Proposal on SLaB Project

Jubilant HSS

Proposal for Science Equipment

Jubilant High School

1. Introduction

Jubilant High School was established in 1981 (2038 B.S.). It lies in *Kalimati*, Kathmandu district, the busy city area. This area has dense population of different ethnic group Newar, Brahmin, Chhetri, Tamang, Gurung, Limbu and many more. Most of the people of this area do business (in street, rented room), some work in the private as well as in government offices. The biggest fruit and vegetable wholesale market also lies in *Kalimati*.

Jubilant school has 690 students and 45 teachers. The school management have been improving and enriching for the better education since establishment 40 years ago. However, students have not been able to achieve the required education. Hence, the objective of every grade is fulfilled only partially.

Quality education can be given to students only if we can provide them practical classes. Most of our teaching can be linked to applied field of knowledge. For a clear understanding and lasting memory, students should be taken to labs, and there they learn things by doing with their own hands. And, we have also found that the students of secondary level learn quickly in labs. Despite our focus at practical classes, we have been unable to provide sufficient apparatus in labs. So, for effective learning we always have our effort to provide practical classes to our school students.

2. Objective

We expect to achieve a great deal from involving students in practical and social activities. A lab with necessary materials provides the students with opportunity to do all their tasks

and learn practically. Our students will be more and more interested in learning. Also the parents will be more satisfied to see their kids 'practical knowledge.
Even the community will be benefitted from the practically educated youth. Moreover, our community will be encouraged to spend on children's education.

3. Syllabus of Science from Grade 8 to Grade 12

I. Syllabus of Science of Grade 8

A. PHYSICS

1. Units & Measurement
2. Simple Machine
3. Pressure
4. Work, Energy & Power
5. Heat
6. Sound
7. Light
8. Magnetism
9. Electricity
10. Velocity & Acceleration

B. CHEMISTRY

1. Matter
2. Acid, Base & Salt
3. Mixture
4. Some useful chemicals
5. Metals & Non – Metals

C. Biology

1. Cell & Tissue
2. Life Process
3. Living - Beings

D. GEOLOGY & ASTRONOMY

1. Weather & climate
2. Earth & Space
3. Structure of earth

E. ENVIRONMENT SCIENCE

1. Environment & its balance
2. Environmental degradation & its conservation
3. Environment & sustainable development

II. Syllabus of Science of Grade 9

A. PHYSICS

1. Measurement
2. Force
3. Machine
4. Work, Energy & Power
5. Sound
6. Light
7. Electricity & Magnetism

B. CHEMISTRY

1. Classification of Elements
2. Chemical Reaction
3. Solubility
4. Some Gases
5. Metals
6. Chemical Fertilizers

C. BIOLOGY

1. Classification of Living Things
2. Lifecycle of some insects
3. Adaptation of some organisms
4. The cell tissue & organ
5. Skeletal System
6. Sense Organ
7. Evolution
8. Ecosystem
9. Micro Organisms
10. Human Nutrition

D. GEOLOGY & ASTRONOMY

1. Natural Disaster
2. The Earth in the Universe
3. Green House

III. Syllabus of Science of Grade 10

A. PHYSICS

1. Force
2. Pressure
3. Energy
4. Heat
5. Light
6. Electricity & Magnetism

B. CHEMISTRY

1. Classification of Elements
2. Chemical Reactions & Equations
3. Acid, Base & Salt
4. Metals
5. Carbon & its Compounds
6. Materials used in daily life

C. BIOLOGY

1. Human Nervous & Glandular Systems
2. Chromosomes & Sex Determination
3. Reproduction
4. Blood Circulation in Human Body
5. Heredity
6. Invertebrates
7. Environment Pollution & its Management

D. GEOLOGY & ASTRONOMY

1. History of the Earth
2. The Atmosphere
3. The Universe

IV. Syllabus of Science of Grade 11

A. PHYSICS

1. Machine
   - i. Units & Measurement
   - ii. Scalars & Vectors
   - iii. Kinematics
   - iv. Laws of Motion
   - v. Work, Energy & Power

vi. Circular Motion
vii. Equillibrium
viii. Rotational Dynamics
ix. Elasticity
x. Simple Harmonic Motion
xi. Hydrostatics
xii. Surface Tension
xiii. Fluid Dynamics
xiv. Gravity & Gravitation

2. Heat & Thermodynamics

i. Heat & Temperature
ii. Thermal Expansion
iii. Calorimetry
iv. Change of State
v. Gases & Gas Laws
vi. Kinetic theory of Gases
vii. Hygrometry
viii. Transfer of Heat
ix. First Laws of Thermodynamics
x. Second Laws of Thermodynamics

3. Geometrical Optics

i. Photometry
ii. Reflection at Plane & Curved Surfaces
iii. Refraction through Prisms
iv. Lenses
v. Dispersion of Light
vi. Optical Instruments

4. Electrostatics

i. Fundamental Electrostatic Phenomena
ii. Electrostatic Force, Field & Potential
iii. Capacitor

B. CHEMISTRY

1. General & Physical Chemistry

i. Language of Chemistry
ii. Chemical Arithmetic
iii. Atomic Mass & Molecular Mass

iv. Avogadro's Hypothesis & its Application
v. Equivalent Mass
vi. Gaseous State
vii. Liquid State
viii. Solid State
ix. Atomic Structure
x. Nuclear Chemistry
xi. Electronic Theory of Valency Bonding
xii. Periodic Classification of Elements
xiii. Oxidation & Reduction
xiv. Equillibria

2. Inorganic Chemistry

i. Hydrogen
ii. Oxygen
iii. Ozone
iv. Water
v. Nitrogen & its Compounds
vi. Halogens (Chlorine, Bromine & Iodine)
vii. Carbon
viii. Phosphorous
ix. Sulphur
x. Boron & Silicon
xi. Environmental Pollution
xii. Metal & Metallurgical Principles
xiii. Alkali& Alkaline Earth Metals

3. Organic Chemistry

i. Alkanes
ii. Fundamental Principles of Organic Chemistry

C. BIOLOGY

1. Botany

i. Introduction to Biodiversity
ii. Monera
iii. Mycota
iv. Mucor
v. Yeast
vi. Lichen
vii. Virus

viii. Angiosperm
ix. Cell
x. Cell Organelles
xi. Cell Division
xii. Ecology
xiii. Plantae
xiv. Ecosystem
xv. Forest Conservation
xvi. Gymnosperms

2. Zoology

i. Earthworm
ii. Frog
iii. Introduction to kingdom Animalia
iv. Introduction to Protista
v. Paramecium
vi. Plasmodium
vii. Evolution
viii. Environmental Pollution
ix. Conservation of Wildlife Resources
x. Animal Behavior
xi. Introduction to Biology
xii. Origin of Life
xiii. Adaptation

V. Syllabus of Science of Grade 12

A. PHYSICS

1. Wave & Optics

i. Wave Motion
ii. Mechanical Waves
iii. Waves in Pipes & Strings
iv. Acoustic Phenomena
v. Nature & Propagation of Light
vi. Interference
vii. Diffraction
viii. Polarization

2. Electricity & Magnestism

i. Direct Current Circuit

ii. Heat & Power
iii. Electrical Circuits
iv. Thermoelectric Effect
v. Chemical Effect of Current
vi. Magnetic Field
vii. Basic Concept of Magnetism
viii. Magnetic properties of Materials
ix. Electromagnetic Induction
x. Alternating Currents

3. Modern Physics

i. The Electron
ii. Photons
iii. Quantisation of Energy
iv. X- Rays
v. Nuclear Physics
vi. Radioactivity
vii. Nuclear Energy & other Sources of Energy
viii. Particle Physics & Cosmology

B. CHEMISTRY

1. General & Physical Chemistry

i. Volumetric Analysis
ii. Ionic Equillibrium
iii. Electro Chemistry

2. Organic Chemistry

i. Aromatic Hydrocarbons
ii. Haloalkanes & Haloarenes
iii. Alcohols & Phenols
iv. Nitro Compounds
v. Molecules of Life

3. Inorganic Chemistry

i. Heavy Metals

C. BIOLOGY

1. Botany

i. Anatomy & Physiology of Plants
ii. Genetics

iii. Developmental Biology
iv. Application of Biology

2. Zoology

i. Animal Tissues
ii. Development Biology
iii. Human Biology & Health
iv. Application of Biology

4. Action Plan

SN	Activities	Date	How much day	Who	What to do	How
1	Meeting with a committee to write a proposal	Sep 5-8, 2021	4 days	Committee Members	Arranged a meeting	Discussion
2	Writing proposal for Science Lab	Sep 10 – 15, 2021	6 days	Committee Members	Writing	Writing
3	Forwarding proposal	Sep 16, 2021	1 day	Committee Members	Forwarding	Via Email
4	Waiting for the further response from the TGUP. LSF	Sep 18…	…	….	….	….
5	Installing science Materials in the Lab	Oct 1 – 5, 2021	6 days	Committee Members	Installing the Materials	Arranging Materials in the lab
6	Ready to do Practical Class	Round the year	200	students	experiments	Lab tasks

5. List of experiments

PHYSICS

SN	Experiments	Equipments	Available Quantity	Required Quantity
1	-To measure small distance between two points - To determine refractive index of glass	- Travelling microscope with vernier caliper - Stop watch	Stop watch -1	-Travelling microscope – 2 -Stop Watch - 2
2	To measure coeff. Of friction and to verify the laws of solid friction	-Inclined plane woodenbox -pulley system -Slotted weight with hanger -Spring Balance 1	-slotted weight with hanger-1 -Spring balance - 1	-Inclined Plane -2 -Pulley System -2 -slotted weight with hanger-1 -Spring balance - 1
3	To determine Young's Modules of elasticity.	-Young's Modules Apparatus	-	-Young's Modules Apparatus-1
4	To determine surface tension of liquid by capillary tube method.	-Surface tension apparatus (capillary tubes)	-	-Surface tension apparatus (capillary tubes) -1
5	To determine viscocity of liquid.	-Viscocity apparatus	-	-Viscocity apparatus-1
6	To determine Archimedes Principle.	-Hydrostatic balance with weight box	-	-Hydrostatic balance with weight box-1
11	To explain Dopplers effect.	-Doppler's effect demo device	-	-Doppler's effect demo device-1
12	-To compare frequencies of different tuning fork/ sound in resonance condition. - To determine velocity of sound in air.	-Resonance tube	-Resonance tube-1	-Resonance tube- 1
13	To measure linear expansivity of solid.	-Pullinger's Apparatus	-	-Pullinger's Apparatus-1
14	To measure thermal conductivity of solid.	-Searle's Apparatus	-	-Searle's Apparatus-1
15	To measure specific heat capacity of solid.	-Regnault's Apparatus	-	-Regnault's Apparatus-1
16	To measure relative humidity.	-Hygrometer + max -Minimum Thermometer -Barometer	-	-Hygrometer + max -1 -Minimum Thermometer -1 -Barometer - 1
17	To verify Joule's law of heating.	-Joule's law of heating apparatus.	-	-Joule's law of heating apparatus -1

18	To determine image and object distance.	-Optical Bench -Lens (concave/convex)	-	-Optical Bench -1 - Lens (concave/convex) - 2
19	To determine lateral shift.	-Glass Slab	-Glass Slab - 10	-
20	To study diffraction pattern.	-Plane diffraction grating -Monochromatic source of light) sodium light	-	-Plane diffraction grating -1 -Monochromatic source of light) -1
21	To verify Ohms law.	-Ohm's law set -Multimeter	-Ohm's law set -1 -Multimeter - 1	-
22	To determine A.C. frequency.	-Sonometer	-Sonometer-1	-Sonometer- 1
23	To study Step – up and down transformer.	-Step up transofrmers -Step down transofrmers	-	-Step up transformers - 1 -Step down transformers - 1
24	To study motor effect.	-DC motor and A.C. motor with DC/AC supply	motor with DC/AC supply- 1	-
25	To study about dynamo and internal resistance of cell.	-Dynamo -Potentiometer -PO Box Rheostat	Potentiometer - 1 -PO Box -2 Rheostat -1	-Dynamo -1
26	To verify Faraday's Law.	-U shaped magnet - horse shoe magnet – bar magnet -Compass Needle	-U shaped magnet -2 - horse shoe magnet -2 Bar Magnet - 5 -Compass Needle -10	-
27	To find magnetic moment of bar magnet.	-Deflection magnetometer	-Deflection magnetometer -1	-Deflection magnetometer -1
28	To find time period and magnetic moment of bar magnet.	-Oscillation Magnetometer	-	-Oscillation Magnetometer -1
29	To study star and planets.	-Telescope	-Telescope -1	-
30	To study AC oscillation nature.	-Oscilloscope	-Oscilloscope -1	-

BIOLOGY

SN	Experiments	Equipments	Available Quantity	Required Quantity
1	Study of permanents slides and specimens.	-Several slides of protozoans and museum specimens (Protozoa to Mammalia)	-1 – 1 Slide each	-2 – 2 Slide each
2	Preparation of temporary slides.	Museum Specimens of Animals	-1 – 1 Specimen each	-2 – 2 Specimens each
3	Preparation of temporary slides of Onion cell.	-Microscope -Slide -Safranin -Iodine -Solution & its bottles	-Safranin -1 -Iodine -1 -Solution & its bottles - 4	-Safranin - 4 -Iodine -4 -Solution & its bottles -4
4	Preparation of temporary slides of Tradescantia plant.			
5	Preparation of temporary slides of Geranium plant.			
6	Study of Adaptional features of animals.	-Flying fishes -Frog -Wall Lizard -Pigeon & set (specimens)	1 each	1 each
7	Histological slides of frog (T.S. of oesophagus, intestine, lungs, pancreas, kidney, ovary, testis.	-Different slides of frog	10 Pieces	15 pieces
8	Disection of Earthworm.	-Disecting box & Tray	1 each	1 each
9	Disection of Frog.	-Disecting box & Tray	1 each	1 each
10	Disection of Rat.	-Disecting box & Tray	1 each	1 each
11	Observation of different animal tissues using permanent slides.	-Different animalslides (squamous, kidney, lungs, testis, ovary and VS of skin)	-	1 each
12	Study of Skeleton of Human Beings.	-Human Skeleton	-Human Skeleton - 3	-Human Skeleton - 2

13	Study of Skeleton of Rabbit.	-Rabbit Skeleton	-	-Rabbit Skeleton - 1
14	Determination of blood Groups.	-Beaker of different size -Testubes -Holders -Droppers	-Beaker of different size -3 -Testubes -3 -Holders-3 -Droppers-3	-
15	Determination of sugar level through urine test.			
16	Evolution of oxygen during photosynthesis.	-Ganong's photometer	-Ganong's photometer -2	-
17	Necessity of chlorophyll for photosynthesis.	-Wide mouth bottle	-Wide mouth bottle - 3	-
18	Necessity of CO2during aerobic respiration.			
19	To observe DNA model of Human Being.	-DNA Model	-DNA Model -2	-
20	Fermentation of different plant beans.	-Fermentor	-Fermentor -2	-
21	Observation of common bacterial growth.	-Bacterial growth incubator	-Bacterial growth incubator -2	-
22	Blood Pressure Measurement.	-Spygmomanometer -Sthethescope	-Spygmomanometer -1 -Sthethescope -1	-
23	Oxygen Pulse Measurement.	-Oxymeter	-Oxymeter -1	-
24	Heart Beat Measurement.	-Oxymeter		

CHEMISTRY

SN	Experiments	Equipments	Available Quantity	Required Quantity
1	Separate soluble & insoluble solids.	-Porcelian Basin, Tipod Stand & Wire Gauze, Funnel & Filter papers, Beaker, Test tubes, Asbestos Sheet, Burner, Conical Flask, Water Trough, Glass Retort	5Each	10 Each
2	Separate volatile & non-volatile solids (sublimation).			
3	Separate two insoluble solids.			

4	Separate pure water from impure water.	-Round bottom flask, Condensor	2 Each	5 Each
5	Obtain pure crystal by crystallization.			
6	Neutralization reaction between acid and base to obtain crystal of salt.	-Beaker, Funnel, Filter Paper, Glass rod, Porcelian Basin, Tripod Stand, Wire Gauze, Test Tubes	2 Each	3 Each
7	Precipitation reaction between BaCl2 & Di.l H2SO4.			
8	Oxidise Ferrous to Ferric ion (Redox reaction).			
9	Preparation of Hydrogen Gas.	-Woulfe's Bottle, Thistle Funnel, Gas Jar, Water Trough, Beehive Self, Corks, Kipp's Apparatus	2 Each	3 Each
10	Preparation of Carbon Doixide Gas.			
11	Preparation of Hydrogen Sulphide Gas.			
12	Determination of weight of given piece of metal.	-Analytical Balance, Eudiometer Tube, Clamp, Short Stem Funnel, Tall Jar, Thermometer	3 Each	2 Each
13	Determination of equivalent weight of given metal.			
14	Determine solubility of given soluble salt.			
15	Identify Acid radicalsby both dry & wet ways (4 tests).	-Test Tubes, Measuring Cylinder, Test tube stands & holders, Delivery tube, Forks	2 Each	2 Each
16	Detect CI-, SO4-- & CO3—in tap & distilled water.			
17	Identify Basic radicals by both dry & wet ways. (4 tests).			
18	Detection of Oxygen.	-Sodium Fusion Tube, Porcelain Basin, Filter Paper, Funnel Burner, Tripod Stand, Test Tube & Holders	1 Each	2 Each
19	Detection of Nitrogen.			

20	Detection of Halogens.			
21	Detection of Phosphorous.			
22	Standardize decinormal solution of HCL with sodium carbonate solution.	-Beaker, Conical Flask, Volumetric Flask, Pipette, Chemical Balance, Burette	1 Each	2 Each
23	Standardize the bench Sulphyric acid against NaOH.			
24	Standardize KMnO4 solution against oxalix acid.			
25	Identify the Alcohol.	-Test Tubes & its holders, Porcelain Basins, Beakers, Glass Rods	2 Each	2 Each
26	Identify Carboxylic Acid.			
27	Identify Ether.			
28	Identify Aldehyde.			

6. Budgeting

Common Science Equipments of TGUP & Jubilant HS

	Item Description	**Unit**	**Quantity**	**Rate**	**Total**
General Lab Equipments	Beaker 50 ml	pc	5	145	725
	Beaker 100 ml	pc	5	145	725
	Beaker 250 ml	pc	5	165	825
	Beaker 500 ml	pc	5	250	1250
Chemistry	Test tubes 15x125 mm	pc	100	25	2500
	Conical flask 250 ml	pc	5	250	1250
	Thistle funnel	pc	5	85	425
	Lab Thermometer	pc	5	175	875
	Volumetric flask 100 ml	pc	5	530	2650
	Volumetric flask 250 ml	pc	5	630	3150
	Volumetric flask 500 ml	pc	2	880	1760
	Volumetric flask 1000 ml	pc	1	1350	1350
	Pipette 10 ml	pc	5	350	1750
	Micropipette 5 ml	pc	2	9800	19600
	Micropipette 1 ml	pc	2	4500	9000

	Graduated pipette 1 ml	pc	5	290	1450
	Graduated pipette 10 ml	pc	2	350	700
	Graduated pipette 25 ml	pc	2	540	1080
	Round bottom flask 250 ml	pc	2	250	500
	Mortar and pestle 3"	pc	5	300	1500
	Measuring cylinder 250 ml, Plastic	pc	2	250	500
	Total				**53565**
Biology	Cover slip	pkt	10	65	650
	Iodine solution	125 ml	5	325	1625
	Dissecting tray	pc	5	750	3750
	Beaker 250 ml	pc	5	165	825
	Test tubes 15x125 mm	pc	50	25	1250
	Compound microscope	set	1	6800	6800
	Petridish 100 mm, Glass	pair	5	165	825
	Total				**15725**
Physics	Inclined plane	pc	2	1450	2900
	Spring balance	pc	1	275	275
	Slotted weight 100 gm	set	1	550	550
	Optical bench	set	2	8500	17000
	Ohms law app	set	1	3500	3500
	Multimeter	pc	1	475	475
	DC motor	pc	2	150	300
	AC/DC power supply 2-12 V	pc	1	2450	2450
	Bread board	pc	1	300	3000
	Total				**30450**

Extra Science Equipments

Chemistry

Equipments Required	**Unit**	**Quantity**	**Rate**	**Total**
Test tube stand	pc	2	450	900
Burner	pc	5	550	2750
Glass retort	pc	5	650	3250
Water trough	pc	5	375	1875

Woulfe's bottle 250 ml	pc	5	425	2125
Beehive shelf	pc	5	110	550
Gas jar	pc	5	250	1250
Ediometer tube	pc	5	350	1750
Short stem funnel	pc	10	135	1350
Analytical balance, digital 0.01 to 500 gm	set	1	3200	3200
Test tube holder	pc	10	55	550
Burette 50 ml	pc	5	850	4250
Total				**23800**

Biology

Equipments required for Biology	**Unit**	**Quantity**	**Rate**	**Total**
Permanent slides of Protozonas	pc	10	95	950
Museum specimens of animals	pc	10	750	7500
Glycerine	400 gm	3	250	750
Safranine solution	125 ml	5	280	1400
Histological slides of frog	pc	10	95	950
Prepared slides of animal tissues	pc	10	95	950
Prepared slides of plant tissues	pc	1	95	95
Bell jar	pc	1	950	950
Ganongs Potometer	pc	1	975	975
Fermenter, Kuhns tube	pc	1	375	375
Sphygmomanometer with stethescope, manual	set	1	2250	2250
Oxymeter	pc	2	2500	5000
Blood grouping set	set	1	850	850
Total				**22995**

Physics

Physics Equipments required	**Unit**	**Quantity**	**Rate**	**Total**
Vernier calliper analog	pc	10	245	2450
Vernier calliper digital		2	2400	4800
Spherometer	pc	1	650	650

Micrometer Screw gauze, Brass	pc	5	820	4100
Youngs modulus app	set	1	2250	2250
Capillary tubes	pkt	1	150	150
Viscosity apparatus	set	1	3250	3250
Hydrostatic balance	set	1	2850	2850
Weight box	set	1	2250	2250
Resonance tube app	set	1	3250	3250
Searles app	set	1	2800	2800
Hygrometer (Wet and Dry)	pc	1	650	650
Max min thermometer	pc	2	650	1300
Barometer Aneroid	pc	1	1150	1150
Joules calorimeter	pc	2	1150	2300
Sonometer	pc	1	2200	2200
Step up transformer	pc	2	2450	4900
Dynamo	pc	3	1250	3750
Rheostat	pc	2	1350	2700
U shaped magnet	pc	3	350	1050
Horse shoe magnet	pc	3	350	1050
Compass needle	pc	3	50	150
Oscillation magnetometer	pc	1	2250	2250
LED	pc	50	5	250
Tranistor	pc	50	5	250
Jumper wire	mtr	10	20	200
Total				**52,950**

Amount Summary

S.N.	Particulars	Amount
1	Common TGUP & Jubilant HS List	99740
2	Physics Extra	52,950
3	Chemistry Extra	23800
4	Biology Extra	22995
Total		**199,485**

Note# extra 13 per cent VAT will be applied to the quoted rates while invoicing

7. Monitoring/Evaluation

All our activities and materials will be closely watched by the teachers. Regular monitoring is done by them. Every teachers has to report about their experiment and activities to their coordinators and finally all these reporting reaches the principal.

8. Committee Members

i. Hima Tamang (CM) – Leader
ii. Aastha Bajracharya (CM) – Leader
iii. Hom Nath Luitel (Chirman) - Member
iv. Rishi Prasad Neupane (Principal) – Member
v. Sanjiv Man Vaidya (Vice Principal) – Member
vi. Naresh Khanal (Pyhsics Teacher) Member
vii. Bedu Ram Aryal (Pyhsics Teacher) Member
viii. Satya Narayan Sah (Zoology Teacher) – Member
ix. Kalyan Adhikari (School Physics Teacher) – Member
x. Rajesh Parajuli (Lab Boy) - Member