Proposal for Science Lab Equipment (SLaB)

GORAKHKALI AAWASIYA MA.VI.

Vyas-3, Shantinagar, Damauli, Tanahun

School Building

Introduction:

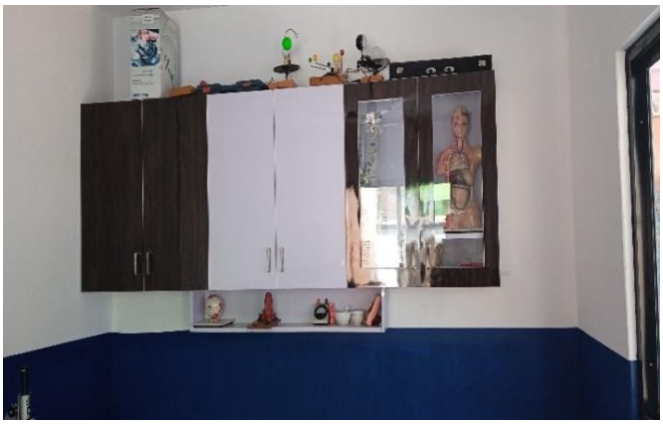
Gorakhkail Aawasiya Madhyamik Vidhalaya an English medium private school was established in 1993AD (2049.B.S.). It is located at Vyas Municipality, Shantinagar, Damauli, Tanahun, It is founded with motto **"Let Me Lead onto Light."** Numerous ethnic groups like Magar, Newar, Chhetri, Tamang, Gurung and large number of Dalit and others major inhabitants reside in this locality. Most residents of this region work as foreign employer, public work places; GKBS offers educational programs from play group to grade 10. It provides up to secondary level education with minimum fee structures and provides a scholarship scheme for deserving students. The School believes in **"Team work Inspires Students and Teachers (TWIST)".** Honesty and Loyalty deeply embedded in heart. It encourages innovative learning through our academic and non-academic programs. GKBS School cultivates excellence in every student by engaging them in rigorous and relevant

learning opportunities that promotes cognitive, intellectual, physical, social and emotional growth.

There are 28 teachers, 430 students and 8 staff at GKBS School. Since its inception 32 years ago, the school management has been enhancing and upgrading for the benefit of quality education. The school management has been aspiring to be a centre of excellence that has developed children intellectually, physically, emotionally, socially and morally. We have imparted perfect schooling that has helped them acquire life-skills, sound character and positive attitude to excel in their lives. As a result, students graduated from here are benefitted in many ways not only in bookish knowledge but also in learning beyond the text.

Students playing

Gorakhkali Boarding School believes that students can only receive a high quality education if we offer them hands on activities which allows them to learn practically. Learners, therefore, should be taken to well set up labs where they can learn by doing things with their own hands in order to retain information and gain a clear comprehension. In spite of our constant efforts in practical sessions, we are still striving to upgrade the standard of our labs with more equipment to ensure effective and unforgettable learning.



Existing Science Lab

Objective:

A well equipped Science Lab will help our children to;

1. Explore the influences of science and technology.
2. Develop an ability to handle the apparatus carefully, and use the resources wisely.
3. Develop interest and motivation through laboratory which will lead to development of positive attitude.
4. Apply skills and knowledge of science and the facts in real life situations. develop scientific understanding of the physical world
5. Develop cognitive abilities of children like critical thinking, problem solving, application, analysis.
6. Demonstrate and explain the nature of science like scientific enterprise, scientists and how they work, existence of scientific methods, interrelationships between science and technology and among the various disciplines of science.
7. Develop positive attitude towards scientific research like curiosity, interest, risk taking, objectivity, precision, confidence, perseverance, satisfaction, responsibility, consensus, collaboration, and liking science.

List of experiments

PHYSICS

SN	Name of Experiments	Equipments	Available Quantity	Required Quantity
1	Calculation of average time period of simple pendulum	-a simple pendulum bob and stand - stop watch	1 2 pcs	1 set ----
2	To determine upper fixed point in thermometer	-Beaker -stand -cork -delivery tube -Hypsometer -Thermometer -Burner -Tripod stand	1 set --- 3 pcs 7 pcs ---- 7 pcs ---- 2 pcs	---- 5 pcs ---- ---- 1 pcs ---- 3 pcs 1 pcs
3	To demonstrate longitudinal wave	Slinky spring	----	----
4	To study reflection and refraction of light	Optical bench	----	----
5	To study electric circuit	-Battery(Tiger battery) -connecting wire -bulb	---- ---- ----	4 pcs 2 pcs 2 pcs

		-Switch	----	2 pcs
6	To measure volume of irregular bodies	-Measuring cylinder	1 pcs	----
7	To measure density of body	-Spring balance -Measuring cylinder	---- 1 pcs	1 pcs ----
8	To measure relative velocity	-Stop watch	2 pcs	----
9.	To find velocity ratio. MA, VR of different simple machines.	-different types of pulleys -model of wheeland axel -inclined plane -wooden box -slotted weight with hanger -spring balance	---- ---- ---- ---- ---- ----	1 pcs 1 pcs 1 pcs ---- 1 pcs 1 pcs
10.	To show liquid pressure	-A glass vessel with different structures	----	2 pcs
11.	To measure pressure exerted by human lungs	-Manometer	----	2 pcs
12.	To measure atmospheric pressure	-Barometer	----	1 pcs
13.	To measure human body temperature	-Clinical thermometer -digital thermometer	4 pics	----
14.	To measure boiling point and melting point of different substances.	-laboratory thermometer (alcohol/mercury)	2 pcs	----
15.	To measure the maximum and minimum temperature of different places	-maximum and minimum thermometer	1 pcs	----
16.	To show the image formed by curved mirror	-Optical bench -Concave/convex mirrors with stand	---- 2 pcs	----
17.	To show refraction of light through glass slab	-Optical board -Pins -glass slab	---- 100 pcs 1 pcs	----
18.	To prove sound is produced by the vibration	-Tuning fork -rubber pad	1 pcs ----	1 pcs ----
19.	To demonstrate the propagation of sound	-Bell jar -electric bell -vaccum pump -9v, 6v battery	---- ---- ---- ----	1 pcs 1 pcs 1 pcs 1 pcs
20.	To measure the distance of cliff depth of the pond or lake (Echolocation)	-Fathometer -hydrophone -stop watch	---- ---- ----	---- ---- ----
21.	To study about static electricity	-Glass rod -ebonite rod	1 pcs ----	---- 2 pcs
22.	To demonstrate conductors and insulator	-electric wire -bulb -dry cell -glass rod	2 meter ---- ---- ----	---- ---- ---- ----

23.	To verify Ohm's law	-Ohm's law set -Multimeter	---- ----	---- ----
24.	To determine A.C. frequency	- sonometer	----	----
25.	To make simple cell and study it's defects	-copper plate -zinc plate -Glass container -dil. Sulphuric acid	---- ---- 1 pcs ----	4 pcs 4pcs ---- ----
26.	To demonstrate about the combination of resistors and their properties	-Bulb -battery -switch -voltmeter -ammeter -conducting wire	---- ---- ---- 1 pcs 1 pcs ----	---- ---- ---- ---- ---- ----
27.	To study about dynamo and internal resistance of cell	-Dynamo -Potentiometer -PO Rheostat	---- ---- ----	1 pcs ---- ----
28.	To show combination of cells and their properties	-Electric wire -bulb -battery -Switch	---- ---- ---- ----	---- ---- ---- ----
29.	To electroplate an iron nail with copper	-copper plate -iron nail -copper sulphate solution -DC supply (6V) -beaker -connecting wire	---- ---- ---- ---- ---- ----	---- ---- 1 bottle ---- ---- ----
30	To make an electro magnet	-DC source(6v) -solenoid wire -iron -nail -pins	---- ---- ---- ---- ----	---- ---- ---- ---- ----
31.	To determine Archmides principle	-Hydrostatic balance with weight box -Ureka can -top pan balance -spring balance	---- ---- ---- ----	---- 1 pcs 1 pcs ----
32.	To demonstrate magnetic lines of force around a bar magnet and properties of magnet	-Board -bar magnet -magnetic compass -iron dust -different types of magnet (U-shaped, horse, shoe shaped, circular, cylindrical)	---- 4 pcs 2 pcs ---- 1 pcs each	---- ---- ---- ---- ----
33.	To study electric bell	Electric bell	----	----
34.	To study about solar heater	A model of solar heater	----	----
35.	To demonstrate dispersion of light	Prisms of different size	2 pcs	----

35.	To show light is a form of energy	-Magnifying glass -concave mirror	1 pcs ----	---- ----
36.	To prove white light consist 7 colors	-Newton's colour Disc	----	1 pcs
37.	To show types and properties of shadow formed by opaque bodies	-Torch light	----	1 pcs
38.	To find angle of dip and angle of declination	- A dip circle	----	----

Chemistry

SN	Experiments	Equipment's	Available Quantity	Required Quantity
1	To show dissolving of salt in water is a physical change	A porcelain basin, a wire gauze, a tripod stand, burner	1 pcs each	----
2.	To demonstrate sublimation process	Porcelain basin, burner, tripod stand, funnel, wire gauze, test tube, cotton, camphor		2 pcs each
3.	To demonstrate burning of a magnesium ribbon is a chemical change	Magnesium ribbon, burner, tongs/forceps	---- ---- ----	1 roll ---- 2 pcs
4.	To show the change in color of acid, base and salt with different indicators	Blue litmus paper, red litmus paper, methylorange, phenolphthalein, PH paper, PH meter, PH scale	1 set each	----
5.	To study classification of elements	A chart of periodic table	----	1 pcs
6.	To show filtration process	Stand, funnel, beakers, glass rod, filter paper	1 set each	----
7.	Laboratory preparation of gases (Hydrogen, Oxygen, Nitrogen, Carbondioxide, Ammonia)	Glass tube, triangular file, rubber cork, cork borer, Gas jar, beehive shelf, watch glass, wash bottle, wire gauze, tripod stand, clamp and stand, test tube brush, test tube holder, spirit lamp, Bunsen burner, woulfe's bottle,		Triangular- 1pcs Beehive shelf- 2pcs Tripod stand- 1pcs Clamp and stand- 2pcs Test tube brush- 5pcs Bunsen burner- 3pcs Water trough- 2pcs

		conical flask, hard glass test tube, thistle funnel, glass rod, asbestos sheet, water trough, lime tower **Chemical required** Calcium chloride, Granulated zinc, sulphuric acid, Hydrochloric acid, Hydrogen peroxide, potassium chlorate, Ammonium chloride, sodium nitrite, calcium Hydroxide, sodium hyudroxide, potassium hydroxide, sodium, manganese dioxide	----	Lime tower-1pcs 1 set each
8.	To show distillation process	Distillation set	----	----
9.	To separate –soluble and insoluble solids -volatile and non-volatile solids -insoluble solids	Porcelain basin, tripod stand and wire guaze, funnel and filter papers, Beakers, Test tubes, Burner, Asbestos sheet, conical flask, water trough, glass retort	----	----
10.	To compare the reactivity of different metals	Zinc power, copper fillings, aluminium powder, iron fillings	----	1 set each
11.	To study the rusting of iron	Test tubes, clean iron nails, corks, anhydrous calcium chloride, vascelin, distilled water	----	----
12.	To explain about chromatography	Adsorbent chromatogram	----	----

Biology

SN	Experiments	Equipments	Available Quantity	Required Quantity
1.	To study onion cell/blood cells, permanent slides	A compound microscope, cover slip, glass slides, glycerine/formaline, drawtube,		Formaline-1 bottle Dissection set- 1psc

		Dissection set(brushes, dropper, needles), Blotting paper, petri dish, Permanent slides: amoeba, paramecium, animal cell, spirogyra etc, plant tissues		Permanent slides-all each pcs.
2.	To study different vertebrates and invertebrates and classify them	Biological specimens (octopus, starfish pila, seahorse etc)	----	All 1 set each
3.	To study vegetative structure and spores of the mushroom/fern -making a spore print	A hand lens, glass slides, cover slip, compound microscope, glycerin	----	----
4.	To study the model of human skeletal system	Model of human skeleton and chart of human skeleton	----	1 set each
5.	To study about human heart, lungs, kidney, digestive system, eye	Model of human body having all body organs	---- ----	1 set 1 set
6.	To study solar and lunar eclipse	Globe, torch light, tennis ball	----	Globe-1pcs
7.	To study solar system, constellation, galaxy, meteor, meteorites	Chart of solar system, galaxy, constellation	----	1 pcs
8.	To study weather	Hygrometer, barometer, Anemometer, Maximum and minimum thermometer	----	----
9.	To show the formation of fossil	Plaster of paris, petroleum jelly spoon, plastic cups, soap case, leaf	----	1 set
10.	To study the parts of flower	A model chart of flower	----	1 set
11.	To explain various methods of vegetative propagation in plants	Model chart of vegetative propagation in plants	----	1 set
12.	To study different phases of the moon	A model chart of phases of the moon	----	1 set

Some science equipment for Primary Level

SN	Experiments	Equipments	Available Quantity	Required Quantity
1.	To study traffic light	A model of traffic light	----	1 set
2.	To study about first aid box	A set of first aid box	1 set	1 set
3.	To study clock	A clock	----	----
4.	T study types of food and nutrition	Chart of food and nutrition	----	2 sets
5.	To study the classification of animals	Chart classifying vertebrates and invertebrates	----	1 set
6.	To identify soluble and insoluble substances	Beaker, stirring rods	----	----
7.	To demonstrate the formation of clouds and rainfalls	Beaker, burner, tripod stand, wire gauze	----	----
8.	To measure volume of liquids:	Measuring can, Measuring cylinder	----	----
9.	To demonstrate solar system, phases of the moon, changes in seasons	-model of solar system, Model of phases of the moon	----	Model of solar system- 3sets
10.	To measure the length, breadth	Measuring tape, scale and height	----	----

BUDGETING

PHYSICS

SN	Name of Experiments	Equipments	Required Quantity	Estimated Budget
1	Calculation of average time period of simple pendulum	-a simple pendulum bob and stand - stop watch	1 set 760 1 570	760 570
2	To determine upper fixed point in thermometer	-Beaker 250ml -stand -cork -delivery tube -Hypsometer -Thermometer -Burner -Tripod stand	1 200 5 950 1 75 10 10 1 pcs 2100 1 200 3 pcs 665 1 pcs 210	200 4750 75 100 2100 200 1995 210

3	To demonstrate longitudinal wave	Slinky spring	1 190	190
4	To study reflection and refraction of light	Optical bench	1 2470	2470
5	To study electric circuit	-Battery(Tiger battery) -connecting wire -bulb -Switch	4 pcs 380 2 pcs 600 2 pcs 20 2 60	380 1200 40 120
6	To measure volume of irregular bodies	-Measuring cylinder	3 350	1050
7	To measure density of body	-Spring balance -Measuring cylinder	1 pcs 110 2 350	110 700
8	To measure relative velocity	-Stop watch	1 570	570
9.	To find velocity ratio. MA, VR of different simple machines.	-different types of pulleys -model of wheeland axel -inclined plane -wooden box -slotted weight with hanger -spring balance	1 set 750 1 pcs 1700 1 pcs 1750 1 550 1 pcs 500 1 pcs 380	750 1700 1750 550 500 380
10.	To show liquid pressure	-A glass vessel with different structures	2 pcs 550	1100
11.	To measure pressure exerted by human lungs	-Manometer	2 pcs 1710	3420
12.	To measure atmospheric pressure	-Barometer	1 pcs 1330	1330
13.	To measure human body temperature	-Clinical thermometer -digital thermometer	2 200 2 250	400 500
14.	To measure boiling point and melting point of different substances.	-laboratory thermometer (alcohol/mercury)	2 190 2 200	380 400
15.	To measure the maximum and minimum temperature of different places	-maximum and minimum thermometer	1 650	650
16.	To show the image formed by curved mirror	-Optical bench -Concave/convex mirrors with stand	1 2500 4 50	2500 200
17.	To show refraction of light through glass slab	-Optical board -Pins -glass slab	1 750 1 50 1 375	750 50 375
18.	To prove sound is produced by the vibration	-Tuning fork -rubber pad	2 275 2 60	550 60
19.	To demonstrate the propagation of sound	-Bell jar -electric bell -vaccum pump	1 pcs 1150 1 pcs 1350 1 pcs 5300	1150 1350 5300

		-9v, 6v battery	1 pcs 1150	1150
20.	To measure the distance of cliff depth of the pond or lake (Echolocation)	-Fathometer -hydrophone -stop watch	1 5700 1 3800 1 665	5700 3800 665
21.	To study about static electricity	-Glass rod -ebonite rod	10 15 2 pcs 200	150 400
22.	To demonstrate conductors and insulator	-electric wire -dry cell -glass rod	1 550 2 150 10 15	550 300 150
23.	To verify Ohm's law	-Ohm's law set -Multimeter	1 3200 1 2500	3200 2500
24.	To determine A.C. frequency	- sonometer	1 2350	2350
25.	To make simple cell and study it's defects	-copper plate -zinc plate -Glass container -dil. Sulphuric acid	4 pcs 100 4pcs 100 2 550 1 1050	400 400 1100 1050
26.	To demonstrate about the combination of resistors and their properties	-Bulb -battery -switch -voltmeter -ammeter -conducting wire	5 10 2 100 2 60 1 650 1 650 1 600	50 200 120 650 650 600
27.	To study about dynamo and internal resistance of cell	-Dynamo -Potentiometer -PO Rheostat	1 pcs 1400 1 2500 1 2850	1400 2500 2850
28.	To show combination of cells and their properties	-Electric wire -bulb -battery -Switch	1 100 5 10 2 100 2 60	100 50 200 120
29.	To electroplate an iron nail with copper	-copper plate -iron nail -copper sulphate solution -DC supply (6V) -beaker -connecting wire	1 130 1 900 1 bottle 1350 1 1350 3 350 1 600	130 900 1350 1350 1050 600
30	To make an electro magnet	-DC source(6v) -solenoid wire -iron -nail -pins	1 1350 1 700 1 500 1 50 1 50	1350 700 500 50 50
31.	To determine Archimedes principle	-Hydrostatic balance with weight box -spring balance	1 5500 1 150	5500 150
32.	To demonstrate magnetic lines of force around a bar	-Board -bar magnet -magnetic compass	1 1050 2 130 2 50	1050 260 100

	magnet and properties of magnet	-different types of magnet (U-shaped, horse, shoe shaped, circular, cylindrical)	5 150	750
33.	To study electric bell	Electric bell	1 1350	1350
34.	To demonstrate dispersion of light	Prisms of different size	5 190	950
35.	To show light is a form of energy	-Magnifying glass -concave mirror	2 400 2 60	800 120
36.	To prove white light consist 7 colors	-Newton's colour Disc	1 pcs 1000	1000
37.	To show types and properties of shadow formed by opaque bodies	-Torch light	1 pcs 450	450

Chemistry

SN	Experiments	Equipment's	Required Quantity	Estimated Budget
1				
2.	To demonstrate sublimation process	Porcelain basin, burner, tripod stand, funnel, wire gauze, test tube, cotton, camphor	2 pcs 650 2 550 2 750 2 350 2 100 2 20 2 50 2 50	1300 1100 1500 700 200 40 100 100
3.	To demonstrate burning of a magnesium ribbon is a chemical change	Magnesium ribbon, burner, tongs/forceps	1 roll 600 1 550 2 pcs 150	600 550 300
4.	To show the change in color of acid, base and salt with different indicators	Blue litmus paper, red litmus paper, methyl orange, phenolphthalein, PH paper, PH meter, PH scale	1 75 1 75 1 650 1 250 1 350 1 2850 1 250	75 75 650 250 350 2850 250
5.	To study classification of elements	A chart of periodic table	1 pcs 950	950
6.	To show filtration process	Stand, funnel, beakers, glass rod, filter paper	1 750 2 350 4 200 10 10 2 250	750 700 400 100 500

7.	Laboratory preparation of gases (Hydrogen, Oxygen, Nitrogen, Carbon dioxide, Ammonia)	Glass tube, triangular file, rubber cork, cork borer, Gas jar, beehive shelf, watch glass, wash bottle, wire gauze, tripod stand, clamp and stand, test tube brush, test tube holder, spirit lamp, Bunsen burner, woulfe's bottle, conical flask, hard glass test tube, thistle funnel, glass rod, asbestos sheet, water trough, lime tower **Chemical required** Calcium chloride, Granulated zinc, sulphuric acid, Hydrochloric acid, Hydrogen peroxide, potassium chlorate, Ammonium chloride, sodium nitrite, calcium Hydroxide, sodium hydroxide, potassium hydroxide, sodium, manganese dioxide	10 10 1 200 2 40 2 150 1 250 2 150 1 550 1 200 1 100 1 750 2 750 5 25 1 50 1 650 3 650 1 750 1 250 2 100 2 100 10 10 1 75 2 350 1 1500 1 1650 1 825 1 950 1 950 1 900 1 1850 1 950 1 1050 1 950 1 950 1 950 1 1250	100 200 80 300 500 300 550 200 100 750 1500 50 50 650 1950 750 250 200 200 100 75 700 1500 1650 825 950 950 900 1850 950 1050 950 950 950 1250
8.	To show distillation process	Distillation set	1 2800	2800
9.	To separate –soluble and insoluble solids -volatile and non-volatile solids -insoluble solids	Porcelain basin, tripod stand and wire gauze, funnel and filter papers, Beakers, Test tubes, Burner, Asbestos sheet, conical flask, water trough,	1 650 1 750 2 100 2 350 2 250 2 200 10 10 2 550 2 100 2 250 2 350	650 750 200 700 500 400 100 1100 200 500 700

		glass retort	4 500	2000
10.	To compare the reactivity of different metals	Zinc power, copper fillings, aluminum powder, iron fillings	1 1800 1 2500 1 900 1 900	1800 2500 900 900

Biology

SN	Experiments	Equipments	Required Quantity	Estimated Budget
1.	To study onion cell/blood cells, permanent slides	A compound microscope, cover slip, glass slides, glycerin/formalin, drawtube, Dissection set(brushes, dropper, needles), Blotting paper, petri dish, Permanent slides: amoeba, paramecium, animal cell, spirogyra etc, plant tissues	1 14500 2 50 10 30 1 650 1 750 10 20 5 150 1 100 1 100 1 100 1 100 1 100	14500 100 300 650 750 200 750 100 100 100 100 100
2.	To study different vertebrates and invertebrates and classify them	Biological specimens (octopus, Starfish pila, seahorse etc)	 1 650 1 650 1 650 1 650	 650 650 650 650
3.	To study vegetative structure and spores of the mushroom/fern -making a spore print	A hand lens, glass slides, cover slip, compound microscope, glycerin	1 350 1 30 1 50 1 14500 1 650	350 30 50 14500 650
4.	To study the model of human skeletal system	Model of human skeleton and chart of human skeleton	 1 7500 1 900	 5500 900
5.	To study about human heart, lungs, kidney, digestive system, eye	Model of human eye Model of liver Model of heart Model of lungs	1 1250 1 1250 1 1250 1 1250 1 1250	1250 1250 1250 1250 1250

		Model of kidney		
6.	To study solar and lunar eclipse	Globe, torch light, tennis ball	1 1500 1 450 1 100	1500 450 100
7.	To study solar system, constellation, galaxy, meteor, meteorites	Chart of solar system, galaxy, constellation	1 3500 1 3700	3500 3700
9.	To show the formation of fossil	Plaster of paris, petroleum jelly spoon, plastic cups, soap case, leaf	1 set 3500	3500
10.	To study the parts of flower	A model chart of flower	1 set 4800	4800
11.	To explain various methods of vegetative propagation in plants	Model chart of vegetative propagation in plants	1 set 2800	2800
12.	To study different phases of the moon	A model chart of phases of the moon	1 set3800	3800

Some science equipment for Primary Level

SN	Experiments	Equipments	Required Quantity	Estimated Budget
1.	To study traffic light	A model of traffic light chart	1 set 750	750
2.	To study about first aid box	A set of firstaid box	1 set 5500	5500
3.	To study clock	A clock	1 1750	1750
4.	T study types of food and nutrition	Chart of food and nutrition	2 sets 750	1500
5.	To study the classification of animals	Chart classifying vertebrates and invertebrates	1 set 750	750
6.	To demonstrate solar system, phases of the moon, changes in seasons	-model of solar system, Model of phases of the moon	3 3800 1 3800	10500 3500

Total Budget

SN	Faculty	Amount	LSF/E4E Share (Organization)	School Share	Total
1	Physics	97,650	97,650	-	97,650

2	Chemistry	55,370	55,370	-	55,370
3	Biology	72730	72,730	-	72,730
4	Equipment for Primary Level	24,250	24,250	-	24,250
5	Infrastructure (cupboard, tables, basin, tap, slab, water tank etc...)	260,000	-	2,60,000	2,60,000
	Project management & reporting		50,000		50,000
	13% VAT		32,500		
	Total		**332,500 (56.1 %)**	**260,000 (43.9%)**	**592,500**

Monitoring/Evaluation

The School Management Team will keep a close eye on all of our activities and resources. Every teacher will to report on their experiments and activities to their coordinators, and all of this information is then forwarded to the principal and E4E.

Committee Members:

a. Phul Maya Nepali (CM) - Leader

b. Beena Kaini (Principal)- Leader

c. Meena Ghale Gurung (Secondary Level science teacher)-Member

d. Arbin Achhami(Lower secondary science teacher) – Member

e. Purnima Gurung (LSF/E4E girl) – Member

f. Sunita BK (LSF/E4E girl) – Member

g. Sandhya Tiwari (LSF/E4E girl) – Member

Conclusion

The school will make sure that the equipments will be properly used and also our kids will be highly benefitted from the new science Lab set up.