

Srijana Secondary School

Pokhara-8, Srijana Chowk, Kaski, Nepal

Proposal for Science Equipment



Introduction:

Srijana Secondary School was established in 1993 (2050 B.S.). It is located at Srijana Chowk, Pokhara. Numerous ethnic groups like Newar, Brahmin, Chhetri, Tamang, Gurung and others are the major inhabitants residing in this locality. Most residents of this region work in private as well as public workplaces.

There are 112 teachers and 1508 students at Srijana School. Since its founding 29 years ago, the school management has been enhancing and upgrading for the benefit of quality education. As a result, students graduated from here are benefitted in many ways not only in bookish knowledge but also in learning beyond the text.

Srijana Secondary School believes that students can only receive a high-quality education if we offer them practical classes. The majority of what we teach is related to practical fields of study. Learners, therefore, should be taken to labs where they can learn by doing with their own hands in order to retain information and gain a clear comprehension. Additionally, we have discovered that secondary pupils learn quickly in laboratories. Despite our constant efforts in practical sessions, we are still striving to upgrade the standard of our labs with more equipment to ensure effective learning.

Objective:

1. To help understand the concepts of science in practical way.
2. To develop cognitive abilities of children like critical thinking, problem solving, application, analysis.
3. To understand 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.

4. To 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	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 BalanceI	-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 viscosity of liquid.	-Viscosity apparatus	-	-Viscosity apparatus-1
6	To determine Archimedes Principle.	-Hydrostatic balance with weight box	-	-Hydrostatic balance with weight box-1
7	To determine law of floatation	– Hydrostatic balance with weight box	–	–Hydrostatic balance with weight box–2
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
	To study refraction and reflection of light	- optical bench		optical bench-3
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
	To study electric bell	- electric bell	-	electric bell-2
23	To study Step – up and down transformer.	-Step up transofrners -Step down transofrners	-	-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	-Oscillation	-	-Oscillation

	moment of bar magnet.	Magnetometer		Magnetometer -1
29	To study star and planets.	-Telescope	-Telescope -1	-
30	To study AC oscillation nature.	-Oscilloscope	-Oscilloscope -1	-
31	To study working of solar heater	– Solar heater model	–	– Solar heater model -2

BIOLOGY

SN	Experiments	Equipment's	Available Quantity	Required Quantity
1	Study of permanent slides and specimens.	-Several slides of protozoans and museum specimens (Protozoa to Mammalia)	-1 – 1 Slide each	-2 – 2 Slide each
	To study permanent slide cell division	permanent slides of plant and animal cell	–	3–3 specimens 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	Dissection of Earthworm.	-Disecting box & Tray	1 each	1 each
9	Dissection of Frog.	-Disecting box & Tray	1 each	1 each
10	Dissection of Rat.	-Disecting box & Tray	1 each	1 each
11	Observation of different animal tissues using permanent slides.	-Different animal slides (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 CO ₂ during 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.	-Sphygmomanometer -Sthethoscope	- Sphygmomanometer -1 -Sthethoscope -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 BaCl ₂ & Dil H ₂ SO ₄ .			
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 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 radicals by both dry & wet ways (4 tests).	-Test Tubes, Measuring Cylinder, Test tube stands & holders, Delivery tube, Forks	2 Each	2 Each
16	Detect Cl ⁻ , SO ₄ ²⁻ & CO ₃ ²⁻ 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 KMnO ₄ 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.			

Budgeting

	S.N.	Item Description	Unit	Quantity	Rate	Total
General Lab Equipments	1	Beaker 50 ml	pc	5	145	725
	2	Beaker 100 ml	pc	5	145	725
	3	Beaker 250 ml	pc	5	165	825
	4	Beaker 500 ml	pc	5	250	1250
Chemistry	5	Test tubes 15x125 mm	pc	50	25	1250
	6	Conical flask 250 ml	pc	5	250	1250
	7	Thistle funnel	pc	5	85	425
	8	Lab Thermometer	pc	5	175	875
	9	Volumetric flask 100 ml	pc	5	530	2650
	10	Volumetric flask 250 ml	pc	5	630	3150
	11	Volumetric flask 500 ml	pc	2	880	1760
	12	Volumetric flask 1000 ml	pc	1	1350	1350
	13	Pipette 10 ml	pc	5	350	1750
	14	Micropipette 5 ml	pc	1	9800	9800
	15	Micropipette 1 ml	pc	1	4500	4500
	16	Graduated pipette 1 ml	pc	5	290	1450
	17	Graduated pipette 10 ml	pc	2	350	700
	18	Graduated pipette 25 ml	pc	2	540	1080
	19	Round bottom flask 250 ml	pc	2	250	500
	20	Mortar and pestle 3"	pc	5	300	1500
	21	Measuring cylinder 250 ml, Plastic	pc	2	250	500
Biology	22	Cover slip	pkt	1 0	65	650
	23	Iodine solution	125 ml	5	325	1625
	24	Beaker 250 ml	pc	5	165	825

	25	Test tubes 15x125 mm	pc	0	5	25	1250
	26	Compound microscope	set		1	6800	6800
	27	Petridish 100 mm, Glass	pair		5	165	825
Physics	28	Optical bench	set		1	8500	8500
	29	DC motor	pc		2	150	300
	30	Bread board	pc	0	1	300	3000
Extra Equipments Chemistry	31	Test tube stand	pc		2	450	900
	32	Burner	pc		5	550	2750
	33	Glass retort	pc		5	650	3250
	34	Water trough	pc		5	375	1875
	35	Woulfe's bottle 250 ml	pc		5	425	2125
	36	Beehive shelf	pc		5	110	550
	37	Gas jar	pc		5	250	1250
	38	Ediometer tube	pc		5	350	1750
	39	Short stem funnel	pc		10	135	1350
	40	Test tube holder	pc		10	55	550
	41	Burette 50 ml	pc		5	850	4250
Extra Equipments Biology	42	Permanent slides of Protozonas	pc		5	95	475
	43	Permanent slides of cell division	pc		5	100	500
	44	Museum specimens of animals	pc		10	750	7500
	45	Glycerine	400 gm		6	250	1500
	46	Safranine solution	125 ml		10	280	2800
	47	Histological slides of frog	pc		10	95	950
	48	Prepared slides of animal tissues	pc		10	95	950
	49	Prepared slides of plant tissues	pc		1	95	95
	50	Bell jar	pc		1	950	950
	51	Ganongs Potometer	pc		5	975	4875
	52	Fermenter, Kuhns tube	pc		4	375	1500
	53	Sphygmomanometer with stethoscope,	set		2	2250	4500
	54	Oxymeter	pc		2	2500	5000
	55	Blood grouping set	set		2	850	1700

Extra Equipments Physics	56	Vernier calliper analog	pc	10	245	2450
	57	Vernier calliper digital		4	2400	9600
	58	Spherometer	pc	10	650	6500
	59	Micrometer Screw gauze, Brass	pc	10	820	8200
	60	Capillary tubes	pkt	2	150	300
	61	Viscosity apparatus	set	2	3250	6500
	62	Hydrostatic balance	set	1	2850	2850
	63	Weight box	set	2	2250	4500
	64	Resonance tube app	set	2	3250	6500
	65	Searles app	set	1	2800	2800
	66	Hygrometer (Wet and Dry)	pc	1	650	650
	67	Max min thermometer	pc	2	650	1300
	68	Barometer Aneroid	pc	1	1150	1150
	69	Joules calorimeter	pc	2	1150	2300
	70	Sonometer	pc	2	2200	4400
	71	Step up transformer	pc	2	2450	4900
	72	Dynamo	pc	2	1250	2500
	73	Rheostat	pc	2	1350	2700
	74	U shaped magnet	pc	3	350	1050
	75	Horse shoe magnet	pc	3	350	1050
	76	Compass needle	pc	30	50	1500
	77	Oscillation magnetometer	pc	1	2250	2250
	78	LED	pc	50	5	250
	79	Tranistor	pc	50	5	250
	80	Jumper wire	mtr	10	20	200
	81	Solar Cooker model	Pc	2	1000	2000
	82	Centrifuge Model	Pc	2	1000	2000
	83	Solar System Model	Pc	1	1500	1500
	84	Periscope Model	Pc	1	1500	1500
	85	Water Turbine	Pc	1	2000	2000
		Total				Rs. 201,335

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

1. Monitoring/Evaluation

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

2. Committee Members:

- a. Ganga Subedi (CM) - Leader
- b. Amrit Dhakal (Physics Teacher) - Member
- c. Durga Adhikari (Chemistry Teacher) – Member
- d. Babu Ram KC. (Biology Teacher) – Member
- e. Indra Kumar Shrestha (Secondary Level Science Teacher) – Member
- f. Sumikshya Sundam (Secondary Level Science Teacher) – Member