

FALL SEMESTER

1	9/3	Scientific method 1. Diffusion.	Skittles diffusion. Raisin imbibition experiment. Capillary effect demo. Capillary/Diffusion comparison experiment. Ink in gelatin experiment.	MS-PS1 Matter and its Interactions
LP1	2 9/10	Scientific method 2. Osmosis.	Gummy bears in different solutions. Instant snow. Dialysis bag. Osmosis visualization with glucose. Desalination by osmosis.	
3	9/17	Intro to microscopy. Cell structure - Semipermeable membrane. Osmosis in the living cell.	Osmosis in the Elodea cells. Egg experiment. Smelly balloons. Soap film as a membrane model.	
4	9/24	Cell structure. Organelles.	Looking under the light scope at the cell organelles (plastids, vacuoles). Electron microscope photos (ER, ribosomes, mitochondria).	MS-ETS1 Engineering Design
LP2	5 10/1	Cell structure - Nucleus: DNA, replication, gene, chromosomes, genetic code, sequencing, prokaryotes vs eukaryotes	Build a DNA model. Working with sequences. Microscope: nuclear staining.	
6	10/8	Chromosomes. Cell cycle. Mitosis. HeLa cells and ethics in science.	Mitosis in onion roots. Candy worm model. Plant and Animal cell cultures (photos). Fluorescent microscope (photos).	MS-LS1 From Molecules to Organisms: Structures and Processes
7	10/15	Types of reproduction. Meiosis	Meiosis in plant and animal cells. Candy worm model. Flower dissection.	
8	10/22	Intro to genetics	Counting dry peas. Pedigree for earlobe attachment. Human face survey.	
LP3	9 10/29	Protein synthesis and classification. Part 1	Alcohol dehydrogenase translation, working with DNA, mRNA, and protein sequences.	
10	11/5	Protein synthesis and classification. Part 2	Experiments with enzymes (catalase, lactase) and protein denaturation.	
11	11/12	Mutations. Classification, examples.	Working with DNA sequences. Phenylthiourea	

	12 11/19	Mutations and evolution.	(PTC) strip test. Mutation examples (slides). Bottle neck effect demo. Stain your tongue with blue dye and count taste buds.
LP4	13 12/3	Genetic methods. Cloning, PCR, bacterial transformation, protein methods.	DNA isolation from strawberries. Build a mice computer game. Fingerprinting in criminalistics.
LP4	14 12/10	Bacteria and viruses. Update on COVID.	Working with COVID DNA sequence. Bacteria under the scope.
LP5	15 12/17	Human circulatory system.	Identify your blood group. Blood under the microscope. Lamb heart dissection. Read an electrocardiogram.

### SPRING SEMESTER

	16 1/7	Human muscle-skeletal system	Mark bones on the small skeleton. Muscle tissue under the scope. Mitochondria in the flying muscle. Arm X-ray to detect age.	MS-LS1 From Molecules to Organisms: Structures and Processes
LP5	17 1/14	Human digestive system	Test for protein, carbohydrates, and fat in the egg. Science of antacids.	
	18 1/28	Human respiratory system	Identify your lung's volume. Insect trachea under the scope.	
LP6	19 2/4	Atom structure. Static electricity	Atom demo, static electricity with PVC and balloons, electrostatic generator	MS-PS1 Matter and its Interactions
	20 2/11	Electric circuits 1. Elements: batteries. Multimeter.	How to use multimeter, experiments with batteries and LEDs. Create a Valentine electric card	MS-ETS1 Engineering Design
	21 2/25	Electric circuits 2. Elements: load, conductor, and switch. Series and parallel circuits.	Test lamps and resistors. Work with wire. Build an alarm, test energy wand	
	22 3/4	Magnetism	Experiments with magnets. Create a device to separate different materials. Make an electromagnetic motor.	
LP7	23 3/11	Crystallization.	Grow crystals and look at the crystal structure of different rocks, learn the basic methods of rock identification	

24 3/18	Minerals – building blocks of rocks. Identification techniques.	Working with rock collection: minerals. Identify a mineral using acid, streak, fracture and cleavage, and fluorescence tests.	MS-ESS2 Earth's Systems
25 3/25	Metamorphic rocks.	Play dough model. Working with rock collection: metamorphic rocks and minerals Marble/quartzite test. Soapstone carving project. Lapis lazuli painting.	
LP8 26 4/8	Three types of rocks. Rock cycle.	Mystery rock identification.	MS-ETS1 Engineering Design
27 4/15	Mt Diablo Foothill field trip (Borges ranch-Sulfur Springs- Castle Rock)	Signs of landslides erosion, sedimentary rocks, sulfur springs, Mt Diablo habitats	
LP9 28 4/22	Life cycle plants and animals. Embryogenesis. Seeds and germination.	Looking at the seeds and seedlings germinating at different conditions.	MS-LS1 From Molecules to Organisms: Structures and Processes
29 4/29	Photosynthesis	Pigment extraction from "light" and "dark" seedlings, chromatography, starch detection in leaves. Viewing plastids in live plant material.	MS-ESS3 Earth and Human Activity
LP9 30 5/6	Species. Systematics. Protists.	Looking under the microscope at the water samples from different sources.	
31 5/13	Ecosystems and adaptations. Field trip to Salt marsh ecosystem, Martinez	McNabney Marsh: key species and adaptations, vertisol, biocrust, human influence, water tests.	MS-LS2 Ecosystems: Interactions, Energy, and Dynamics
32 5/20	Diversity of organisms. Systematics. Using keys to identify. Markham Arboretum field trip.	Tree walk will introduce you to 45 tree species. We will taste carob, open wasp gall, look for araucaria nuts and taste birch sap.	
LP10 33 5/30 (Su)	Ocean trip (ecology, geology, Earth's interaction with celestial objects). Pescadero, day trip. Low tide -1'8" (very rare) at 7.45	Comparing 2 types of intertidal zones (sandy and rocky), reviewing rock types. Algae and animals of the intertidal zone. Crab identification using keys. Algae buffet.	