

Through the Microscope (SCOP) CTY Course Syllabus

Required book: Complete Book of the Microscope, Rogers.

	OBJECTIVES	ACTIVITIES
Registration Sunday	<ul style="list-style-type: none"> Meet parents and students 	<ul style="list-style-type: none"> Mystery slides on low magnification Give families student supply list
Day 1 Morning	<ul style="list-style-type: none"> Meet administrators, Meet class Honor code, Class Rules Lab safety and expectations Mystery Slides Student prior knowledge Metric: Converting fractions to decimals to scientific notation. 	<ul style="list-style-type: none"> Getting to know you activities Read and sign CTY Honor Code. Read and sign lab safety contract. Slide viewing and discussion Pre-assessment Overview of text and reading assignments Lesson on writing fractions and whole numbers in scientific notation.
Afternoon	<ul style="list-style-type: none"> Power of Ten video (Eames) Discuss logarithmic range in size Examples of size variation. Reference books for drawings Microscope parts demonstration Compound microscope design Examples of scientific notation Mystery Slides - Crystals Review day and homework. 	<ul style="list-style-type: none"> Draw a paper Powers of Ten ruler. Write a log scale from 10^{-11} to 10^{12} Draw on ruler a range of sizes from atoms to stars. Student drawings. Look at eyepiece and objective lenses. Identify parts on a microscope. Problem solving, converting numbers Draw crystals at 40x, lit and unlit. Salt, sugar, NaHCO_3, sand.
Homework	Finish and color tens ruler. Begin to learn microscope parts. Read pp. 80-84.	
Day 2 Morning	<ul style="list-style-type: none"> Mystery slides of crystals (sand, salt, sugar, baking soda) Magnify using a water droplet, a clear plastic sphere, cube and cylinder and a magnifying glass. Concave and convex lenses used alone and in series. Lens shape and light diffraction History of Microscopy Light and electron microscopes Microscope demonstration, parts and their function. Light adjustment on microscope 	<ul style="list-style-type: none"> Identify and draw crystals. Discuss the difference if lit or unlit. Examine a penny and newsprint. Examine rocks and rock crystals. Look at your hand and your hair. Use single hand held glass lenses. Magnify with two lenses held apart. Notice differences in what you see. Inventors and scientists See examples of microscopic images. Students label a microscope diagram. Students point out microscope parts. Light level and diaphragm adjustment
Afternoon	<ul style="list-style-type: none"> Learn to wet mount a specimen and coverslip without air bubbles. Center your specimen on the microscope stage and focus. 	<ul style="list-style-type: none"> Put a newsprint letter "e" on a slide, add a water droplet and coverslip. Coarse focus on low power. Fine focus on low power.

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	<ul style="list-style-type: none"> Partners take turns focusing. Drawing lesson for scope image. See, observe and draw exactly what you see on low power. Medium power focus lesson. Magnification calculation. Working distance measurement Review focusing procedure and microscope parts for quiz. 	<ul style="list-style-type: none"> Partners help each other focus. Draw all the imperfections: paper fibers, air bubbles, ink blotches. Draw in lab notebook using pencil. Re-center, refocus, draw in lab book. Eyepiece lens times objective lens. Measure stage to objective lens dist.
Homework	Study for microscope parts quiz. Read pp. 10-17.	
Day 3 Morning	<ul style="list-style-type: none"> Daily lab notebook entry format. Mystery slide– inanimate objects Practice focusing on low power Write it in daily lab notebook Resolving power of a lens Depth of field and magnification Review microscope parts. Review steps in using a scope. Discovery walk find specimens Share and practice focusing. Discuss the characteristics of life? Are crystals alive? Bacteria good and bad. Cell size, shapes and no true nucleus. 	<ul style="list-style-type: none"> Write table of contents and format. Examine: wire mesh, burlap, yarn, fish scales, feathers, eraser shavings, poppy seeds, and sesame seeds. Discuss enlargement and fuzziness. Specimen thickness and focusing. QUIZ: label parts on scope drawing. Study for practical microscope exam. Examine plant parts and insects. View on 40x and 100x. Brainstorm what is alive and why. Grow, reproduce and cell structure Be able to draw a bacterial cell with DNA, cytoplasm and cell membrane
Afternoon	<ul style="list-style-type: none"> Structure of plant and animal cells with nucleus and chromosomes Robert Hooke – cork is made of cells. Living things have cells. Discuss lab report format. Spread onion skin on a slide. Wet mount, coverslip and view. Draw exactly what you see. Wrap-up. What’s in a cell? 	<ul style="list-style-type: none"> Draw basic plant and animal cells. Brainstorm parts of a eukaryotic cell LAB: View, draw and describe cork’s cell structure at 40x and 100x. Lab Report: Draw and describe onion skin rectangular cells with nuclei. Draw image at 40 x and 100 x. Draw air bubbles, folds and dirt.
Homework	Read pp. 8, 9, 32-35, 40. Think about the question, “Are all germs bad?”	
Day 4 Morning	<ul style="list-style-type: none"> Discuss types of microorganisms Agar Culture Experiment Report Hypothesis: What will grow? Methods: Procedure followed. Results: Record results daily in lab notebook and write lab report Conclusion: Your explanation. Archaeobacteria and evolution Bacterial size and shapes Light and electron micrographs Bacteria can be good or bad. DVD: “Simple Organisms in Action. Bacteria” (Schlessinger) Bacteria, prokaryotic cells with no 	<ul style="list-style-type: none"> Bacteria, fungi, protozoa, viruses. Hypothesis: Guess what will grow. Methods: Touch your finger to agar, before and after washing hands. Also grow moldy blue cheese or fruit. Results: Write in Lab Notebook, then write Experiment Lab Report. Prokaryotes and ancient bacteria. Good bacteria: microorganisms in digestion and in making food. Bad bacteria cause diseases like strep throat and ear infections. Rod shaped and spherical bacteria.

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	true nucleus, just dsDNA.	<ul style="list-style-type: none"> • Draw a basic bacterial cell. • View electron micrographs. • Draw a square plant cell with a Nucleus, chloroplasts and cell wall.
Afternoon	<ul style="list-style-type: none"> • Learn basic plant cell structure • Cell wall, chloroplasts, vacuole • Learn basic animal cell contents. • Compare, contrast all three cells. • Discuss intracellular organelles • Demonstrate playdough models of plant, animal and bacteria cells • Flatten playdough and wrap to Make layers around a nucleus. • Discuss plane of sectioning. • Fruit salad mystery slides. View cell structure of ten fruits. • Individual Proficiency Exams: Each student is individually tested and must pass to use the microscope independently. 	<ul style="list-style-type: none"> • Draw an animal cell with nucleus, mitochondria, Golgi, etc. • View electron micrographs. • Make Models: Each student makes 3 cell models of cells. Cut open and add colorful playdough organelles. • Bacterium has one layer. • Animal cells have two layers (nucleus with cytoplasm around it) • Plant cells have three layers (nucleus, cytoplasm and cell wall) • Students guess identity of ten fruits under the microscope. • Students mount, focus and view a newsprint letter “e” at 40x and 100x.
Homework	Read pp. 26-29, 50. Study for quiz: draw bacteria, plant and animal cells, label organelles.	
Day 5 Morning (half day; July 4)	<ul style="list-style-type: none"> • Petri Dish: What grows there? Look, but do not open dish. • Continue scope proficiency tests. • Mystery slides – identify objects. • What’s in a bacterial cell? Prokaryote vs. eukaryote cells. Bacteria shapes and types. • Model a bacterial cell with clay. Bacteria are balls or rods and have one layer (cytoplasm). • Eukaryote cell has a nucleus. and intracellular organelles. • Compare and contrast organelles in plant and animal cells. • Discuss function of chloroplast, cell wall, and vacuole in plants. • Discuss structure and function of the nucleus, mitochondria, Golgi, RER, SER, ribosomes cell membrane, double nuclear membrane and chromosomes. • What are organelles made of? lipid, protein and DNA. • Models: Playdoh model of bacterial, plant and animal cells: • Animal cells have two layers: the nucleus and cytoplasm. • Plant cells have three layers: a 	<ul style="list-style-type: none"> • LAB Experiment: Record growth on agar. What grew? Where did it grow? • Students finish LAB write-ups. • Velcro, hair, dandelion seed, mica • Draw bacteria cell structure: DNA, cytoplasm and cell membrane. • Transmission electron micrographs. Model a bacterium with a small ball of Playdoh. Cut it in half and put a circle of Playdoh DNA inside. • Evolution of eukaryotic cells. mitochondria and chloroplast origins. • View microscope images of typical cells and their organelles. • Draw typical plant and animal cells. Why are plant cells rectangular? • Draw correct organelles inside cells of plant and animal cells. Practice drawing while learning function. • Label organelles in each cell. • Draw eukaryotic cells: Color code lipid membranes, DNA and protein. • Activity: Bacteria – small ball • Animal cell: wrap Playdoh cytoplasm around a small ball nucleus.

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	<ul style="list-style-type: none"> nucleus, cytoplasm and cell wall. Cut each cell in half and discuss the plane of sectioning. Review and study for quiz. 	<ul style="list-style-type: none"> Plant cell: Wrap three layers: cell wall, cytoplasm, nucleus. Add Playdoh mitochondria to both plant and animal cytoplasm. Add chloroplasts to plant cytoplasm.
Homework	Study for the quiz. Read pp. 30-35.	
Day 6 Morning	<ul style="list-style-type: none"> Quiz #2 – Study, then draw three cell types: bacteria, plant, animal Agar Culture: What germs grew? Lab Experiment Report format: Hypothesis (a guess), Methods (What you did), Results (What you found) and Conclusion (What does it mean?) Explain results. Characteristics of life and types of living organisms. Video: Simple Organisms in Action. Protists (Schlessinger) Protists: protozoa are one celled organisms with a variety of intracellular organelles. 	<ul style="list-style-type: none"> Quiz: Draw bacterial, plant and animal cells. Label all organelles. Guess (hypothesis) then look (results) Write daily observations in your lab notebook: the size, shape, texture and appearance of each colony. Write Lab Report: Hypothesis, Methods and Results on day 4. Brainstorm: bacteria, fungi, plants, animals and protozoa. Students see video with close-ups of protozoa, algae and slime molds. Watch cytoplasmic streaming. Examine microscopic protozoa and Invertebrates. Think about report on a microscopic organism.
Afternoon	<ul style="list-style-type: none"> Continue microscope proficiency tests for each student while other students view specimens. Explain DNA structure. Sugar phosphate backbone. Make ATGC with 4 colors. DNA replication: DNA → DNA; DNA and RNA structures. DNA transcription: one DNA strand codes for one ssRNA. Example of DNA → RNA Translation mRNA → protein. How does DNA make protein? (DNA, mRNA, protein, virus) Explain DNA → mRNA → protein. Virus Infection acted out. Make an edible eukaryotic cell with lemon Jello and small candies to represent organelles 	<ul style="list-style-type: none"> Students mount specimen, center and Focus at 40x and 100x. Student see specimens they have collected. Activity: make pipe cleaner DNA. Make backbone and 4 nucleotides. Loosely attach hydrogen bonds. Unwind and copy part of one strand. Make a small pipe-cleaner RNA Activity: Students draw dsDNA. Write the DNA code of one strand. Write the complementary mRNA. Activity: Students take turns play acting transcription and translation. Each child plays a part: ribosome, mRNA, tRNA, amino acid or DNA. Viral DNA takes over a bacterial cell Play act virus making viral protein. Candy chloroplasts, mitochondria, chromosomes and ribosomes. Search on textbook website.
Homework	Read text pp.22-23 and 48-50. Choose one microscopic organism to research and report on.	
Day 7 Morning	<ul style="list-style-type: none"> Agar Culture Experiment Report Discuss growth on agar cultures. Compare results of entire class. Conclusion: explain results. 	<ul style="list-style-type: none"> Make final day 5 observations and Complete writing your Results. Examine colonies with stereoscope. Describe fuzzy fungi and bacteria.

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	<ul style="list-style-type: none"> Teacher makes slides of germs, and safely disposes of slides. Collect and view specimens. Bacterial verses viral infections. Immunization verses antibiotics Bacterial infections – Disease and antibiotic resistance. Even bacteria get viral infections The structure of a bacterial virus. Viruses are DNA + protein coat Genetics of phage assembly: Head, collar, sheath, tail fibers. 	<ul style="list-style-type: none"> LAB: Examine your colonies. Students finish lab reports. LAB: view specimens from home. Brainstorm: Childhood diseases that are now curable. Bacterial or viral? Explain importance of antibiotics. How to prevent antibiotic resistance TEM pictures of bacterial viruses, the lytic cycle: Viruses kill cells. Model a bacteriophage: color, cut and assemble a paper model using the same steps a virus would use.
Afternoon	<ul style="list-style-type: none"> Discuss life forms: bacteria, plants, animals, protozoa, fungi Single cell verses multicellular. Prokaryote verses eukaryote cell. Show video: Simple Organisms in Action. Fungi. Computer lab to look at text site + microscopy websites. Report format: Draw and label it. Write about where it lives, what it eats, its size, and more Begin microscopic organism report. Examine protists and invertebrates. Science jeopardy game to review cell structure and organelles. Review and wrap-up. 	<ul style="list-style-type: none"> Brainstorm types of living things. LAB: Examine prepared fungi slides. Yeast, mold, lichen, mushroom Review structure of bacteria, algae, yeast, animal and plant cells. Discuss video and relate to agar culture Experiment. Fuzzy fungi colonies. Search for key words and make notes on what you found. Discuss in class. Research your microscopic organism. LAB: Pick a microscopic organism. Examine live or prepared specimens Begin writing your individual report LAB: Examine green hydra, volvox, green algae, rotifers, water fleas. View and draw each one. Teams answer organelle questions on bacteria, plant and animal cells.
Homework	Read pp. 36-37. Write microscopic organism report.	
Day 8 Morning	<ul style="list-style-type: none"> Demonstration oral report on a Microscopic organism. What is an invertebrate? Examine the body structure of Three fresh water invertebrates. Bugs in the water. Protozoa species and diversity Discuss body shapes, types of Motility and photosynthesis. Imaginary Protozoan: Discuss possible organelles in protozoa: multiple nuclei, cilia, flagella, chloroplasts, mitochondria. This size of cells ranges from: 	<ul style="list-style-type: none"> Watch the teacher give a report. Brainstorm invertebrates. LAB: Examine hydra, planaria, rotifers and nematodes. LAB: Look at water fleas. LAB: Examine six protozoa: euglena, paramecium, amoeba, volvox, stentor, and algae. Activity: Draw an imaginary paper protozoan. Draw all organelles and label. Decorate with raffia flagella and ribbon or paper cilia. LAB: Look different types of fungi. Include yeast, mushrooms and

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	egg>RBC>yeast>bacteria <ul style="list-style-type: none"> • Discuss infectious diseases, fungal, bacterial or viral. How antibiotics kill bacteria. How immunization works. 	lichen <ul style="list-style-type: none"> • Lively discussion about childhood diseases that are now curable. Cancer is not contagious. Genetic defects are not contagious.
Afternoon	<ul style="list-style-type: none"> • Normal Cell Division (mitosis) and chromosome separation. • Cell cycle: interphase and mitosis DNA replicates, each new cell gets one copy of each of 23 pairs of chromosomes. • Errors in chromosome separation cause genetic defects and often lead to mental retardation. • Discuss two written reports: a microscopic organism and a human cell, tissue or organ. 	<ul style="list-style-type: none"> • Model DNA replication with paper chromosomes. Unfold to double, then break in half at centromere for normal chromosome separation. • Draw mitosis: prophase, metaphase anaphase and telophase. • Draw metaphase plate on paper plate. • Learn: Non-disjunction and genetic defects XXY, XO, XYY, XXX trisomy 21, and trisomy 18
Homework	Finish microscopic organism report. Oral presentations and written report due tomorrow.	
Day 9 Morning	<ul style="list-style-type: none"> • Listen to and assess oral reports on a microscopic organism. • Ask questions of report speaker. • Cell division and mutation. • Mutation: point, deletion or insertion, chromosomal, Homeotic mutants, fruit flies • Mosaicism and X- inactivation. • Mendel and inheritance patterns Dominant vs. Recessive alleles; Phenotype vs. Genotype. • Drawing Your Family Tree: Punnett Squares: monohybrid and Dihybrid cross for eye and hair. 	<ul style="list-style-type: none"> • Reports: Student oral presentations Each on a microscopic organism. • Each student hands in written report. • Mistakes of DNA replication. • Entire DNA, deletion or point mutation -> mutant phenotype. • Calico cat and cell origins. • Gene is a unit of inheritance. • Example: hair and eye color. • Activity: Draw a trait in your family. • Brainstorm: Each student does one square for hair and eye color.
Afternoon	<ul style="list-style-type: none"> • Multicellularity requires cell specialization and differentiation. • Cells differentiate as they divide. nerve, muscle, skin, bone, ... • Epidermis: form and function • Microscopic look at epidermis: • View your hair. Look at feathers • Computer Lab: final project Find and compare science links • Embryonic development and the origin of differentiated cells. • Egg->Morula->Gastrula-> three cell layers -> adult cells. • Cell differentiation in animals: Compare sea urchin, bird and mammalian embryology. • Embryology and Cell Division in 	<ul style="list-style-type: none"> • Invertebrate, plant and animal cells. Types of specialized cells in each. • Pick a report topic: a cell, or tissue. • LAB: Look at your hair. • LAB: Look at prepared slides of bone, nerve, skin, muscle, etc. • Pick a cell or tissue and search for Information on the internet. • Research your cell or tissue on the internet. Shape and function of cells. • Examine a chart of embryonic origins of adult human tissues. • 1 cell-> 2->4-> 8-> 16->32-> 64 cells • Brainstorm types of adult cells: Ectoderm: nerve and skin cells; Mesoderm: muscle, fat, bone;

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	<p>early embryos. Discuss equal verses unequal cell divisions.</p> <ul style="list-style-type: none"> • Wrap-up and write report topics On the board. 	<p>Endoderm: lines digestive tract</p> <ul style="list-style-type: none"> • Discuss yolk verses placenta. • Imagine the three cell layers and look at a chart of cell embryonic origins.
Homework	Research for your report and begin writing it. Ask family about traits: hair and eye color.	
Day 10 Morning	<ul style="list-style-type: none"> • Differentiation in multicellular organisms: cell specialization. • View photos and drawings of differentiated animal cells: light and electron microscope images. • Demonstrate how to draw human cell types: nerve, muscle types, bone, fat, blood, salivary gland. • Microfilaments: actin and myosin • Insect embryonic development • Drosophila homeotic mutants. • Genetic control of development • Discuss next report on a human cell, tissue and/or organ. • Ultrastructure of human cells: Secretory and digestive cells differ in their morphologies. 	<ul style="list-style-type: none"> • Brainstorm organs tissues and cells Discuss human cell types. • Lesson on drawing human cells: nerve, epithelial, bone, muscle and blood cells. Learn characteristic organelles. • Activity: Practice drawing different human cell characteristic shapes. • View muscle cell ultrastructure. • Insect development, imaginal discs and development of body segments • Monster flies: duplications (bithorax) and body segment transformations. • Pick a cell or tissue type for report: written and oral report and drawings. • Distribute reference material for individual research projects on human cells, tissues and organ.
Afternoon	<ul style="list-style-type: none"> • Demonstrate ultrastructural clues as to cell function. Specialized structures: microfilaments, microtubules, microvilli. • View prepared slides of cells. Morphology and specialization. • Discuss student projects. • Teacher presentation of a sample report on a cell or tissue. • What cell am I? Electron microscope images. • Students do incomplete work. • Science Team Jeopardy: review curriculum: bacteria, viruses, protozoa, fungi, cells, tissues, cell specialization, organelles, DNA, mitosis, genes. 	<ul style="list-style-type: none"> • Recognize the ultrastructures of secretory cells (RER and vesicles) and digestive cells (lysosomes). • What cell am I? Guess function from electron micrograph image. • LAB: Draw from microscopic image nerve, muscle, bone, blood and skin. • Students listen to sample report. • Guess a cell's function from its ultrastructural morphology. • Make-up labs and other work. • Students form two teams, choose a category and a spokesperson. Teacher creates questions from curriculum.
Homework	Work on final report. Read pp. 40-45 (plants)	
Day 11 Morning	<ul style="list-style-type: none"> • Early life on ancient Earth: bacteria, algae and the rise of multicellular organisms. • Chloroplasts and chlorophyll. Explain how CO₂ +H₂O are 	<ul style="list-style-type: none"> • How photosynthesis changed early Earth. Why animals depend on plants. Photosynthesis and the oxygen cycle. • Discuss photosynthetic organisms

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	<p>converted to glucose + O₂ .</p> <ul style="list-style-type: none"> • Transpiration in plants. • Mystery Vegetable Lab: Identify microscopically edible plant parts as a root, leaf or stem. • Review the parts of a plant. Organs: root, stem and leaf. What plant parts do we eat? • Plants: roots, stems and leaves • Plants: photosynthesis occurs in the leaf, adsorption in the roots and transport up the stem. • Discovery walk: collect plant parts and examine. 	<p>we studied: algae protozoa, plants.</p> <ul style="list-style-type: none"> • Oxygen and carbon dioxide cycles. • Food LAB: Microscope examination. Roots: potato, turnip, carrot, beet Stems: celery, asparagus, Leaves: lettuce, artichoke, endive • Brainstorm plant parts that we eat. Categorize food as root, stem, leaf fruit or flower. Also fungi. • Brainstorm functions of plant parts. • What did edible foods look like? • Identify plant parts in microscope. Roots, stems and leaves. • Collect roots, stems, leaves, seeds and examine under the microscope.
Afternoon	<ul style="list-style-type: none"> • Structure and function of roots, stems, leaves, flowers and fruit. • Root: cell shape, arrangement and specialization. Root hairs. • Root function: adsorption of water and minerals. • Stem: contains tiny tubules. Xylem transports water up. Phloem transports glucose. Seed plants verses ferns and moss • Teacher presents information: The structure and function of human cells and tissues. 	<ul style="list-style-type: none"> • Activity: Model a plant with a stem of straw, raffia roots and paper leaves. • LAB: Look prepared slides of root tips longitudinally sectioned. Draw and look for dividing cells. Notice cell shape and elongation. • LAB: Look at prepared slides of stems in cross section. Draw them • Compare monocot and dicot stems; arrangement of tubules differs. • Learn about cell morphologies. Work on independent reports by researching, writing and drawing.
Homework	Oral and written reports (1-2 pages) due tomorrow. Draw and discuss your cell's shape, contents, location and function.	
Day 12 Morning	<ul style="list-style-type: none"> • Listen and evaluate oral reports, drawings and discussion Relate structure to function. Show cell arrangement in tissue. • Teacher presents a scientific report on a cell and tissue. • Discuss reports. • Science jeopardy. 	<ul style="list-style-type: none"> • Each student's oral presentation. Students show their drawings of a tissue and a cell's ultrastructure. • Discussion and questions. • Students listen and ask questions of the teacher. • Students discuss what they learned. • Categories include plant parts.
Afternoon	<ul style="list-style-type: none"> • Photosynthesis and leaf structure • Palisade photosynthetic cells on top surface are columnar. • Spongy mesenchyme in middle have spaces for gas exchange. • Stomata and guard cells regulate gas exchange on leaf bottom. • Drying: waxy cuticle, leaf shape, stomata and guard cells. • Discuss: How does leaf shape 	<ul style="list-style-type: none"> • LAB: Look at prepared leaf slides. • Notice upper green photosynthetic columnar layer of cells, middle spongy mesenchyme cells and lower epithelium with stomata. • Draw what you see and color it. Label your drawings. • LAB: Examine leaf variation from different biomes. Tropical verses desert changes leaf shape.

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	Promote plant survival? <ul style="list-style-type: none"> • Video: Plant Life in Action. (Schlessinger Science Library) 	<ul style="list-style-type: none"> • Discuss adaptation and survival. • Watch video about plant structure function, and variation.
Homework	Read about plants.	
Day13 Morning	<ul style="list-style-type: none"> • CTY students evaluate course and program • Biomes: ocean, rain forest, regular forest, desert, arctic, antarctic, tundra, pond, lake ... • Living things are well adapted. • Ecosystems and Biomes: Draw a biome and its food web on the board: class participation. Explain: Predator and prey. • Explain: Herbivore and Carnivore. 	<ul style="list-style-type: none"> • PA administers evaluation. • Brainstorm biomes: Students think of types of biomes and their climates. • List plants and animals and other Living things in each biome. • Discuss the interdependence of all living things and nature's balance. • Activity: Each student picks a biome and draws a food web. Draw using reference books. Present to class.
Afternoon	<ul style="list-style-type: none"> • Watch video: Animal Life for Children: All About Food Chains. (Schlessinger Media) • PA gives a presentation. • Finish individual biome charts. • Review everything. Add to the student list of facts and concepts • Play science team jeopardy. Categories include curriculum. • PA gives report on a tissue. Discuss biomes and survival. • Mendel and genetic inheritance • Darwin and Evolution: Genetic variation, heredity and selection 	<ul style="list-style-type: none"> • Discuss interdependence of all life: Decomposers, sunlight and cycles. • Students discuss PA's report. • Student presentations of biomes. • Brainstorm ideas: Make a list on the board that is student generated. • Play jeopardy by cooperating. Team Spokesperson says the answer. • Students listen to actual scientific presentation on cell or tissue. • Blending theory vs. gene hypothesis • Darwin the naturalist. What he saw. How he realized evolution.
Homework	Read pp. 51-62 (insects)	
Day14 Morning	<ul style="list-style-type: none"> • Insects have three body parts: head, thorax, and abdomen • Spiders and scorpions are not insects and have 8 legs. • Read poems from Insectopedia. • Play science team jeopardy to review the curriculum. • Post-Assessment • Review assessment test answers. • Look at specimens from home 	<ul style="list-style-type: none"> • Make a paper and pipe cleaner model of an insect using reference books. • LAB: Look at insects under the Microscope. • Students listen and comment. • Students pick categories and review what they have learned. • Students take same test as before. • Students volunteer answers. • LAB: examine random specimens.
Afternoon	<ul style="list-style-type: none"> • Survival of the fittest: insects have many progeny and few survive. Selection, mutation and evolution. Fossils, origin of life on Earth and carbon dating. • Evolution flowchart: the origins of life on Earth. Genetics and mutation and Darwin. 	<ul style="list-style-type: none"> • Discuss mutation and selection in insects versus mammals. Discuss theories on mammalian evolution. • Discuss evidence for evolution and genetic similarities of species. • Activity: Draw an evolutionary chart of life forms: bacteria and algae -> Protozoa, fungi, plants and

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		animals.
Homework	Review textbook to prepare for final science jeopardy.	
Day 15 Morning	<ul style="list-style-type: none"> • Finish evolutionary charts. • Discuss what we have learned and write about it. • Show microscope specimens to Be a Scientist! class. • Each student given a slide box with glass and plastic slides. • Science in our everyday lives and science issues in society • The air we breath, the water we drink, the food we eat. • Climate change and effects. 	<ul style="list-style-type: none"> • Students draw and display charts. • Each student writes a paragraph about what they liked and disliked. • Through the Microscope students act as mentors for younger students. • Students make their own slides and look at their slides. • Brainstorm: Everyday applications of Science to health and home • Discuss environmental issues and interdependence of living things. • Species extinction and our changing environment. Global warming.
Afternoon	<ul style="list-style-type: none"> • Review and discussion. • Open microscope lab. • Welcome families to the class. • Review what we have learned. 	<ul style="list-style-type: none"> • Open discussion, microscope topics. • Students look at almost any specimen • Students volunteer and write on the board. Demonstrate knowledge. • Students show parents how to use a microscope. Look at protozoa.