Proposal on Science Lab (SLaB) Project

Shree Sanjiwani Secondary School

Dhulikhel, Kavre

1. Introduction

Shree Sanjiwani Secondary School was established in 2033 B.S. It is located in 30km away from Kathmandu and lies in Dhulikhel, Kavre east side. This school is in province 3, ward-7 of Dhulikhel Municipality. The majority of people living in this area are from Newar Community and rest of the people of ethnic group like Tamang, Rai, Gurung, Magar, chhetri, Brahmins are migrated temporarily or permanently for the employment and education. These people are living in the rents and do private jobs. The school area is very much crowded as there is District Administrative Office. Dhulikhel is the headquater of Kavre District so there is dense population here.

Sanjiwani secondary school has around 1110 students from primary level to higher secondary level with huge number of teachers. The school has been providing education to especially abled student (blind) in a separate building inside the school with hostel facilities. The school has several buildings for primary, secondary and higher secondary level. This schools main motto is 'Qualitative Education, Our commitment'.

To achieve the school's goal, one must provide high quality education to the students for their success. So it is necessary to provide up to date and high quality science and

computer lab for their experiential knowledge rather than providing the text book knowledge. A constant rate of show and tell is required for effective science teaching and learning .To ensure that the children fully understand each idea, good institutions integrate classroom instructions with laboratory experimentations. Hands on activities on science lab make children understand more and later they can utilize their knowledge in different fields. When children watch tests being performed right in front of their eyes, they are more likely to remember what they have learnt.

In science lab students can develop interests in scientific study. Their reasoning skills are refined as they notice many objects and conduct various experiments As a result schools play vital role in educating the next generation of engineers and doctors.

In conclusion, school must have up to date scientific lab supplies and equipment in order to engage and encourage them to make contributions in physics biology chemistry and other branches of science later in their life.

2. Objectives

Some of the main objectives that may be achieved through the use of laboratory are as follows:

a. To develop intuition and deepen understanding of concepts
b. To develop critical, quantative thinking.
c. To learn to use scientific apparatus
d. To understand the nature of science like scientific enterprise, scientists and how they work.
e. To develop interest and motivation through laboratory this, will lead to the development of positive attitude.

3. Current Status

Science laboratory works has been conducted at minimal level which comprises basic tasks. Locally available materials are collected by science instructors and student and demonstrated by student in class. Project works are assigned to the students to prepare model of different scientific phenomenon and display in the classroom.

4. Syllabus of science from grade 8

A. Physics

i. Measurement
ii. Pressure
iii. Heat
iv. Energy
v. Light
vi. Sound

vii. Electricity
viii. Magnetism
ix. Velocity and acceleration.

B. Chemistry

i. Matter
ii. Mixture
iii. Metal and Non- metals
iv. Acid Base and Salt

C. Biology

I. Living Beings
ii. Water

Syllabus of science for grade 9 and 10

A. Physics

i. Force and Motion
ii. Simple Machine
iii. Wave
iv. Heat
v. Light
vi. Electricity and magnetism

B. Chemistry

i. Metals and non-metals
ii. Acid Base and salt
iii. Atomic Structure and chemical bond
iv. Carbon and its compound
v. Some Gases

C. Biology

I. Classification of living beings
II. Body structure and life process
III. Mushroom
IV. Invertebrates

D. Information and Technology

E. Nature and Environment

F. Geology and Astronomy- The Universe

5. Action Plans

S.N	Activities	Date	Day count	Involvement	What To Do?	How
1.	Arranged meeting with committee members for the discussion of proposal	25th – 30th Oct, 2022	6 days	Committee members	Arranging a meeting	Discussion
2.	Writing proposals for science lab	1st - 5th Nov,2022	5 days	Coordination mentor with the help of school	Writing proposals	Writing Or typing
3.	Forwarding proposals	10th Nov,2022	1	CM and school committee	Forwarding either by mail or visiting office	Email/ visiting
4.	Visit store for the research of equipment	25th – 28th Nov 2022	4	CM and school committee	Visit Store	Research about equipment
5.	Ordering the equipment from store	1st Dec 2022	1	CM and school committee	Ordering the equipment	Visit store
6.	Installing equipment in the science lab	3rd – 5th Dec 2022	3 days	Committeee members and school management	Installing the science equipments in science lab	Arranging materials in lab

7.	Running Practical classes	Round the year	Around 190 days	Teachers and students	Experiments and Demonstration	Lab task or activities

6. List of experiments

PHYSICS

SN	Experiments	Equipment	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 coefficient of friction and to verify the laws of solid friction	-Inclined plane woodenbox -pulley system -Slotted weight with hanger -Spring Balance	-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 viscosity of liquid.	-Viscosity apparatus	-	-Viscosity apparatus-1
5	-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
6	To measure linear expansivity of solid.	-Pullinger's Apparatus	-	-Pullinger's Apparatus-1
7	To measure specific heat capacity of solid.	-Regnault's Apparatus	-	-Regnault's Apparatus-1
8	To determine image and object distance.	-Optical Bench -Lens (concave/convex)	-	-Optical Bench -1 - Lens (concave/convex) – 2
9	To determine lateral shift.	-Glass Slab	-Glass Slab - 10	-
10	To verify Ohms law.	-Ohm's law set -Multimeter	-Ohm's law set -1	-

			-Multimeter -1	
11	To determine A.C. frequency.	-Sonometer	-Sonometer-1	-Sonometer- 1
12	To study motor effect.	-DC motor and A.C. motor with DC/AC supply	motor with DC/AC supply- 1	-
13	To find magnetic moment of bar magnet.	-Deflection magnetometer	-Deflection magnetometer -1	-Deflection magnetometer -1
14	To find time period and magnetic moment of bar magnet.	-Oscillation Magnetometer	-	-Oscillation Magnetometer -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 Slide each	-2 – 2 Slide each
2	Preparation of temporary slides.	Museum Specimens of Animals	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	Study of adaptation features of animals.	-Flying fishes -Frog -Wall Lizard -Pigeon & set (specimens)	1 each	1 each
5	Histological slides of frog (T.S. of esophagus, intestine, lungs, pancreas, kidney, ovary, and testis.	-Different slides of frog	10 Pieces	15 pieces
6	Dissection of Earthworm.	-Dissecting box &Tray	1 each	1 each
7	Dissection of Frog.	-Dissecting box & Tray	1 each	1 each
8	Dissection of Rat.	-Dissecting box & Tray	1 each	1 each

9	Observation of different animal tissues using permanent slides.	-Different animalslides (squamous, kidney, lungs, testis, ovary and VS of skin)	-	1 each
10	Study of Skeleton of Human Beings.	-Human Skeleton	-Human Skeleton -3	-Human Skeleton - 2
11	Study of Skeleton of Rabbit.	-Rabbit Skeleton	-	-Rabbit Skeleton - 1
12	Determination of blood Groups.	-Beaker of different size -Test tubes -Holders -Droppers	-Beaker of different size -3 -Test tubes -3 -Holders-3 -Droppers-3	-
13	Determination of sugar level through urine test.			
14	To observe DNA model of Human Being.	-DNA Model	-DNA Model -2	-
15	Blood Pressure Measurement.	-Sphygmomanometer -Stethoscope	-Sphygmomanometer -1 -Stethoscope -1	-

CHEMISTRY

SN	**Experiments**	**Equipment**	**Available Quantity**	**Required Quantity**
1	Separate soluble & insoluble solids.	-Porcelain Basin, Tripod 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, Condenser	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, Porcelain Basin, Tripod Stand, Wire Gauze, Test Tubes	2 Each	3 Each
7	Precipitation reaction between BaCl2 & Dil. H_2SO4.			
8	Oxidize Ferrous to Ferric ion (Redox reaction).			
9	Preparation of Hydrogen Gas.	-Wolfe's Bottle, Thistle Funnel, Gas Jar, Water Trough, Beehive Self, Corks, Kipp's Apparatus	2 Each	3 Each
10	Preparation of Carbon Dioxide 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^-, $SO4^{--}$& CO_3^{--}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,	1 Each	2 Each

		Burette		
23	Standardize the bench Sulphuric acid against NaOH.			
24	Standardize KMnO4 solution against oxalic 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.			

7. Budgeting

Common science equipment in Sanjiwani School

Equipment	Amount	Cost	Total	Remarks
Dropper	15	8	120	
Test Tubes	30	6	180	
Thistle Funnel	10	45	450	
Funnel(Plastic)	5	30	150	
Calcium Hydroxide	500gm	250	250	
Phenolphthalein	10 bottles	170	1700	
Methyl orange	5bottles	200	1000	
Nitric Acid	500 ml	250	250	
Wolfe's bottle	4(250ml)	250	1000	
Litmus Paper(red and blue)	10 packets	250	2500	
Bee-hive shelf	3	40	120	
Hard glass test tube	25	30	750	
Round bottom flasks	3(250ml)	120	120	
Zinc (Graduated)	500gm	1150	1150	
Hydrochloric acid	500ml	240	240	
Gas jar	3	140	420	
Copper sulphate	500mg	800	800	
Measuring cylinder	3(250 ml)	390	1170	
Tripod stand	3	150	450	
Wire gauze	8	25	200	
Spatula	3	25	75	
Sulphuric acid	500ml	240	240	
Test tube holder	4	30	120	
Bunsen Burner	1	450	450	

Sodium	500ml	240	240	
Ethanol	1 litre	420	420	
Magnesium ribbon	1 coil	200	200	
Glycerine	500ml	600	600	
Hydrogen peroxide	500ml	275	275	
Magnesium dioxide	500ml	325	325	
Ammonium hydroxide	500ml	290	290	
Sodium nitrate	500ml	370	370	
Camphor	1 packet	300	300	
Microscope	2	4500	4500	
Glass slide	1 pack(50 ps)	90	90	
Saffranin	2 bottles	225	450	
Beaker	3(1000ml)	100	300	
Fire tongs	3	50	150	
Laboratory thermometer	2	150	300	
Test tuber cleaner brush	5	10	50	
Wash bottles	3	60	60	
Watch glass	5	20	100	
Spring balance	1	90	90	
Universal indicator	1 bottle	200	200	
Max-min thermometer	1	350	350	
Magnet(Bar)	6	200	1200	
Prism	2	100	200	
Lens	4	40	160	
Magnifying glass	4	100	400	
Water troughs	3	300	900	
Dynamo	1	950	950	
Miscellaneous		2500	2500	**Total: 29,875**

8. Charts and models

Particulars	Amount	Cost (Rs.)	Total	Remarks
Digestive System	1	265	265	
Urinary system	1	265	265	
Circulatory system	1	265	265	
Reproductive system	1	265	265	

Skeletal system	1	550	550	
Life cycle of silk	1	255	255	
Life cycle of mosquito	1	265	265	
Life cycle of Honey Bee	1	265	265	
Solar system	1	250	265	
Phases of moon	1	265	265	
Structure of earth	1	265	265	
Modern periodic table	1	265	265	
Heart	1	265	265	
Food chain	1	265	265	
Animal cell	1	250	250	
Plant cell	1	250	250	
Total				**Total=4485**

	Item Description	**Unit**	**Quantity**	**Rate**	**Total**
General Lab Equipment	Beaker 50 ml	Pc	8	150	1200
	Beaker 100 ml	Pc	5	150	750
	Beaker 250 ml	pc	5	170	850
	Beaker 500 ml	pc	5	250	1250
Chemistry	Test tubes 15x125 mm	pc	100	30	3000
	Conical flask 250 ml	pc	7	250	1750
	Thistle funnel	pc	8	80	640
	Lab Thermometer	pc	5	180	900
	Volumetric flask 100 ml	pc	5	550	2750
	Volumetric flask 250 ml	pc	5	700	3500
	Volumetric flask 500 ml	pc	3	850	2550
	Volumetric flask 1000 ml	pc	3	1200	3600
	Pipette 10 ml	pc	10	350	3500
	Micropipette 5 ml	pc	2	9500	19000
	Micropipette 1 ml	pc	2	4800	9600

	Graduated pipette 1 ml	pc	5	290	1450
	Graduated pipette 10 ml	pc	2	350	700
	Graduated pipette 25 ml	pc	4	540	2160
	Round bottom flask 250 ml	pc	3	250	750
	Mortar and pestle 3"	pc	4	300	1200
	Measuring cylinder 250 ml, Plastic	pc	4	250	1000
	Total				**62,100**
Biology	Cover slip	pkt	10	70	700
	Iodine solution	125 ml	5	350	1750
	Dissecting tray	pc	5	850	4250
	Beaker 250 ml	pc	5	160	800
	Test tubes 15x125 mm	pc	50	30	1500
	Compound microscope	set	3	6500	19500
	Petridish 100 mm, Glass	pair	5	180	900
	Total			**29,400**	
Physics	Inclined plane	pc	2	1500	3000
	Spring balance	pc	2	300	600
	Slotted weight 100 gm	set	1	550	550
	Optical bench	set	2	8000	16000
	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	300
	Logic gate circuit	Pc	1	1950	1950
	Zener diode	Pc	1	2310	2310
	Magnetometer	Pc	1	950	950
	Magnetic compass	Pc	1	80	80
	Total	**59,115**			

Extra Science Equipment Project

Chemistry

Equipment Required	Unit	Quantity	Rate	Total

Test tube stand	Pc	2	450	900
Burner	Pc	5	550	2750
Beehive shelf	Pc	5	110	550
Gas jar	Pc	5	250	1250
Test tube holder	Pc	10	55	550
Burette 50 ml	Pc	5	850	4250
Total	**10,250**			

Biology

Equipment required for Biology	**Unit**	**Quantity**	**Rate**	**Total**
Permanent slides of Protozoans	pc	10	95	9500
Museum specimens of animals	pc	10	750	7500
Ganong'sPotometer	pc	1	975	975
Sphygmomanometer with stethoscope, Manual	set	1	2250	2250
Blood grouping set	Set	1	850	850
Total	**21,075**			

Physics

Physics Equipment required	**Unit**	**Quantity**	**Rate**	**Total**
Spherometer	Pc	1	850	850
Micrometer Screw gauze, Brass	Pc	5	800	400
Capillary tubes	Pkt	1	250	250
Viscosity apparatus	Set	1	3050	3050
Hydrostatic balance	Set	1	3850	3850
Hygrometer (Wet and Dry)	Pc	1	600	600
Max min thermometer	Pc	2	700	1400
Barometer Aneroid	Pc	1	1250	1250
Joules calorimeter	Pc	2	1350	2700
Sonometer	Pc	1	2200	2200
Step up transformer	Pc	2	2400	4800
Dynamo	Pc	3	1200	3600
Rheostat	Pc	2	1300	2600
U-shaped magnet	Pc	4	350	1400
Horse shoe magnet	Pc	3	350	1050

Compass needle	Pc	5	50	250
Oscillation magnetometer	Pc	1	2200	2200
LED	Pc	50	10	500
Transistor	Pc	50	10	500
Jumper wire	Meter	10	30	300
Total	**33,750**			

Amount Summary

S.N.	Particulars	Amount
1	Common Science Equipment	**29,875+4485=34360**
From project		
2	Physics Extra	**33,750+ 59,115=92,865**
3	Chemistry Extra	**10,250+62,100=72,350**
4	Biology Extra	**29,400+21,075=50,475**
5	Project Management	**43,138**
Total from project		**2,58,828**

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

Monitoring and evaluation

The science teacher as well as the school committee will keep a close eye on all of the materials and experiments in school. Lab assistant and science teacher must report on their experiments and activities done in the lab and then the relevant information is to be forwarded to the principal or the school management.

Committee Members

Sudha Buddhacharya (CM)	Leader
Bedh Prasad Koju (Managing Director)	Member
Lokendra Dhakal (Principal)	Member
Pawan Pradhan (Vice Principal)	Member
Shankar Sharma (Science Teacher)	Member
Bimesh Koirala (Science Teacher)	Member
Shreeya Ghimire (LSF Girl)	Member
Sunita Magar LSF Girl	Member