

Opening windows of minds and hearts









### Science Workshops Catalogue



## About Joy of Learning Foundation

The Joy of Learning Foundation is a group of passionate and committed people, each committed towards making a contribution to science education reform. Some of us are associated with a larger network of educators through our own past work trajectories. The group is a recent formation that came together in February 2017. The team is a mix of some full times, and other free-lance or voluntary members . It is an evolving organization, and as it grows, more people are showing interest in contributing.

We believe that for children, learning science is possible with joy, stimulation and deep appreciation of natural phenomena. We model this for middle and high school teachers, student-teachers, or children in specially designed workshops. The workshops aim at capacity building and are typically 2-5 hours each, on one specific science topic. The challenge of deeper conceptual understanding is as important in these as the joy of doing hands-on science activities and experiments. The workshops progress with lots of questions, concrete activities, careful observations and analysis-cum-discussions.

We aim to bring joy in learning in the formal curriculum, to build critical thinking abilities and a capacity for inquiry, deeper understanding and connection of formal education with real life. This includes freeing learning from excessive stress, anxiety, competition and comparison between learners. The aim is to take education more towards genuine empowerment of each individual instead of it becoming a tool for rejecting and damaging children.

# Our Work

## Experiential Science Workshops



### **Research and Content Development**

Before reaching out to teachers with new workshops, our team dedicates its effort towards researching on the best possible ways to take that topic to middle and high school children. We create a logical and progressive sequence of concepts that appear for a coherent understanding of any given topic. Most often, these easily align with chosen curricula of various boards. We design various activities to immerse children in the phenomenon being studies and link the observations to the theoretical concept emerging out of it. Often, we spend months to weave together chosen experiences, historical progression of ideas activities, demonstrations, discussions and questions for analysis before we finally test the designed workshop with children to understand the gaps. We use many innovative methods with the following features:

- Every participant is involved in each activity, through experiences engaging their minds, bodies and hands.
- If required, we take care of large groups by making small groups of 4-6 participants each, working together on a set of materials.
- Participants are constantly supported by resource people, who take rounds of tables, handholding people, assisting them in successfully doing things with their own hands
- All learning is initiated using actual observations, experimentation and concrete experiences.
- Experiences are nudged towards learning using non-routine questions, discussions and conclusions participants themselves arrive at.
- We utilize role-plays that simulate natural phenomena, where a group of participants themselves move as entities e.g. particles, fluids, matter or charges in action to represent physical processes, mechanisms and structures, particularly in directly non-observable situations. Wherever possible, actual observations on the phenomena support a role-play.

No. of participants: This ranges from 25 to 50, depending on the situation.

**Materials:** In workshops held upon invitations, materials are provided by JLF, typically in 10 sets, for participants divided into 8-10 groups

**Duration of Workshop:** 2-4 hours depending on topics covered. Typically Physics and Chemistry workshops are a minimum of 4 hours each for high school level, and Biology are 2 hours each. However, some customization is possible for needs of a specific group.

**Resource People:** The number of resource people involved are 2 to 3, besides one helper to assist with materials



## Request a workshop for your school or organization

We accept requests for teacher or children's workshops all year round. For requesting a workshop for your school, please reach out to us on any of the following numbers:

ANSHUMALA GUPTA: 9990343475

VIKAS SAINI: 8447356787

www.joyoflearningfoundation.com Facebook: @joyoflearningfoundation Email: joyoflearningfoundation@gmail.com Office: 78B, DDA Flats, Shahpur Jat, New Delhi-110049

### Workshops Currently Offered

#### Physics

OPTICS SOUND STATIC AND CURRENT ELECTRICITY ELECTROMAGNETISM AIR PRESSURE HEAT AND TEMPERATURE DENSITY AND FLOATATION FORCE AND NEWTON'S LAWS WORK AND ENERGY ASTRONOMY-SOLAR SYSTEM

#### Chemistry

ENTRY INTO CHEMISTRY CHEMICAL BONDING AND CHEMICAL REACTIONS PERIODIC TABLE

#### Biology

CIRCULATION AND RESPIRATION SKELETAL SYSTEM PLANT LIFECYCLES PHOTOSYNTHESIS DIGESTION AND NUTRITION





Seeing the path of light How are images formed? How are shadows formed? Reflection of Light Specular vs. Diffused Reflection Spherical and Plane Mirrors Refraction of Light Image Formation through Lenses Scattering of Light Total Internal Reflection Making your Own Rainbows!







Visualizing Vibrations

Production of Sound

Non-Audible Sound

Sound as a Wave

Amplitude, Frequency and Pitch

Creating your own Musical Instrument

Longitudinal and Transverse Waves

Sound Through Different Media

Resonance



## Static and Current Electricity

Static charge generation Charge flow in conductors and insulators Interaction between charges, charging by induction, conduction and friction Current in an electric circuit Different elements of a circuit Electric Field and Electric Potential Energy Potential Difference and Voltage Parallel and Series Circuits Variable Resistance Cells - Making and Principle Chemical Effects of Electric Current





Electric Fields

Magnetic Fields

Fleming's Left Hand Rule

Fleming's Right Hand Rule

Electromagnetic Induction

Lenz's Law

AC Motor

AC Generator

DC Motor

DC Generator





# Air Pressure

How do we know air Exists?

Behavior of Solids, Liquids and Gases

Air Occupies Space

Atmospheric Pressure

Toricelli 's Experiment

Principle of a Barometer

Fluid Pressure

Gauging Fluid Pressure in Liquids

Gas Behavior and Gas Laws







Temperature as an objective state of a body Measuring Temperature Heat Transfer from High to Low Temperature Amount of heat Energy vs. concentration Convection, Conduction and Radiation Conductors and Insulators Color of a surface and Radiation Absorption Effect of Heat in States of Matter Changes in Boiling and Melting point with Pressure Evaporation



# **Density and Floatation**

What makes things float? Volume of irregular solids How are weight and volume related? Mass and volume ratio: Density Can sinking objects be made to float? Weight of an object in air vs. weight in water Archimedes Principle Buoyancy, weight and upthrust





## Forces and Newton's Laws

Measuring forces Recognizing hidden forces Forces as resistance Forces as pairs Contact and non-contact forces Balanced and unbalanced forces Mass and Weight Units and Measurements Force's effect on masses Normal Reaction Friction and Tension Galileo's Experiment Newton's Laws of Motion





Work and Energy

Energy as a cause of motion

Motion as Energy

Mechanical Energy—Potential and Kinetic

Calorie and Joule

Conservation of energy

Force fields and potential energy

Energy Transfer and Work

Power

Different forms of energy

**Energy Conversions** 

Linear momentum and its conservation





# Astronomy

Rising of sun, moon and stars at the horizon Daily, monthly and annual rhythms in the solar system Different time zones of earth Latitudes and Longitudes Distances—on flat surfaces and spheres Phases of Moon Changes in star position with changing months Solar and Lunar eclipse Constellations and Zodiac Signs Seasons







#### **CHEMISTRY**

# Entry into Chemistry

Elements, compounds and mixtures Physical and chemical change Law of conservation of mass Law of constant and multiple proportion Structure of atom—Role Play The Mole concept Particle Nature of Matter—Role Play





### **CHEMISTRY**

## Types of Chemical Bonding and Chemical Reactions

Atomic Structure

Octet Rule

Valency

Ionic Bonding

**Covalent Bonding** 

Lewis Diagram

Different types of chemical reactions





### CHEMISTRY

# Periodic Table

Evolution of periodic table

Organization of periodic table

Periodic properties

Prediction and explanation of properties

using the periodic table

Anomalous behavior among elements

Seeing atomic spectra

Playing with periodic table





### BIOLOGY



# Circulation and Respiration

Transportation in human body Model of circulation in human body William Harvey's discovery Pulse and heart rates and their measurement Understanding blood pressure Types of blood vessels Circulation—Role Play How do lungs work? What is respiration?



### BIOLOGY



- Studying the human skeleton
- Looking at bones and skulls of different animals



## **Plant Lifecycles**

Identifying flowers Functions of a flower Essential Parts of a flower Analyzing different flowers Inflorescence Sexual and asexual reproduction in plants Pollination—Role play Fertilization and seed formation Fruit formation Seed dispersal Different methods of seed dispersal Observing different seeds







# Photosynthesis

Why are plants hardier than animals?

How do we conclude that plants make their own food?

Transpiration in plants

What is Photosynthesis?

Conditions and Ingredients for photosynthesis to occur

Storage of food in plants

Respiration in plants

Why do plants need manure?

Role of soil











# Digestion and Nutrition

Components of food- Nutrients

Testing of major nutrients

Calorific value

Food pyramid

Balanced diet

Mechanical break-down of food

Chemical break-down of food

Mechanism of digestion, assimilation and utilization of nutrients





