



Science Research Laboratory on the Subject of Light

2014-2015 Summary of Activities

Presented to Mark Gelfand of the Gelfand Family Charitable Fund

Goals:

1. To introduce students to the scientific study of light and its related sub-topics.
2. To motivate and peak students' curiosity about light by enabling them to experience new technology.

Through these objectives, we believe that the students will internalize the quote displayed on the Science Research Laboratory's wall, "and they shall discover the scientist within themselves..."

2014 - 2015 Summary of Activities:

Throughout the year, students have acquired a breadth of knowledge and experiences made possible by the existence of the laboratory. The program has introduced the concept of "light" and its relation to our daily lives. Lessons included discussions on opaque, transparent and semi-transparent objects (with the aid of shadow theatre). Furthermore, the equipment in the laboratory has allowed us to teach the children about shadows, including illusions and their various manifestations.

Additionally, we taught the children about the range of colors and the way in which they are formed. Lessons on this topic discussed RGB, color filters, prisms, Newton's Wheel, and the compositions, combinations and integrations of various wave frequencies. We also touched on the subject of the "mirror" and its uses. In this context, students learned about the camera and the way in which it produces images, including its historical development. To this end, we utilized the magnifying glass, *the camera obscura* and the periscope.

Moreover, we taught the students about the basics of the solar system. We discussed the solar system as a source of energy and light, and learned in depth the meaning of common terminology, such as a "month" and an "eclipse." These lessons were conducted with the use of a solar system model and solar kit.

In the continuation of the year, the students will learn about the production of solar energy, optic fibers and their various uses in industry, as well as the use of light in art (light painting). Later, the program will expand upon more advanced aspects of light, such as the visible spectrum, UV and infra-red radiation, and invisible light (demonstrated by using a banknote identification kit). Through these lessons, we will observe the ultra violet light installed in the laboratory and, eventually, process data using the Einstein Tablet.

As an interim summary, I am delighted to report that the students are immensely enjoying their studies about light and the various supplementary activities. They are enthusiastically attending classes, and are motivated to learn and expand their knowledge. Moreover, the students' parents are pleased to see their children challenged and enjoying their studies by having their curiosity stimulated and horizons broadened.

Below, please find the yearly syllabus:

MAIN TOPIC	SUB TOPICS	ACTIVITIES IN THE LIGHT ROOM
INTRODUCTION TO LIGHT (3 LESSONS)	The use of light in our world	
	Natural & artificial light sources	
	Opaque, transparent and semi-transparent objects	The Shadow theatre
SHADOW S(4 LESSONS)	What is a shadow?	The Star of David puzzle
	How is the size of a shadow established?	Father and son
	How is the direction of a shadow established?	The hopping bunny
	The sundial through history	The sundial
THE THEORY OF COLOR (5 LESSONS)	What is a color – wave frequency?	Layer activity in space
	Base colors and their uses	RGB activity
	Color combinations	Color filters
	What does the color white consist of?	Prism
	What does the color white consist of?	Newton Wheel
LENSES (3 LESSONS)	Concave and convex	Magnifying glass

	lenses	
	Concave and convex lenses	The Magic Cylinder
	The spectacles	
MIRRORS (3 LESSONS)	What is a mirror and what is it made of?	Double mirror
	What is a mirror and what is it made of?	The magic mirror
	The uses of the mirror	Periscope
CAMERAS (2 LESSONS)	How does the camera work?	
	The camera throughout history	Camera obscura
THE SOLAR SYSTEM (4 LESSONS)	The sun – energy source and the greatest light	
	The eclipse	The sun model
	The stages of the month	The sun model
	Generating solar energy	A solar kit
OPTIC FIBERS (1 LESSON)	Optic fibers and their use in industry	Optic fibers
LIGHT AND THE ARTS (2 LESSONS)	Light and the arts	Light painting kit
	Light and the arts	Light painting kit
THE VISIBLE SPECTRUM, UV AND INFRA-RED LIGHT (4 LESSONS)	The visible spectrum	
	The invisible light	Banknotes identification
	Measuring the ultra violet radiation	The Einstein Tablet
	Data processing	The Einstein Tablet