Science
Unit 2: Cells and Microscopes

Essential Understandings	▪ There are single-celled and multi-celled organisms. ▪ Cells are made of smaller parts that carry out different functions. ▪ Plants and other producers make their own food in a chemical process called photosynthesis. ▪ All living things convert food into usable energy in a process called respiration. ▪ Photosynthesis and respiration occur within the organelles of the cells of living things. ▪ Food provides molecules that serve as fuel and building material for all organisms. ▪ Organisms that eat plants break down the plant structure to produce the material and energy they need to survive, and then they are consumed by other organisms. ▪ Almost all food energy comes originally from sunlight and goes through the food web. ▪ Microscopes are used to study microscopic things.
Essential Questions	▪ What are the parts of a cell? ▪ What is a producer? ▪ Where does photosynthesis occur? ▪ What are the starting products and end products of photosynthesis and respiration? ▪ How does the plant get the starting products needed for photosynthesis? ▪ Where do the end products go? ▪ What type of an instrument is used to study cells? ▪ How does a microscope work? ▪ How are plant cells different from animal cells?

Science
Unit 2: Cells and Microscopes

Essential Knowledge	▪ Plants use the energy in light to make sugars out of carbon dioxide and water. This food can be used immediately for fuel or stored for later use. ▪ There are different parts to a microscope and a safe way to use one. ▪ Cells have different parts. ▪ Organelles have different functions. ▪ Photosynthesis occurs inside the chloroplast of cells. ▪ Only plants and other producers have chloroplasts. ▪ Water, carbon dioxide and sunlight are needed for photosynthesis to occur. ▪ The end products of photosynthesis are oxygen and glucose sugar. ▪ Sugar is turned into useable energy inside the mitochondria of all living cells during respiration. ▪ Plants are producers, which means they make their own food. ▪ Most animals are consumers and cannot manufacture their own food inside their bodies.
Vocabulary	▪ <u>Terms</u>: ○ diaphragm, base, lens, binocular, stage, objective, aperture, ocular, magnification, cell wall, cell membrane, nucleus, cytoplasm, ribosome, chromosomes, nuclear membrane, pores, endoplasmic reticulum, vacuole, mitochondria.
Essential Skills	▪ Handle and use a microscope properly. ▪ Prepare wet and dry mount slides and view them. ▪ Identify the parts of the cell. ▪ Describe the chemical processes of photosynthesis and respiration. ▪ Record observations accurately.

Science
Unit 2: Cells and Microscopes

Related Maine Learning Results	Science A. Unifying Themes A1.Systems Students apply the principles of systems, models, constancy and change, and scale in science and technology. b. Explain how the output of one part of a system, including waste products from manufacturing or organisms, can become the input of another part of a system. A4.Scale Students use scale to describe objects, phenomena, or processed related to Earth, space, matter, and mechanical and living systems. a. Describe how some things changes or work differently at different scales. D. The Physical Setting D3.Matter and Energy Students describe physical and chemical properties of matter, interactions and changes in matter, and transfer of energy through matter. k. Describe the properties of solar radiation and its interaction with objects on earth. E. The Living Environment E2.Ecosystems Students examine how the characteristics of the physical, non-living (abiotic) environment, the types and behaviors of the living (biotic) organisms and the flow of matter and energy affect organisms and the ecosystem of which they are part. c. Describe the source and flow of energy in the two major food webs, terrestrial and marine. d. Describe how matter and energy change from one form to another in living things and in the physical environment. E3.Cells Students describe the hierarchy of organization and function in organisms, and the similarities and differences in structure, function, and needs among and within organisms. a. Describe the basic functions of organisms carried out within cells including the extracting of energy from food and the elimination of wastes. d. Explain that all living things are composed of cells numbering from just one to millions.

Science
Unit 2: Cells and Microscopes

Sample Lessons And Activities	▪ Germination Lab ▪ Cheek/Elodea Cell Lab ▪ Viewing slides of different organisms ▪ Use of a microscope
Sample Classroom Assessment Methods	▪ Quizzes on microscopes ▪ Germination Lab Report ▪ Microscope Sketches
Sample Resources	▪ Publications: ○ ScienceSaurus ○ Kids Discover "Plants" ○ http://www.cellsalive.com/ ○ http://www.ibiblio.org/virtualcell/tour/cell/cell.htm ○ http://nobelprize.org/educational/medicine/cell/game/ ○ http://www.windows2universe.org/earth/Life/cell_intro.html ▪ Videos: ○ Plants VHS tapes at BJHS