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| **Guided Notes: Early Scientists and the Cell Theory** | | |
| [https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcRfChREoe5MIwq9GyYRvamrjm4Cf3nrjSuR8g2geICxtJfT3XrS](http://www.google.com/imgres?hl=en&qscrl=1&rlz=1T4NDKB_enUS522US523&biw=1366&bih=641&tbm=isch&tbnid=UZ3E0nL5T4GpNM:&imgrefurl=http://www.marshallmiddle.org/apps/classes/443644/assignments/&docid=5jA8Mv1CgrKk8M&imgurl=http://www.marshallmiddle.org/ourpages/auto/2012/3/26/60559677/pyramid_blank.jpg&w=250&h=190&ei=fC15Us3HIerdsATlkYLYCA&zoom=1&iact=rc&page=4&tbnh=152&tbnw=200&start=71&ndsp=22&ved=1t:429,r:80,s:0&tx=82&ty=76)**Levels of Organization** (smallest to largest) |  | |
| [https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcQZkjIVMsWv7YuPbwlWPZF0aFnViLysM8LhlHBMLYTPp7QtiuY-](http://www.google.com/imgres?sa=X&hl=en&qscrl=1&rlz=1T4NDKB_enUS522US523&biw=1366&bih=641&tbm=isch&tbnid=bJzP8SIAVz3XUM:&imgrefurl=http://www.biologycorner.com/worksheets/cell_color_plant.html&docid=S8GrSPBihTqU0M&imgurl=http://www.biologycorner.com/resources/plant_cell_color.gif&w=686&h=510&ei=9yx5Ur_iK-TesASjuIHwDQ&zoom=1&iact=rc&page=2&tbnh=176&tbnw=251&start=11&ndsp=21&ved=1t:429,r:13,s:0&tx=160&ty=100)A **CELL** is… | * Cells were unknown until the invention of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the 1650’s. | |
| **Anton van Leeuwenhoek**  [http://www.cartage.org.lb/en/themes/sciences/physics/optics/OpticalInstruments/Microscope/GlassSphere/usph_08.gif](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&docid=qPoMtc9qFaZ_gM&tbnid=8PjRxRPg_YrOVM:&ved=0CAUQjRw&url=http://www.cartage.org.lb/en/themes/sciences/physics/optics/OpticalInstruments/Microscope/GlassSphere/GlassSphere.htm&ei=yCx5UoCMMo_MsQTq-IDQCQ&bvm=bv.55980276,d.cWc&psig=AFQjCNFTZxjO1sSx3ZQhEBaL-Qig4qa1FA&ust=1383759427546320)(1632-1723) | * Observed pond water, sour milk, blood and semen * Named the tiny living organisms he saw… * Invented the 1st… | |
| **Robert Hooke**  [https://encrypted-tbn2.gstatic.com/images?q=tbn:ANd9GcRfJqMG9u3xEIqs1OXhgQlb2KXl8uybbToSud6Ht3-jx_IWvgoK](http://www.google.com/imgres?sa=X&rlz=1T4NDKB_enUS522US523&biw=1366&bih=641&tbm=isch&tbnid=-H_OTrGFL5ypKM:&imgrefurl=http://www.corksorb.com/index.php?id%3D118&docid=9DZt1h60c131CM&imgurl=http://www.corksorb.com/downloads/misc5.jpg&w=281&h=182&ei=byx5UsOrB9LksASNlIC4DQ&zoom=1&iact=rc&page=2&tbnh=145&tbnw=224&start=11&ndsp=24&ved=1t:429,r:13,s:0&tx=155&ty=87)(1635-1703) | * Studied slices of cork * Named the tiny structures he saw \_\_\_\_\_\_\_\_ because they reminded him of the small rooms monks slept in * He was actually viewing… | |
| **Matthias Schleiden**  (1804-1881) | * 1804: German botanist concluded that… | |
| **Theodor Schwann**  (1810-1882) | * 1839: German physiologist concluded that… | |
| **Rudolf Virchow**  (1821-1902) | * 1858: German physician concluded that… | |
| **3 components of the Cell Theory** | | |
| **Modern Cell Theory**   * The cell contains hereditary information (\_\_\_\_\_\_\_\_\_\_) which is passed on from cell to cell during (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_). * All cells are basically the same in chemical composition and metabolic activities. * All basic chemical and physiological functions are carried out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of cells. * Cell activity depends on the activities of… | | |
| [https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcRcKSBu76lVwBgUXT5r2zMGAhS2F_y7cTEt5vEhnpYHiQ1ochbS](http://www.google.com/imgres?rlz=1T4NDKB_enUS522US523&biw=1366&bih=641&tbm=isch&tbnid=_rEf2K3imG7V5M:&imgrefurl=http://www.rebecca-elliott.co.uk/p/other-drawings.html&docid=6J4TOq0ZQm4V0M&imgurl=http://3.bp.blogspot.com/_2K_6fvKJd7U/TBEmENLHD8I/AAAAAAAAAJk/mBfLlPhQY_o/s1600/mice_hug.jpg&w=1120&h=749&ei=_Ct5UoGJGq_nsASg24LoBA&zoom=1&iact=rc&page=4&tbnh=171&tbnw=218&start=54&ndsp=24&ved=1t:429,r:77,s:0&tx=91&ty=46)**Spontaneous Generation** | | * Until the 1850’s, most people believed that living things could spontaneously appear from… * EX: Mice could be created by… |
| **Francesco Redi**  **(1626-1697)** | | * 1st to challenge… * Did not accept the idea that flies came from rotting meat |
| **Redi’s Experiment**  **(1668)**  [http://www.pc.maricopa.edu/Biology/rcotter/BIO%20205/LessonBuilders/Chapter%201%20LB/maggots.jpg](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&docid=UAmmQ1NuWp_-uM&tbnid=AiVSUiBuBOB1-M:&ved=0CAUQjRw&url=http://www.pc.maricopa.edu/Biology/rcotter/BIO%20205/LessonBuilders/Chapter%201%20LB/Ch1LessonBuilder_print.html&ei=oh15UojSGOnNsQSI_YHoBg&bvm=bv.55980276,d.cWc&psig=AFQjCNF2pU_CacyKbq81k2UE4leMbCmvhA&ust=1383755534372669) | | * IV: * DV: * Hypothesis: If a jar containing rotting meat is covered, then… * Conclusion: Flies lay eggs, eggs grow into maggots, maggots grow into flies. If flies cannot lay eggs... |
| **Objections to Redi**  https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcQbv7RphywSPIVPyDuPeuV4AijpA_VeAVnw2PLxtPqwKoLldGb9dQ | | * Sealing the jar kept… * Accepted the notion that large organisms could not spontaneously generate, but… |
| **[http://aportes.educ.ar/biologia/Experimentos%2BSpallanzani.jpg](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&docid=VNC6t3GOjEgSoM&tbnid=frAV07YymRJFQM:&ved=0CAUQjRw&url=http://aportes.educ.ar/biologia/nucleo-teorico/recorrido-historico/como-se-origina-la-vida/los_primeros_experimentos.php&ei=ryB5UoODMsjSsATKsYD4CA&bvm=bv.55980276,d.cWc&psig=AFQjCNGIyMdJuANfYIl6huQnKrI1DB1LQA&ust=1383756302124236)Lazzaro Spallanzani (1729-1799)** | | * Microbes that spoil food come from the air and can be killed by boiling. * IV: * DV: * Hypothesis: If air is allowed to reach food, then… |
| **Spallanzani’s Experiment**  **(mid-1700’s)**  **Flask 1:**  **Flask 2:**  **Results:** | | http://i6.photobucket.com/albums/y227/childofthecorn9/school_biology/boilinggravy.gif |
| **Objections to Spallanzani**  https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcS-UKyOqUDIKlwqL32wCoRgqSWBdVpB1BCAIl_zAXNVrRTXqATkvQ | | * Sealing the flask… |
| **Louis Pasteur**  **(1822-1895)** | | * Supported the idea that… * Invented \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (sterilization by heat) * Developed a special “swan-neck flask” which… |
| **Pasteur’s Experiment (mid-1800’s)**  **IV:**  **DV:**  **Hypothesis:** | | http://i6.photobucket.com/albums/y227/childofthecorn9/school_biology/brothinflask.gif |
| **SOL Practice Questions**   |  |  | | --- | --- | | 1. Which of the following came first in the scientific study of living things?  a. Light microscope c. Cell Theory  b. Electron microscope d. Model of DNA | 2. The results of Pasteur’s experiment helped Pasteur to —  a. isolate the virus responsible for smallpox  b. reject the theory of spontaneous generation  c. convince people to cover food  d. produce a vaccine against rabies |   3. Francesco Redi performed an experiment in 1668. In the experiment, he placed rotting meat in two jars. The first jar was left open. After a few days, fly larvae were found on the decaying meat inside. The mouth of the second jar was covered with gauze. After a few days, the decaying meat inside was free of fly larvae, but larvae were found on the gauze. This experiment supports the hypothesis that —  a. fly larvae only come from adult flies c. Adult flies are not attracted to decaying meat  b. fly larvae prefer fresh meat d. Decaying meat produces fly larvae | | |
| **A Cloze Activity on the Cell Theory**  In 1665, Robert Hooke, an English scientist, used a crude compound light microscope to examine thin slices of cork from the bark of an oak tree. He observed that the (1)\_\_\_\_\_\_\_\_\_\_ was composed of tiny, (2)\_\_\_\_\_\_\_\_\_\_ boxes similar to a (3)\_\_\_\_\_\_\_\_\_\_. Hooke called the boxes (4)\_\_\_\_\_\_\_\_\_\_ because they reminded him (5)\_\_\_\_\_\_\_\_\_\_ the small, boxy living (6)\_\_\_\_\_\_\_\_\_\_ of monks. Their rooms (7)\_\_\_\_\_\_\_\_\_\_, in fact, called cells. (8)\_\_\_\_\_\_\_\_\_\_, we know that the (9)\_\_\_\_\_\_\_\_\_\_ Hooke observed were the cell (10)\_\_\_\_\_\_\_\_\_\_ of dead plant cells. (11)\_\_\_\_\_\_\_\_\_\_ published his drawings and (12)\_\_\_\_\_\_\_\_\_\_ which led other scientists (13)\_\_\_\_\_\_\_\_\_\_ that time to look (14)\_\_\_\_\_\_\_\_\_\_ evidence of cells.  In (15)\_\_\_\_\_\_\_\_\_\_ 1830’s, two German scientists, (16)\_\_\_\_\_\_\_\_\_\_ Schleiden and Theodor Schwann (17)\_\_\_\_\_\_\_\_\_\_ able to view many (18)\_\_\_\_\_\_\_\_\_\_ organisms with microscopes and (19)\_\_\_\_\_\_\_\_\_\_ some important conclusions. Schleiden (20)\_\_\_\_\_\_\_\_\_\_ a microscope to observe (21)\_\_\_\_\_\_\_\_\_\_ and concluded that all (22)\_\_\_\_\_\_\_\_\_\_ are composed of cells. (23)\_\_\_\_\_\_\_\_\_\_ made similar observations about (24)\_\_\_\_\_\_\_\_\_\_ cells.  The observations and (25)\_\_\_\_\_\_\_\_\_\_ of scientists from the (26)\_\_\_\_\_\_\_\_\_\_ 17th century to the (27)\_\_\_\_\_\_\_\_\_\_ of Schwann and Schleiden (28)\_\_\_\_\_\_\_\_\_\_ summarized into the cell (29)\_\_\_\_\_\_\_\_\_\_, one of the most (30)\_\_\_\_\_\_\_\_\_\_ ideas of modern biology.  (31)\_\_\_\_\_\_\_\_\_\_ cell theory is made (32)\_\_\_\_\_\_\_\_\_\_ of three main ideas…   1. (33)\_\_\_\_\_\_\_\_\_\_ organisms are composed of (34)\_\_\_\_\_\_\_\_\_\_ or more cells. An (35)\_\_\_\_\_\_\_\_\_\_ may be a single (36)\_\_\_\_\_\_\_\_\_\_, such as an amoeba (37)\_\_\_\_\_\_\_\_\_\_ a bacterium. Larger organisms, (38)\_\_\_\_\_\_\_\_\_\_ as humans, are composed (39)\_\_\_\_\_\_\_\_\_\_ many cells. 2. The cell (40)\_\_\_\_\_\_\_\_\_\_ the basic unit of (41)\_\_\_\_\_\_\_\_\_\_ of organisms. In the (42)\_\_\_\_\_\_\_\_\_\_ way that the basic (43)\_\_\_\_\_\_\_\_\_\_ of matter is the (44)\_\_\_\_\_\_\_\_\_\_, the basic unit of (45)\_\_\_\_\_\_\_\_\_\_ is the cell. 3. All (46)\_\_\_\_\_\_\_\_\_\_ come from pre-existing cells. (47)\_\_\_\_\_\_\_\_\_\_ come from the reproduction (48)\_\_\_\_\_\_\_\_\_\_ previously existing cells, a (49)\_\_\_\_\_\_\_\_\_\_ in which cells reproduce (50)\_\_\_\_\_\_\_\_\_\_ copies of themselves.  |  |  |  |  |  | | --- | --- | --- | --- | --- | | All | Animal | Are | At | Atom | | Basic | Cell | Cells | Cells | Cells | | Cells | Conclusion | Cork | Descriptions | Different | | Draw | Exact | For | Hollow | Honeycomb | | Hooke | Is | Late | Life | Mathias | | Of | Of | Of | One | Or | | Organism | Organization | Plants | Plants | Process | | Quarters | Same | Such | Schwann | The | | The | Theory | Time | Today | Unit | | Up | Used | Walls | Were | Were | | | |