

# A SCHMAHL SCIENCE WORKSHOP

## Friday Homeschool Families Science Workshops

### Middle School Biology Series

Ever wonder how your brain works? Question why plants are green? Enjoy watching Nemo or nature? Biology is the scientific study of living organisms. You are about to begin a year of exploration and answering questions about the living world around you. During this year, you will not only learn about living organisms and their environment but you will also develop your skills and learn to use the scientific method.

Throughout the year we will focus on the Unity and Diversity of living organisms. As we are learning about many different aspects of living things, we will focus on the big ideas: homeostasis, organization, structure meets function, and transfer of matter and energy. By the end of the year, you will have a collection of knowledge about living things and how they relate to these larger themes including knowledge of the major human body systems that we build throughout the year.

### Course Dates and Times

**Day:** Fridays, 1 - 2:30 PM

**Dates:** Sept. 4, 11, 25; Oct. 2, 9, 23, 30; Nov. 6, 13; Dec. 4, 11; Jan. 8, 15, 29; Feb. 5, 12, 26; Mar. 5, 12, 26; Apr. 9, 23

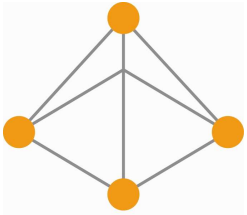
**Location:** Firehouse, History San Jose, 1650 Senter Rd., San Jose, CA

**Tuition:** \$495 per student for the complete 22 meeting series, nonrefundable. This is payable up front or according to the following payment plan: \$124 due August 1, 2009; \$248 due Sept. 1, 2009; and \$123 due Feb. 1, 2010. For each of these payments made via charter, there is an extra \$5 processing fee. Please include the registration form at the end of this email with your payments.

**NOTE:** We recognize that most charters won't pay the first payment in advance, but Schmah Science needs to receive this payment to order materials -- please discuss with your ES if your charter offers a reimbursement procedure for such payments made by you. Tuition doesn't include the costs of a lab notebook or a textbook. Topics (may begin one day and finish another, number may be reduced in interests of time):

- **Cells:** When students begin a unit in Life Science in school, they often are confronted with facts about cells; what they are, what is inside of them, how they reproduce, and the two basic types - animal and plant. What they most often do not receive is enough first-hand experience viewing living, working cells to relate what they have studied with what they have seen and know to be true. The students' environment is full of such cells, which can readily be seen and examined, with the light microscope. This workshop introduces our students to the design and use of the light microscope, and demonstrates cellular biology staining techniques.
- **Diffusion & Osmosis:** Students investigate diffusion across a selectively permeable membrane (dialysis tubing) and discuss applications to understanding the selectively permeable cell membrane. This activity includes a demonstration of osmosis (diffusion of water across a selectively permeable membrane).

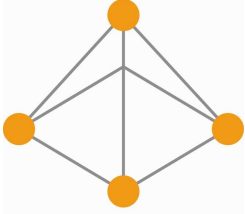
Questions: Contact Belinda Lowe-Schmahl at [bel@schmahscience.org](mailto:bel@schmahscience.org) or 408-281-7595



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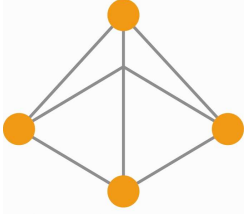
- **How Sweet It Is: Enzyme Action in Seed Germination:** This experiment is intended to familiarize students with the macromolecule starch, the action of enzymes (alpha-amylase), and the energy utilization in germinating seeds.
- **Cellular Respiration & Fermentation:** Students evaluate whether the little brown grains of yeast obtained from the grocery store are alive by testing for metabolism and growth.
- **Photosynthesis and Respiration in *Elodea*:** Students will measure the changes in carbon dioxide concentration associated with both respiration and photosynthesis in the fresh water plant *Elodea*.
- **Mitosis & Meiosis:** Students use sockosome models of chromosomes (made from pairs of socks) to understand the processes of mitosis, meiosis and fertilization. Students are also introduced to the concept that understanding meiosis and fertilization provides the basis for understanding genetics and learn how a mistake in meiosis can result in Down Syndrome
- **Corn Snake Mendelian Genetics:** Students learn about corn snake color genetics and practice Punnett squares.
- **Molecular Biology - Off To The Races:** What molecule will be first to the finish line? To study highly purified materials and molecules that are similar in size and electric charge, scientists use gel electrophoresis. This is a technique also used to separate DNA for genetic testing, determine susceptibility to disease, and conduct DNA fingerprinting to solve crimes. In this experiment, students make, pour and load their own gel with six food coloring samples. The smaller the molecule and the more negative its charge, the closer it gets to the finish line. By determining where it finishes its "race", scientists can make a determination about the identity of the molecule.
- **Population Genetics - A Hardy-Weinberg Simulation:** Students test their ability to taste PTC with the included PTC paper. The test allows them to obtain hereditary data to test the Hardy-Weinberg principle as it applies to small and large populations. They also perform an activity using cards that simulate the effects of selection, the heterozygous advantage, and genetic drift on a population.
- **Bacteriology:** Sterile technique, plating, streaking, staining, microscopy..... everything you need to know for the practical side of microbiology.
- **Fungi:** Students investigation the physiological effects of gravity (gravitropism) of mushroom growth.
- **Plant Diversity - Nonvascular Plants:** This wonderful Autumn activity will have students looking closely at lichens. Students will learn the characteristics of these organisms and their symbiotic relationships.
- **Plant Diversity - Seed Plants:** Millions of seeds are produced from a variety of plants. The seeds are the beginning of life for future species of the same plant. The challenge to plant survival is moving the seed to a suitable germination site. Many plants disperse the seeds through wind, water, or unique vectors (animals that carry the seeds and pollen). Some plants are unique in their means of regenerating. Through hands-on activities, students will become familiar with methods of seed dispersal. (Code 36)
- **Molecular Phylogeny of Plants**
- **Animal Diversity (2-workshops):** Dive into the world of the spineless wonders! Stinging cells, suction cups and spiny skin are all characteristics students will observe as important components to invertebrate classification. Through hands-on investigation, students will gain a deeper understanding of a variety of invertebrates and their organization into animal phyla.
- **Plant Anatomy - Monocots and Dicots: A Crash Course in Cutting and Comparing Corn and Coleus:** Fresh mounts of corn and coleus stem material are used to identify tissues and cells and make comparisons between the two groups.



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- **Plant Growth - The Effects of Gibberellic Acid:** Students grow both wild-type and dwarf rosette mutants of Wisconsin Fast Plants and experiment with application of gibberellic acid to help provide a visual example of the effects of this plant hormone on plant growth and development.
- **Vertebrate Anatomy - Circulatory:** From the moment it begins beating until the moment it stops, the human heart works tirelessly. In an average lifetime, the heart beats more than two and a half billion times, without ever pausing to rest. Like a pumping machine, the heart provides the power needed for life. This life-sustaining power has, throughout time, caused an air of mystery to surround the heart. Modern technology has removed much of the mystery, but there is still an air of fascination and curiosity. Through hands-on activities we explore the heart and discover the complexities of its structure. We will follow the blood through the blood vessels. We will learn how to have a healthy heart and how to monitor your heart's health. (Code)
- **Vertebrate Anatomy - Respiratory:** Every part of your body needs oxygen from the air you breathe in order to survive. The lungs are designed to absorb oxygen from the air and transfer it into the bloodstream. Besides teaching the physiology of the respiratory system and the damage caused by smoking, we discuss asthma, tuberculosis and other types of lung disease, as well as indoor and outdoor air pollution and its effects on the lungs. A highlight of the workshop is the use of actual samples of respiratory parts, both diseased and healthy. This is a unique opportunity for children to be able to see and touch these specimens. (Code)
- **Animal Behavior:** Students use isopods to investigate animal behavior in response to environmental variables.
- **Ecology - Pond Water Tour:** Using microscopes, students explore the different types of protozoa, and their microhabitats. Students learn how to prepare wet mounts for microscopic examination; how to prepare hay infusions and cultured protozoa; how to stain specimens.



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### Middle School Course Registration Form

Child's Name \_\_\_\_\_ Grade 2009-10 \_\_\_\_\_

Child's Name \_\_\_\_\_ Grade 2009-10 \_\_\_\_\_

Child's Name \_\_\_\_\_ Grade 2009-10 \_\_\_\_\_

Parent Name \_\_\_\_\_ Email \_\_\_\_\_  
(For registration confirmation)

Address \_\_\_\_\_

City \_\_\_\_\_ Zip \_\_\_\_\_

Home Phone \_\_\_\_\_ Emergency Phone \_\_\_\_\_

Any Medical issues for child(ren) \_\_\_\_\_

Workshop Series	Students' Names	# of Students	Amount Due
Biology Series \$495			
<b>Invoicing Fee for Charter school students (\$5.00 per student per session)</b>	<b># of sessions x # of student X \$5.00</b>		
<b>Total due</b>			

- **Mail registration to:** A Schmah Science Workshop, 171 Branham Lane, Ste. 10, PMB 223, San Jose, CA 95136.
- **Payment is due with registration. No refunds. No substitutions.** Send check or money order made out to A Schmah Science Workshop. Credit Card Payments: MasterCard, Visa, American Express (Circle One)  
 Card Number \_\_\_\_\_ Exp. Date \_\_\_\_\_ CID \_\_\_\_\_  
 Signature \_\_\_\_\_ Date \_\_\_\_\_
- Check here to be added to our mailing list of future workshops \_\_\_\_\_.
- Check here for information via email \_\_\_\_\_.
- SSW may take workshop photos for use in SSW's publicity. Names and locations will not be published. Check here if we have your permission to take photos of your children during our workshop(s) \_\_\_\_\_.

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