlYQd82NcK28IckfFJ-4GjukppUnXYgLvf1LVI/edit?usp=sharing)  [Cell writing Peer Checklist](https://docs.google.com/document/d/1AMRnqQ8De3C2jvYXPVV9ixC2YlcsS5XRWz5imhmY6hk/edit?usp=sharing)  [Study Jams](http://studyjams.scholastic.com/studyjams/services/search-results?query=cells) Provides information and pictures of examples of plant and animal cells  **The Cell in its Environment (Suggested length = 1 Week (55 minutes a day X 5)**  Engage students with activities to describe how materials move into and out of a cell. **6.MS-LS1-2 (6.W.1)**  Diffusion and Osmosis- Students will learn that the cell parts help them to survive by obtaining nutrients and water from their environment.  Resources for Lesson 4:  [Diffusion and Osmosis lab Egg-speriment](https://docs.google.com/document/d/1avfmEXGw0Vl7aLpKm2qxhW4CQhXqDzw2nyrOdgvqm6I/edit?usp=sharing)  [Gummy Bear Osmosis Lab & Rubric](https://docs.google.com/document/d/1zc7UXG8YbG_AI49arp4ffGYDXVoZsuhW7iyrt4fGudE/copy)  [Bee Keeper Do Now](https://docs.google.com/document/d/1Z32aAIKX_ALY7KQRNhqPHVvHgvMfd5sTTVzOQmlMx-0/edit?usp=sharing)  [Bee Keeper Rubric](https://docs.google.com/document/d/1_YDUs--Xe4gea4uDcei6z6hDIlY1P6oO_25Sug7lVKI/copy)  Parts of cells contribute to key cellular functions- photosynthesis and cellular respiration  [Photosynthesis & Cellular Respiration Concept Map](https://docs.google.com/document/d/1FS04PaxKZjXH1fKWyEE7oO20LsrzIc8azwCAm8N6PRU/edit?usp=sharing)  Students write a letter to explain the importance of photosynthesis and cellular respiration  [R.A.F.T. Photosynthesis & Cellular Respiration Letter](https://docs.google.com/document/d/1Hm8FD0CDX91bbH4yT3ttegpTrozuIAdAiljH3wh5yy0/edit?usp=sharing)  [Photosynthesis Choice Activities](https://docs.google.com/document/d/1JR2kzacESImk6YgAlYbbBCUgtAGuB_bS7DUZXCY05Tk/edit?usp=sharing) | | | |
| **Instructional Notes:** **Sociocultural implications**  [***Guide****: think about the interaction of the student (including his/her identity, knowledge, culture, proficiency in English and home languages, literacy level, academic readiness, beliefs, values, and experiences) with the given academic contexts (including register, genre/text type, and task/situation, and the student’s relationship to other participants’ identities and social roles) - delete*]  **Connections to Prior Knowledge**   * list   **Connections to Future Knowledge**   * list   **Common Misconceptions**   * list   **Instructional Strategies**   * list | | | |
| **Resources:** **Open Resources:** [**Next Generation Science Standards**](http://ngss.nsta.org/)  [OER Commons](https://www.oercommons.org/)  **Videos:**   * [**Introduction to Cells Trailer**](http://safeyoutube.net/w/Gzcb) * [**Cell Theory**](http://safeyoutube.net/w/dddb) * [**Cell Parts Rap**](https://www.youtube.com/watch?v=-zafJKbMPA8) * [**Brain Pop-Cells**](https://www.brainpop.com/science/cellularlifeandgenetics/cells/) * [**Organelles Mr. Parr**](https://www.youtube.com/watch?v=dngsFl2X3nc) * [**Types of Diffusion**](https://www.youtube.com/watch?v=Ptmlvtei8hw)   **Books:**   * Life Science: Cells by Scholastics * Cells for Kids by Nishi Singh   **Online Sites:**   * [**Cells Alive!**](http://www.cellsalive.com/) | | | |