

PRIVATE SECONDARY EDUCATION AUTHORITY

MONITORING OF NORMS AND STANDARDS IN A FACILITY RECKONED AS:**BIOLOGY LABORATORY UP TO GRADE 11 – Year 2021-2022****Subject Appellation and Level:**

- **BIOLOGY – Grades 10 & 11 – CIE SC/OL syllabus code: 5090**
- **SCIENCE – Up to Grade 9 & 9+(EP) - (the *Biology* component only in schools where there is no Science Junior Laboratory) - NCF**

Name of School : _____ Date of Verification : _____

Is the Lab a separate facility? ____ If no, where is the equipment provided? _____

Is the facility New / Relocated / Existing? _____

Number of sections and students using this facility:

Grade	Extended Program				Regular				
	7	8	9	9+	7	8	9	10	11
No. of Sections									
No. of Students									
No. of Groups									

Educator in Charge: _____ Qualifications: _____

Specialist Room Attendant: _____ Qualifications: _____

IMPORTANT NOTES:**The following conditions should be fulfilled to ensure a reasonable standard:**

- **The room and floor area provided should be appropriate.**
- **A minimum score of 75 % should be obtained in each of the four Sections A to D.**
- **Compulsory items in Section D, highlighted in bold characters, should be provided.**
- **Record of use of the Lab. should be kept as required.**

Minimum requirements for a class of 20 students are specified. However, in case of need provision should be made to accommodate up to 4 additional students.

(A) PHYSICAL FACILITIES – weightage: 30 %						
Item	Description	Requirements	Marks Per Unit	Marks Item-wise	Existing	Score <i>(for PSEA use only)</i>
1. Floor Area and Room *NOTES: 1. For existing <i>Labs</i> , the previously approved Floor Area shall be accepted and rated pro-rata. 2. For new labs, the floor area of 60m ² shall be required.	Concrete Building	An area of 60 m ² is required* <i>(See Side-notes)</i>	75/m ²	4500		
	CONDITIONS OF ROOM:			1500		
	Ceiling	Plastered & crack-free	10%	Rated pro-rata on area		
	Walls	Plastered, crack-free & painted	10%			
	Flooring	Flat & tiled /painted	10%			
	Shape	Convenient	10%			
	Set Up	Conducive	10%			
	Cleanliness	Maintained	10%			
	Proper Storage and Classification	Indexing & Accessibility	10%			
	Lighting	Adequate	10%			
	Ventilation	Natural/ Assisted	10%			
	Utilities	Water/Gas/ Electricity	10%			

Contd. on the next page

Item	Description	Quantity Required	Marks Per Unit	Marks Item-wise	Existing	Score (for PSEA use only)
2. Furniture & Accessories *NOTE: Worktables should be of Laboratory type and fitted with taps, sinks, bunsen burners and power supply. **NOTE: Demonstration Table rated only if it has ALL of the 4 facilities listed at a) to d).	i) Work Tables*	15 m ²	30	450		
	ii) Stools	20	21	420		
	iii) Demonstration Table (2m x 1m)**	2m ²	110	220		
	a) Tap and Sink (Tap: Graded Type)	1 Set	110	110		
	b) Bunsen Burner with gas supply	1	110	110		
	c) Power Point – attached or nearby	1	110	110		
	d) 20 cm higher than work tables	-	110	110		
Note: Conditions Problems identified with the conditions of Furniture and Accessories , if any, shall be evaluated on how far they affect teaching and learning on a scale of 1 to 10 before effecting deductions on marks for conditions. The marks may be totally forfeited in case of even a single grave problem with conditions.	iv) Chair for Teacher	1	150	150		
	v) White Board (Size: 243cm X 105cm below size not rated)	1	200	200		
	vi) Tap (graded type) & Sink (of appropriate material)	6 Sets	90	540		
	vii) Power Points (free)	2	80	160		
	viii) Wall Clock	1	100	100		
	ix) Shelves/Cupboards	Sufficient for Storage	300	300		
	Conditions i) to ix)			800		
			TOTAL Section A	9 780		Score sect A

Actual Marks Scored on Physical: Score sect A X 12000 = _____
Facilities (Sect. A) 9 780

(B) INSTRUCTIONAL TOOLS & RECORDS – weightage: 30 %

1. Practicals	Number of Sessions	20	250	5000						
NOTE: Reckoned pro-rata for the current academic year - max. 20 per class or group on 8.5 months.										
Requirements: a) 20 practical sessions per class for Grades 10 & 11 in the academic year spread over all three school terms. b) 7 practical sessions per class for Grades EP & Reg.7-9 in the academic year. c) Records to be signed, kept class-wise and in the lab.	Grade Class/Group	Ext. Prg.				Regular				
		7	8	9	9+	7	8	9	10	11
	A									
	B									
	C									
	D									
	E									
	Total (x 3 for EP & Reg. Gds. 7-9)									
	Average (Gradewise)									
	Overall Average									
Notes for Guidance:	<i>Grades EP & Reg. 7, 8 and 9 to be reckoned only if school does <u>not</u> have a Science Junior Lab.</i>									
2. Audio Visual Sessions	Number of Sessions	10	200	2000						
NOTE: Reckoned pro-rata for the current academic year - max. 10 per class or group on 8.5 months.										
Requirements: a) 10 Audio Visual sessions per class for Grades 10 & 11 in the academic year spread over all three school terms. b) 4 Audio Visual sessions per class for Grades EP 7-9 & Reg.7-9 in the academic year. c) Records to be signed, kept class-wise and in the lab. d) Audio Visual Sessions - (video lessons, Computer Assisted Learning)	Grade Class/Group	Ext. Prg.				Regular				
		7	8	9	9+	7	8	9	10	11
	A									
	B									
	C									
	D									
	E									
	Total (x 3 for EP & Reg. Gds. 7-9)									
	Average (Gradewise)									
	Overall Average									
Notes for Guidance:	<i>Grades EP & Reg. 7, 8 and 9 to be reckoned only if school does <u>not</u> have a Science Junior Lab.</i>									

	Description	Quantity Required	Marks Per Unit	Marks Item-wise	Existing	Score (for PSEA use only)
3.	Time-Table of practicals (With school seal and year stated)	1 (displayed)	100	100		
4.	Stock-Book (Up to date, signed and with school seal. New acquisitions should be highlighted.)	1	150	150		

5.	TEACHING AND LEARNING AIDS					
(i)	Reference books for Theory (Published in the past 3 years)	5	100	500		
(ii)	Reference books for Practical work (Published in the past 5 years)	5	100	500		
(iii)	Multimedia a) PC/Laptop b) Internet c) LCD Projector* d) Screen*	1 Connected 1 1	200 100 240 70	200 100 240 70		
(iv)	Charts (Printed and of minimum size – A3. Contents should be readable with drawings and bold characters)					
	Anatomy					
1.	Alimentary System	1	40	40		
2.	Circulatory System	1	40	40		
3.	Classification of organisms – the 5 kingdoms	1	40	40		
4.	Development of foetus	1	40	40		
5.	Dicot leaf (Anatomy)	1	40	40		
6.	Dicot root (Anatomy)	1	40	40		
7.	Dicot stem (Anatomy)	1	40	40		
8.	Endocrine system	1	40	40		
9.	Flower - wind pollinated, insect pollinated	1	40	40		
10.	Heart : Structure & Function	1	40	40		
11.	Human blood- composition & functions	1	40	40		
12.	Kidney and excretory system	1	40	40		
13.	Liver (human)	1	40	40		
14.	Menstrual cycle	1	40	40		
		Sub-Total (Section B)		2420		

	Description	Quantity Required	Marks Per Unit	Marks Item-wise	Existing	Score (for PSEA use only)
15.	Monocot – anatomy	1	40	40		
16.	Nervous System	1	40	40		
17.	Reproductive System (male, female)	1	40	40		
18.	Respiratory System	1	40	40		
19.	Safety measures in a laboratory	1	40	40		
20.	Skeleton – human	1	40	40		
21.	Skin	1	40	40		
	Medical					
22.	Balanced diet	1	40	40		
23.	Cardiovascular diseases	1	40	40		
24.	Dental Care	1	40	40		
25.	Drugs : Use and Abuse	1	40	40		
26.	Effect of smoking on health including emphysema	1	40	40		
27.	HIV Virus and AIDS	1	40	40		
28.	Liver cirrhosis	1	40	40		
29.	Lung cancer - causes, symptoms, prevention	1	40	40		
30.	Malaria	1	40	40		
31.	Syphilis	1	40	40		
	Environment					
32.	Nitrogen cycle	1	40	40		
33.	Carbon cycle	1	40	40		
34.	Water cycle	1	40	40		
35.	Ecosystem (e.g. pond life)	1	40	40		
36.	Food chain / web	1	40	40		
37.	Energy flow	1	40	40		
38.	Pollution (air)	1	40	40		
39.	Pollution (land)	1	40	40		
40.	Pollution (river)	1	40	40		
41.	Pollution (sea)	1	40	40		
		Sub-Total (Section B)		1080		

(C) SAFETY ITEMS – weightage: 10 %						
Item	Description	Quantity	Marks Per Unit	Marks Item-wise	Existing	Score (for PSEA use only)
1. First Aid Kit	Equipped to treat cuts, burns and eye problems	1	350	350		
2. Fire Extinguisher	Capacity: 2 L or 2 Kg (serviced on time)	1	400	400		
3. Fire Blanket	0.9m x 0.9 m	1	350	350		
4. Emergency Exit (clearly indicated)	Additional door for quick exit in case of emergency	1	400	400		
5. Safety Goggles	For protection of eyes while conducting practicals.	20	20	400		
6. Safety Charts Min. size: A ₃ (permanently affixed at appropriate places)	Clear instructions about safety precautions <ul style="list-style-type: none"> • Exit signs • In case of fire • Dangerous chemicals; etc 	5	80	400		
7. i) Main Switch/ Circuit Breaker	Separate for the Chemistry Lab. And located at an accessible place inside the Lab.	1	350	350		
ii) ELCB/RCD		1	400	400		
8. Gas conductors (NOTE: Gas tanks to be kept preferably outside the building with an internal gas switch)	Rubber tubing connected to Bunsen Burners should be replaced before expiry date stated thereon.	10	60	600		
9. Storage of chemicals	Safe storage, organisation and accessibility of chemicals, especially hazardous ones	Safe Storage	100	100		
		Organisation	100	100		
		Accessibility	100	100		
			TOTAL Section C	3950		Score sect C

Actual Marks Scored on Safety Items : $\frac{\text{Score sect C}}{3950} \times 4000 = \underline{\hspace{2cm}}$
(Sect C) **3950**

(D) EQUIPMENT & CONSUMABLES – weightage: 30 %						
	Equipment	Quantity Required	Marks Per Unit	Marks Item-wise	Existing	Score (for PSEA use only)
1.	Apparatus and chemicals for water cultures to show effect of NO_3^- and Mg^{2+} on growth	5	8	40		
2.	Aquarium with air pump <i>*Re. footnote</i>	1	40	40		
3.	Aspirator bottle 10 litres	1	40	40		
4.	Beaker 50 cm ³	10	12	120		
5.	Beaker 100 cm ³	10	12	120		
6.	Beaker 250 cm ³	10	12	120		
7.	Beaker 500 cm ³	10	12	120		
8.	Bell jar	2	20	40		
9.	Bench lamp	5	8	40		
10.	Bioset	10	8	80		
11.	Bioviewer	10	8	80		
12.	Black Paper / Aluminium foil	2 Rolls/pks	20	40		
13.	Blade (Safety)	20	2	40		
14.	Boiling tube	30	4	120		
15.	Bottle, reagents (250 cm ³) (<i>empty</i>)	24	5	120		
16.	Brush (Paint)	10	4	40		
17.	Brush (test tube)	10	8	80		
18.	Bunsen Burner (with gas supply and in use)	10	12	120		
19.	Conical flask 100 cm ³	20	4	80		
20.	Conical flask 300 cm ³	20	4	80		
21.	Cork (assorted)	50	1.6	80		
22.	Cork borer	1	40	40		
23.	Cotton Wool	2 pks	20	40		
24.	Cover slip	2 boxes of 200	40	80		
25.	Cylinder (measuring) 25 cm ³	10	8	80		
		Sub-Total (Section D)		1880		

***An aquarium to be rated must be fully functional with air pump, weeds, aquatic organisms. An empty aquarium or with water only will not be rated.**

	Equipment	Quantity Required	Marks Per Unit	Marks Item-wise	Existing	Score (for PSEA use only)
26.	Cylinder (measuring) 100 cm ³	10	8	80		
27.	Cylinder (measuring) 500 cm ³	2	40	80		
28.	Cylinder (measuring) 1000 cm ³	2	40	80		
29.	Delivery tube	5	16	80		
30.	Desiccator	1	40	40		
31.	Dish for specimens	10	8	80		
32.	Dropper with teat	40	2	80		
33.	Dropping bottles – 30 cm ³	20	4	80		
34.	Electric kettle	1	80	80		
35.	Electronic balance (2 D.P)	1	80	80		
36.	Filter Paper	1 box	80	80		
37.	Forceps (fine)	20	4	80		
38.	Funnel (large)	10	8	80		
39.	Funnel (small)	10	8	80		
40.	Funnel holder	10	8	80		
41.	Glass rod	20	4	80		
42.	Glass slide (Microscope)	1 box of 50	80/box	80		
43.	Glass tube (4mm diameter)	10 m	4	40		
44.	Glass tube cutter	1	40	40		
45.	Goggle (safety)	10	8	80		
46.	Hand lens	20	4	80		
47.	Microscope (Monocular)	5	24	120		
48.	Mortar and pestle	2	20	40		
49.	Mounted Needle	20	2	40		
50.	Petri dish 15 x 100 mm	20	4	80		
51.	Pin	1 box	40	40		
52.	Pipette (straight graduated)	20	4	80		
53.	Plain Mirror	20	2	40		
54.	Potometer	2	40	80		
		Sub-Total (Section D)		2080		

	Equipment	Quantity Required	Marks Per Unit	Marks Item-wise	Existing	Score (for PSEA use only)
55.	Potted Plants (assorted)	12	10	120		
56.	Refrigerator * <i>Re. footnote</i>	1	120	120		
57.	Rubber bung (assorted)	40	2	80		
58.	Rubber bung with one hole	20	4	80		
59.	Rubber bung with two holes	20	4	80		
60.	Rubber tubing	5m	16	80		
61.	Ruler (plastic) – 30 cm	20	2	40		
62.	Scalpel	20	4	80		
63.	Scissors (sharp and pointed)	20	4	80		
64.	Seeker (feeler)	20	2	40		
65.	Spotting tile/Cavity tile (12 spots)	10	8	80		
66.	Stop clock/stopwatch	10	8	80		
67.	Syringe – 2cm ³	20	4	80		
68.	Syringe – 5 cm ³	20	4	80		
69.	T – tube / T-connector	5	8	40		
70.	Test tube	120	1	120		
71.	Test tube holder	20	6	120		
72.	Test tube rack	20	6	120		
73.	Thermometer (-10 ⁰ – 110 ⁰ C)	20	4	80		
74.	Thistle funnel	2	20	40		
75.	Tripod stand	10	8	80		
76.	Trough (200 x 200 mm)	2	20	40		
77.	Vacuum flask (1 dm ³)	4	10	40		
78.	Visking tubing (14mm)	1 reel	40	40		
79.	White tile (15 cm x 15 cm)	20	4	80		
80.	Wire gauze with ceramic centre	10	8	80		
81.	Y – tube/Y connector	2	20	40		
		Sub-Total (Section D)		2040		

***A Refrigerator to be rated should be operational all year through with ice cubes and cold water. Enzymes should be preferably kept in the lower deck or door shelves.**

	Consumables (chemicals)	Quantity Required	Weightage per 100g/ 100cm³	Marks	Existing	Score (for PSEA use only)
1.	Agar powder	250g	32	80		
2.	Albumen	500g	16	80		
3.	Benedict's reagent	2 dm ³	40/dm ³	80		
4.	Bromothymol blue	500 cm ³	8	40		
5.	Citric acid	100g	80	80		
6.	Cobalt chloride paper	5 boxes	8	40		
7.	Copper (II) sulfate. 5H ₂ O	500 g	16	80		
8.	Diastase/Amylase	25g	3.2/g	80		
9.	Distilled /Deionised water	10 dm ³	12/dm ³	120		
10.	Eosin	25g	1.6/g	40		
11.	Ethanol – 95%	2 dm ³	20/dm ³	40		
12.	Formaldehyde	2.5 dm ³	16/dm ³	40		
13.	Glucose (analar)	500g	16	80		
14.	Hydrochloric acid (conc)	2.5 dm ³	16/dm ³	40		
15.	Hydrogen carbonate indicator	500 cm ³	16	80		
16.	Hydrogen peroxide (100 vols)	2 dm ³	20/dm ³	40		
17.	Invertase	100 cm ³	40	40		
18.	Iodine	100g	80	80		
19.	Lime Water	2.5 dm ³	16/dm ³	40		
20.	Methylated spirit (denatured alcohol)	2 dm ³	20/dm ³	40		
21.	Methylene blue	25g	1.6/g	40		
22.	Pepsin	25g	1.6/g	40		
23.	Petroleum jelly/Vaseline	500 g	8	40		
24.	Potassium hydroxide (solid)	500g	8	40		
25.	Sodium hydrogen carbonate	500g	8	40		
26.	Sodium hydroxide pellets	500g	8	40		
27.	Sodium nitrate	500g	8	40		
28.	Starch (soluble)	500g	8	40		
29.	Sucrose (analar)	250g	16	40		
30.	Sulfuric acid (conc)	2.5 dm ³	16/dm ³	40		
31.	Universal indicator B.D.H	100 cm ³	40	40		
32.	Yeast powder (fermentive, active, dried)	500g	8	40		
		Sub-Total (Section D)		1720		

PREPARED SLIDES

	Description	Quantity Required	Marks Per Unit	Marks Item-wise	Existing	Score (for PSEA use only)
1.	Amoeba	5	8	40		
2.	Bacteria	5	8	40		
3.	Blood smear showing RBC, WBC	5	8	40		
4.	Dicot leaf T.S	5	8	40		
5.	Dicot root T.S	5	8	40		
6.	Dicot Stem T.S	5	8	40		
7.	Human cheek cells	5	8	40		
8.	Monocot leaf T.S	5	8	40		
9.	Monocot root T.S	5	8	40		
10.	Monocot Stem T.S	5	8	40		
11.	Mucor with sporangia	5	8	40		
12.	Ovary (mammalian) T.S	5	8	40		
13.	Pollen	5	8	40		
14.	Root tip (mitosis) L.S	5	8	40		
15.	Spirogyra	5	8	40		
16.	Testis (mammalian) L.S.	5	8	40		
17.	Yeast	5	8	40		
		Sub-Total (Section D)		680		
			TOTAL Section D	8400		Score sect D

Actual Marks Scored on Equipment & Consumables (Sect. D) $\frac{\text{Score sect D}}{8400} \times 12000 = \underline{\hspace{2cm}}$

MARK SCHEME AND SCORE

SECTION	WEIGHTAGE	TOTAL MARKS	ACTUAL MARKS SCORED	% SCORE Section-wise
A. Physical Facilities	30%	12000		
B. Instructional Tools & Records	30%	12000		
C. Safety Items	10%	4000		
D. Equipment and Consumables	30%	12000		
OVERALL	100%	40000		

REMARKS AND SHORTCOMINGS

(With particular reference to conditions at page 1 and score obtained)

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Signature of PSEA Supervisor/Senior Supervisor (s)

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Signature of Manager

Date:

Date: