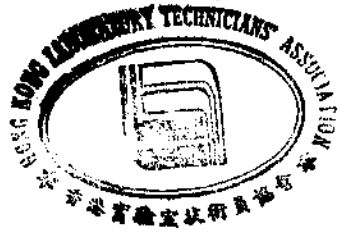
1979

# REPORT OF THE WORKING GROUP

# ON A REVIEW OF THE LABORATORY TECHNICIAN GRADE



# C O N T E N T S



# A P P E N D I C E S

## I. Introduction

1.1 Since most of the recommendationsof the Reconvened Working Party Report on Laboratory Assistants/Technicians completed on 14th July 1977 were found unacceptable by the Official Side in the Education Department Staff Consultative Council in November 1978, it was decided at an Education Department Directorate Meeting that a Working Group should be set up to review the structure and manning scale of the Laboratory Technician grade in secondary schools in the light of the recent developments in science curriculum and class organizations in secondary schools. The composition of the Working Group was as follows :-

Chairman : Mr. T.L. LAM, Assistant Director (Schools)
Mr. D. LEUNG, Ag. Principal Education Officer (NT)
Mr. J. TAAM, Principal Inspector (Science)
Mr. S.W. WONG, Ag. Senior Education Officer (Servicing Unit)

Secretary : Mr. A. LIANG, Education Officer (Servicing Unit)

1.2 The first meeting of the Working Group was held on 13th December, 1978. Mr. A. Fok, Ag. Principal Education Officer (H.K.) who was originally appointed as a member also attended this first meeting before he proceeded onto overseas study leave in January, 1979. Arrangement, however, had been made before the first meeting for Mr. S.W. WONG, Ag. Senior Education Officer (Servicing Unit) to substitute Mr. Fok as a member of the Working Group which has since then held eight meetings in the course of its deliberations. The terms of reference of the Working Group were :

(i) to review the whole structure of the Laboratory Technician grade and

(ii) to review the manning scale of Laboratory Technicians in government and aided schools.

1.3 The Working Group noted that the existing structure of the Laboratory Technician grade was approved in 1970 when new pensionable posts of Laboratory Technician III/II, Laboratory Technician I and Senior Laboratory Technician were created to offset the deletion of Laboratory Assistant and Senior Laboratory Assistant posts on the understanding that the deleted posts would be retained on a supernumerary basis until the incumbents have either been regraded or vacated their posts.

1.4 As to the manning scale for Laboratory Technicians, the Working Group noted that it had been adopted since 1965 as follows :-

| No. of laboratories in a school | No. of Laboratory Technicians provided |
|---|---|
| 1 | 1 |
| 2 | 1 |
| 3 | 2 |
| 4 | 2 |
| 5 | 2 |
| 6 | 3 |

(where a secondary school was doing sixth Form work and had one or more demonstration rooms, one demonstration room only would be counted as a laboratory for the purpose of the above manning scale)

1.5 In view of the lapse of time since the existing structure and manning scale had been implemented, the Working Group considered that a review on them was justifiable.

## II. Changes in curriculum and class structures

2.1 The Working Group recognised that there were more practical work with the introduction of Junior Secondary Science into the junior secondary curriculum. In schools where general science was taught, only one or two of the four science periods per week would be a practical period. However, in schools where Junior Secondary Science was taught, all four science periods per week had to be held in laboratories in view of the experimental approach connected with the new syllabus.

2.2 It was also recognised that the new Science syllabus of the Hong Kong Certificate of Education was more practical biased thus increasing the utilization rate of laboratories in schools. While two periods of practical work per week for each science subject at Form 4 and 5 level might be considered sufficient for the traditional syllabus, it was necessary to have three periods of practical work per week for each science subject if the new science syllabus was to be adopted. A comparison between the number of practical periods involved for the traditional and new syllabuses was as follows :-

| Class Level | No. of Practical Periods per week with traditional syllabus | No. of Practical Periods per week with new syllabuses |
|---|---|---|
| F.1 | 2 | 4 |
| F.2 | 2 | 4 |
| F.3 | 6 | 4 |
| F.4 Arts (with 1 science subject) | 2 | 3 |
| F.4 Science (with 3 science subjects) | 6 | 9 |
| F.5 Arts (with 1 science subject) | 2 | 3 |
| F.5 Science (with 3 science subjects) | 6 | 9 |
| F.6 Science | 18 | 18 |
| F.7 Science | 18 | 18 |

2.3 Apart from the change of syllabuses, the introduction of floating classes to government and aided schools since September 1976 also increased the utilization rate of laboratories in schools in two aspects. Firstly, the number of practical periods increased as a direct result of the increase in the number of operating classes and secondly, in view of the shortage of classrooms, laboratories might have to be made use of as teaching spaces for subjects other than science. In general, for a standard 24 classes secondary schools with a class structure of 4-4-4-4-4-2-2, two additional streams of Form 1-3 had been added as floating classes turning its class structure to become 6-6-6-4-4-2-2. The increase in the number of practical periods for the whole school as a result of adopting the new syllabuses and the introduction of floating classes could be shown in the following tables :

24 operating classes with traditional Syllabus

| No. of Classes | Level | No. of Practical Periods per week per class with traditional syllabus | Total no. of practical periods per week |
|---|---|---|---|
| 4 | Form 1 | 2 | 8 |
| 4 | Form 2 | 2 | 8 |
| 4 | Form 3 | 6 | 24 |
| 2 | Form 4 Arts (with 1 science subject) | 2 | 4 |
| 2 | Form 4 Science (with 3 science subjects) | 6 | 12 |
| 2 | Form 5 Arts (with 1 science subject) | 2 | 4 |
| 2 | Form 5 Science (with 3 science subjects) | 6 | 12 |
| 1 | Form 6 Arts | 0 | 0 |
| 1 | Form 6 Science | 18 | 18 |
| 1 | Form 7 Arts | 0 | 0 |
| 1 | Form 7 Science | 18 | 18 |
| 24 | | | 108 |

30 operating classes with new syllabuses

| No. of Classes | Level | No. of Practical Periods per week per class with new syllabus | Total no. of practical periods per week |
|---|---|---|---|
| 6 | Form 1 | 4 | 24 |
| 6 | Form 2 | 4 | 24 |
| 6 | Form 3 | 4 | 24 |
| 2 | Form 4 Arts (with 1 science subject) | 3 | 6 |
| 2 | Form 4 Science (with 3 science subjects) | 9 | 18 |
| 2 | Form 5 Arts (withn 1 science subject) | 3 | 6 |
| 2 | Form 5 Science (with 3 science subjects) | 9 | 18 |
| 1 | Form 6 Arts | 0 | 0 |
| 1 | Form 6 Science | 18 | 18 |
| 1 | Form 7 Arts | 0 | 0 |
| 1 | Form 7 Science | 18 | 18 |
| 30 | | | 156 |

2.4 It could thus be seen that there was an increase of 48 practical periods per week for a standard secondary school. The Working Group was aware that the class organisation of such a school might probably be restructured to become 5-5-5-5-5-2-2. With this proposed class structure, it was noted that the number of practical periods per week was even greater than when it used to operate 30 classes under the 6-6-6-4-4-2-2 structure. The working was as follows :

29 Operating classes with new syllabus

| No. of Classes | Level | No. of Practical Periods per class per week with new syllabus | Total no. of practical period per week |
|---|---|---|---|
| 5 | Form 1 | 4 | 20 |
| 5 | Form 2 | 4 | 20 |
| 5 | Form 3 | 4 | 20 |
| 2 | Form 4 Arts (with 1 science subject) | 3 | 6 |
| 3 | Form 4 Science (with 3 science subjects) | 9 | 27 |
| 2 | Form 5 Arts (with 1 science subject) | 3 | 6 |
| 3 | Form 5 Science (with 3 science subjects) | 9 | 27 |
| 1 | Form 6 Arts | 0 | 0 |
| 1 | Form 6 Science | 18 | 18 |
| 1 | Form 7 Arts | 0 | 0 |
| 1 | Form 7 Science | 18 | 18 |
| 29 | | | 162 |

2.5 In order to investigate whether or not the provision of Laboratory Technician under the existing manning scale could cope with the demand of Laboratory Technician services in schools, a survey on the workload carried out by Laboratory Technicians in several schools was conducted by inspectors of the Science Inspectorate. A detailed record of the workload of four Laboratory Technicians (two at Delilios Public School and two at Bishop Hall Jubilee School) observed over a period of one week is at Appendix I.

2.6 It was found that in Bishop Hall Jubilee School where Junior Secondary Science was adopted for Form 1-3 and the C.D.C. curriculum for Form 4-5, the two Laboratory Technicians were so fully engaged in assembling materials for experiments, removing apparatus from the laboratories and replacing new sets of experimental set-ups for classes to follow that they rarely had time to assist the teachers in supervising the pupils even when potentially dangerous ~~experiments~~ were performed by pupils. In the case of Delilios Public School where Junior Secondary Science was adopted for Form 1-2 and the traditional syllabus for Form 3-5, the Working Group concurred with the findings of the inspectors that the workload though heavy could still be manageable by the two Laboratory Technicians.

2.7 In order to have a better understanding of the workload of Laboratory Technicians in schools with a non-standard class structure, surveys similar to those as had been carried out in Belilios Public School and Bishop Hall Jubilee School were made in respect of the Laboratory Technicians working in Sha Tau Kok Government Secondary School, Queen s College, Yuen Long Public Middle School, Ho Lung Technical School for Girls, F.M.O. Aberdeen Secondary Technical School and Tsuen Wan Government Secondary Technical School. Reports on these surveys are at Appendix II. Judging from the reports of these surveys, the Working Group was convinced that the number of laboratories in a school should not be the only deciding factor in formulating the manning scale of Laboratory Technicians as has been hitherto but that the number of classes operated and the science syllabuses adopted by a school should also be taken into consideration.

III. Considerations given to the revision of the manning scale

3.1 In gathering information as to how the manning scale of Laboratory Technician could best be revised, the Working Group gave considerations over the design of and manning scale for laboratories in the United Kingdom. It was revealed that in the United Kingdom, every 100 students were treated as an unit for one laboratory. For a school with 1,000 students, there would then be ten laboratories which would normally be situated on two floors with one big preparation room at the centre of each floor serving the five laboratories on that floor. There would be seven Laboratory Technicians for the ten laboratories and there would also be Laboratory Attendants to assist with the cleaning work. The Working Group considered that it would be ideal to have one laboratory to every hundred students. Nevertheless, the United Kingdom student/laboratory ratio and manning scale of Laboratory Technicians were thought to be impractical for adoption here in Hong Kong.

3.2 Considerations were also given to a recommended establishment proposed by the Association of Science Educatinn which appeared in an article in 'Education in Science' whereby the provision of Laboratory Technicians were based mainly on the number and age of students on roll. An extract of the article is at Appendix III. The formula proposed by the Association of Science Education is as follows :

$$\text{No. of Laboratory Technicians} = \frac{\text{Unit Total}^* + (4\text{x number of pupils on roll})}{3{,}000}$$

* The Unit Total is to be calculated from the following information :

| | |
|---|---|
| For each pupil under 14 years of age | 2 units |
| For each pupil aged 14 and under 15 | 3 " |
| For each pupil aged 15 and under 16 | 4 " |
| For each pupil aged 16 and under 17 | 6 " |
| For each pupil aged 17 and over | 8 " |

The ages of the pupils are taken on 31st March of the particular year.

3.3 The Working Group tried to work out the number of Laboratory Technicians for Hong Kong schools in accordance with the above formula and found that 3 Laboratory Technicians should be provided for a school with 30 classes (6-6-6-4-4-2-2). Again, this recommendation proposed by the Association of Science Education was found unacceptable in the context of Hong Kong since some figures used in the formula were found to be quite arbitrary.

3.4 The role of a Laboratory Technician in the United Kingdom was also studied. It was noted that his major tasks included laboratory servicing, construction and repair, safety and administration and they were considered to be similar to those of a counterpart in Hong Kong. In this connection, the Working Group firmly believed that the role of a Laboratory Technician should be distinctly separated from that of a teacher.

3.5 In January 1979, a letter from the Hong Kong Subsidized Secondary Schools Council was received. Among other things, it requested that the manning scale of Laboratory Technicians be revised, the proposal being one Laboratory Technician for one laboratory.

3.6 Also requesting an increase of Laboratory Technician establishment in schools was the Association of Laboratory Assistants and Technicians (Education Department) which submitted, for the consideration of the Working Group, a proposed manning scale of Laboratory Technicians in secondary schools whereby the number of Laboratory Technicians provided in a school would be based on the total number of weighed laboratory periods of that school. Copies of its submissions are at Appendix IV. The suggested ratios in weighing the laboratory periods at different levels are as follows :

| | Weighting |
|---|---|
| Form 1-3 Conventional syllabus laboratory period | 1 |
| Form 1-3 Junior Secondary Science laboratory period | 1.5 |
| Form 4-5 Laboratory period | 1.5 |
| Form 6-7 Laboratory period | 2 |

It was proposed by the Association that for each 70 weighed laboratory periods, one Laboratory Technician would be required.

3.7 The Working Group noted that the proposed weightings attached to different levels of laboratory periods were based on a comparison with the work involved in respect of a Form 1 to 3 conventional science laboratory period. These weightings were arbitrary and so was the proposed standard that there should be one Laboratory Technician for every 70 weighed laboratory periods. While the Working Group recognised that the workload of a Laboratory Technician has definitely increased in recent years, it showed reservations over the weighing of laboratory periods and the manning scale as proposed by the Association of Laboratory Assistants and Technicians (Education Department).

3.8 The Association also proposed to increase the Laboratory Technician establishments for the Special Education Section and the Audio Visual Education Section. However, these were regarded to fall outside the terms of reference of the Working Group which considered that Laboratory Technician establishments apart from those in schools should best be justified on functional grounds.

3.9 During the course of the deliberations of the Working Group, the Hong Kong Laboratory Technicians' Association also forwarded its suggestions regarding the conditions of service and manning scale of Laboratory Technicians in aided schools for the consideration of the Working Group and requested amendments and additions to be made to the Code of Aid. A copy of its submission is at Appendix V. Careful considerations were given to each point raised. However, since the revision of the Code of Aid fell outside the terms of reference of the Working Group, all recommendations with the exception of that on a proposed manning scale of Laboratory Technicians, were referred to the Working Party on the Revision of the Code of Aid after comments have been added on by the Working Group. As to the suggested manning scale of one Laboratory Technician for 8 classes having science lessons for

Form 1 to 5 with each class of Form 6 and above with science lessons counted as one and a half class, the Working Group considered that it would be unreasonable to base a manning scale of Laboratory Technicians without making reference to the number of laboratories in and the kind of science syllabuses adopted by a school. Moreover, there was no reference made as to the number of science subjects taught in a class. The suggested manning scale of one Laboratory Technician for 8 classes having science lessons therefore appeared unsound to the Working Group.

3.10 After considerable deliberations, the Working Group was of the opinion that any revision to the manning scale of Laboratory Technician serving in schools should bear reference to the syllabuses adopted by the school, the number of operating classes, the number of laboratory periods involved and the number of laboratories in a school.

It can be noted

## IV. Recommendations

4.1 It can be noted from the table following para. 2.3 that there were 108 practical periods per week for a school with the original standard class structure and traditional syllabus. A standard school building would have four laboratories and under the existing manning scale of one Laboratory Technician for every two laboratories, two Laboratory Technicians would be provided. Consequently, it could be assumed that when the existing manning scale was first established, each Laboratory Technician had to take 54 practical periods per week. The Working Party considered that it would not be unreasonable to base the new manning scale on the assumption that each Laboratory Technician could take the same workload i.e. 54 practical periods per week. As a result of the increase in the number of practical periods due to the introduction of floating classes and the adoption of the Junior Secondary Science and the C.D.C. syllabuses, the Working Group opined that the Laboratory Technician establishment should proportionally be increased. The Working Group recognised that more time would be required for the preparation of a laboratory period under the Junior Secondary Science and the C.D.C. syllabuses. However, judging from the surveys on workload performed by Laboratory Technicians working in several schools as detailed in Appendice I and II, it was unanimously agreed by the Working Group that 54 practical periods per week would still be a reasonable factor in formulating a new manning scale of Laboratory Technicians. The new manning scale proposed is as follows :

$$\text{No. of Laboratory Technician} = \frac{\text{No. of practical period per week for the whole school}}{54}$$

4.2 The number of practical periods per week for the whole school should be calculated according to the number of classes at different levels and the syllabuses adopted. The number of practical periods for each class with different syllabuses should be at a fixed scale as stipulated in the table following para. 2.2. The tables below will show that different laboratory periods are involved by the adoption of different syllabuses.

(A) 24 classes with a 4-4-4-4-4-2-2 structure

| No. of Classes | Level | Practical Periods Involved | | | |
|---|---|---|---|---|---|
| | | Traditional Syl. F1-3 Traditional Syl. F4-5 | Traditional Syl. F1-3 C.D.C. Syl. F4-5 | Jun. Sec. Sci. Syl. F1-3 Traditional Syl. F4-5 | Jun. Sec. Sci. Syl. F1-3 C.D.C. Syl. F4-5 |
| 4 | F.1 | 8 | 8 | 16 | 16 |
| 4 | F.2 | 8 | 8 | 16 | 16 |
| 4 | F.3 | 24 | 24 | 16 | 16 |
| 2 | F.4 Arts | 4 | 6 | 4 | 6 |
| 2 | F.4 Sci. | 12 | 18 | 12 | 18 |
| 2 | F.5 Arts | 4 | 6 | 4 | 6 |
| 2 | F.5 | 12 | 18 | 12 | 18 |
| 1 | F.6 Arts | 0 | 0 | 0 | 0 |
| 1 | F.6 Sci. | 18 | 18 | 18 | 18 |
| 1 | F.7 Arts | 0 | 0 | 0 | 0 |
| 1 | F.7 Sci. | 18 | 18 | 18 | 18 |
| 24 | | 108 | 124 | 116 | 132 |

(B) 29 classes with a 5-5-5-5-5-2-2 structure

| No. of classes | Level | Practical Periods Involved | | | |
|---|---|---|---|---|---|
| | | Traditional Syl.F1-3 Traditional Syl. F4-5 | Traditional Syl. F1-3 C.D.C. Syl. F4-5 | Jun.Sec.Sci. Syl. F1-3 Traditional Syl. F4-5 | Jun.Sec. Sci. Syl. F1-3 C.D.C. Syl.F4-5 |
| 5 | F.1 | 10 | 10 | 20 | 20 |
| 5 | F.2 | 10 | 10 | 20 | 20 |
| 5 | F.3 | 30 | 30 | 20 | 20 |
| 2 | F.4 Arts | 4 | 6 | 4 | 6 |
| 3 | F.4 Sci. | 18 | 27 | 18 | 27 |
| 2 | F.5 Arts | 4 | 6 | 4 | 6 |
| 3 | F.5 Sci. | 18 | 27 | 18 | 27 |
| 1 | F.6 Arts | 0 | 0 | 0 | 0 |
| 1 | F.6 Sci. | 18 | 18 | 18 | 18 |
| 1 | F.7 Arts | 0 | 0 | 0 | 0 |
| 1 | F.7 Sci. | 18 | 18 | 18 | 18 |
| 29 | | 130 | 152 | 140 | 162 |

(C) 30 classes with a 6-6-6-4-4-2-2 structure

| No. of classes | Level | Practical Periods Involved | | | |
|---|---|---|---|---|---|
| | | Traditional Syl. F1-3 Traditional F.4-5 | Traditional Syl. F1-3 C.D.C. Syl. F4-5 | Jun.Sec.Sci. Syl. F1-3 Traditional Syl. F4-5 | Jun.Sec.Sci. Syl.F1-3 C.D.C. F4-5 |
| 6 | F.1 | 12 | 12 | 24 | 24 |
| 6 | F.2 | 12 | 12 | 24 | 24 |
| 6 | F.3 | 36 | 36 | 24 | 24 |
| 2 | F.4 Arts | 4 | 6 | 4 | 6 |
| 2 | F.4 Sci. | 12 | 18 | 12 | 18 |
| 2 | F.5 Arts | 4 | 6 | 4 | 6 |
| 2 | F.5 Sci. | 12 | 18 | 12 | 18 |
| 1 | F.6 Arts | 0 | 0 | 0 | 0 |
| 1 | F.6 Sci. | 18 | 18 | 18 | 18 |
| 1 | F.7 Arts | 0 | 0 | 0 | 0 |
| 1 | F.7 Sci. | 18 | 18 | 18 | 18 |
| 30 | | 123 | 144 | 140 | 156 |

In applying

4.3 [redacted] the proposed manning scale, any decimal figure arrived at below one Laboratory Technician should be rounded up to one while any decimal figure above one will only be rounded up to the next whole number if the decimal reaches 0.5 or above.

4.4 The Working Group noted that in some assisted private schools which were being changed to become subsidized, the number of laboratories in the school might not be as many as that of a standard-plan subsidized secondary school. In view of that, the Working Group recommended that when the proposed manning scale was applied, the number of Laboratory Technicians provided for a school should not in any event be greater than the number of laboratories in that school.

4.5 The proposed manning scale was based on the actual need of a school. It was noted that while some schools might gain an additional Laboratory Technician, the government might save over the expenditure spent on Laboratory Technicians in respect of new aided schools in their early years of development. For an aided school with four laboratories, the school could, under existing practice, employ at once two Laboratory Technicians to staff its four laboratories. However, under the proposed manning scale, only one Laboratory Technician should be employed since its total number of laboratory periods per week does not warrant the appointment of two Laboratory Technicians.

4.6 Under existing practice, there might not be any increase in the number of Laboratory Technician in a school's later years of development since all Laboratory Technician posts might have been filled in its first year of operation. While workload increases in a school's later years of development, the number of Laboratory Technicians remains unchanged. This might affect the morale of the serving Laboratory Technicians who fail to realise that they have in fact been under-utilised in the first place and think that there should be more Laboratory Technicians as workload increases. With the proposed manning scale, this unsatisfactory situation could be avoided. Laboratory Technicians would not be under-utilised as might have been in the past.

Co-ordinator between the laboratories and assume direct reponsibility for stores and equipment.

4.7 Regarding promotion prospect for Laboratory Technician II, the Working Group considered that it would be fair for the ratio between Laboratory Technician I and Laboratory Technician II to be 1:2 provided that a Laboratory Technician I post would only be created for a school with five or more laboratories. The Laboratory Technician I created would serve as a [redacted] and equipment. At the same time, he would be expected to supervise the work of the Laboratory Technician II in the same school. The Working Group noted that under the existing Code of Aid, a Laboratory Technician I post would be created for a school with 5 or more laboratories whereas in the government sector, it would only be created for a school with more than 5 laboratories. It was recommended that the counting of demonstration rooms as laboratories should remain the same as hitherto i.e. where a school operated Sixth Form science classes and had one or more demonstration rooms, one demonstration room only shall count as a laboratory for the purpose of calculating the total number of laboratories in a school. The Working Group also recommended that before promotion to Laboratory Technician I, a Laboratory Technician should have acquire at least five years of satisfactory service as a Laboratory Technician II.

4.8 As to Senior Laboratory Technician posts in schools, the Working Group had reservations on the functional needs for such to be created and recommended that any Senior Laboratory Technician posts in schools should be considered individually according to functional justifications.

4.9 In order that an estimate could be made on the financial involvement if the proposed manning scale of Laboratory Technicians were to be introduced in September 1980, information on the number of operating classes, syllabuses adopted and number of laboratories and Laboratory Technicians in respect of all government and aided secondary schools was studied and, it was estimated that with the increase of Laboratory Technician posts, an increase in annual expenditure of $0.3 million for government and $2.3 million for aided schools would be involved. In addition, another $0.7 million was needed for the increase of Laboratory Technician posts in the Caput schools if they were to become fully subsidised by September 1980.

4.10 Due to high utilization rate of laboratories in schools, the Working Group thought it appropriate that the working hours of a Laboratory Technician in a school should be left to the discretion of the Principal since it might not be feasible to ask a Laboratory Technician to work the normal office hours of 9 a.m. to 5 p.m. in view of the fact that there might be a practical lesson in the first period of the day requiring the service of a Laboratory Technician before 9 a.m. in the morning.

The role of a Laboratory Technician

4.11 [redacted]hnician is considered to be distinctly different from that of a teacher in that he is only required to give assistance to a teacher during a practical period and the Working Group considered that it would be unwise to treat him as a member of the teaching staff especially in respect of one serving in an aided school where the [redacted] involved. On the issue of leave taking in respect of Laboratory Technicians working in schools, the Working Group recommended that they be asked to take their vacation leaves in turns during major school holidays. Under the proposed manning scale, it was anticipated that there would not be any difficulty in releasing Laboratory Technicians to take their vacation leaves provided that they take them in turn during major school holidays.

entitlement of school holidays and Provident Fund are involoved.

4.12 In a standard government or aided secondary school which used to operate 24 classes, four laboratories are normally provided. The introduction of floating classes and the adoption of the Junior Secondary Science and the C.D.C. syllabuses have all combined to set a greater demand on the use of laboratories. It can be seen from tables in paras. 2.3 & 2.4 that the total number of practical periods involved for 30 classes and 29 classes schools are 156 and 162 respectively. It is obvious that the four laboratories in a school could not cater for all these practical periods.

4.13 Schools usually have their periods set in groups of 3 and 2 in the mornings and groups of 3 in the afternoons. The total number of periods for a week is 40. Theoretically speaking, the maximum number of practical [redacted] 34. The theoretical maximum [redacted] rate is thus 85%. An explanation is at Appendix VI. However, it was noted that time must be allowed for cleaning, collecting apparatus and materials of a preceeding practical session and setting to get ready for the next one. Furthermore, experience with compiling time table in schools has revealed difficulties of utilizing the laboratories to their maximum. Therefore, the theoretical maximum utilization rate of 85% can rarely be achieved. I[redacted] considered more reasonable to set the maximum [redacted] of a laboratory at around 80%, i.e. 32 periods per week.

periods that can be taken in a laboratory is 34.
utilization rate is thus 85%.

It was considered more reasonable to set the maximum utilization rate of a laboratory at round 80%, i.e. 32 periods per week.

(i.e. five laboratories for a 29 or 30 classes secondary school).

4.14 In order to cater for the extra number of practical periods created as a result of additional classes and change of science syllabuses, the Working Group considered that it would be ideal for the existing standard school building to have an additional laboratory (i.e. five laboratories for a [redacted] classes secondary school). While it was hoped that schools in the new projects could have 5 laboratories, it was noted with regret that it would be physically quite impossible for most of the existing schools to give up two classrooms so that they might be converted into a laboratory.

4.15 Though the structure and manning scale of Laboratory Technicians serving in Technical Institutes, Colleges of Education, Special Education Centres, Audio-Visual Education Centre and other divisions of the Education Department did not fall within the terms of reference of the Working Group, it was g nerally felt that any request for additional posts or upgrading of posts in those areas should be considered as an individual case and justified on functional grounds. It was recognised that the nature of work and responsibilities borne by Laboratory Technicians serving in those areas were quite different from their counterparts working in schools.

## V. Conclusion

5.1 It is undeniable that the workload of Laboratory Technicians in schools has increased with the introduction of floating classes and the adoption of the new science syllabuses which are more practical biased. As a result, it is recommended that the manning scale of Laboratory Technician should be revised.

5.2 The recommended manning scale was based on two factors. First, it was the actual number of practical periods involved for the whole school in accordance with the number of classes operated and science syllabuses adopted and second, the assumption that a Laboratory Technician should be able to cater for 54 practical periods per week regardless of the syllabus change. The proposed manning scale is as follows :

$$\text{No. of Lab. Tech. } * = \frac{\text{No. of Practical Periods for the whole school}}{54}$$

* (i) Any decimal below one should be rounded up to one. Any decimal above one will only be round up to the next whole number if the decimal reaches 0.5 or above.

(ii) The number of Laboratory Technicians to be provided for a school should not in any event be greater than the number of laboratories in that school.

5.3 In order that there could be a standard scale for working out the number of practical periods for the whole school, the number of practical periods for each class with different syllabuses adopted should be in accordance with the following table :

| Class Level | No. of Practical Periods per week with traditional syllabus | No. of Practical Periods per week with Jun. Sec. Sci. and C.D.C. syllabuses |
|---|---|---|
| F.1 | 2 | 4 |
| F.2 | 2 | 4 |
| F.3 | 6 | 4 |
| F.4 Arts (with 1 science subject) | 2 | 3 |
| F.4 Sci.(with 3 science subjects) | 6 | 9 |
| F.5 Arts(with 1 science subject) | 2 | 3 |
| F.5 Sci.(with 3 science subjects) | 6 | 9 |
| F.6 Arts | 0 | 0 |
| F.6 Science | 18 | 18 |
| F.7 Arts | 0 | 0 |
| F.7 Science | 18 | 18 |

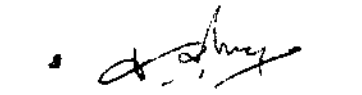
5.4 The Working Group recommended that the ratio between Laboratory Technician I and Laboratory Technician II be 1:2 provided that Laboratory Technician I posts would only be created for schools with five or more laboratories. Where a school operated Sixth Form science classes and had one or more demonstration rooms, one demonstration room only shall count as a laboratory for the purpose of calculating the total number of laboratories in a school. It was also recommended that before promotion to Laboratory Technician I, a Laboratory Technician should have acquired at least five years of satisfactory service as a Laboratory Technician II.

5.5 The maximum utilization of a laboratory should be set at 80%. For government and aided schools which are to be designed for the operation of 29 classes, it was recommended that five laboratories should be included in the building plan. For operating schools with a shortage of laboratories, favourable consideration should be given to the conversion of other teaching spaces into an additional laboratory if found feasible.

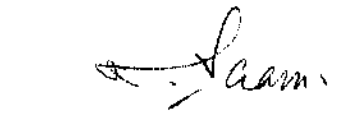
5.6 The role of a Laboratory Technician is distinctly different from that of a teacher. Therefore, Laboratory Technicians should not be regarded as members of the teaching staff. As a result, they do not enjoy long school holidays. However, they should be encouraged to take their vacation leaves in turn during major school holidays when the school is not in operation.

5.7 Additional or upgrading of Laboratory Technician posts other than those on the schools' establishment should be considered on their own merits and be justified on functional grounds. As for schools, the Working Group recommended that the proposed manning scale be applicable with effect from the 1980-81 academic year.

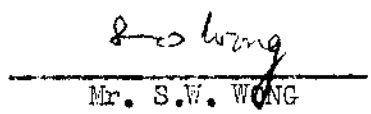
Mr. T.L. LAM — Chairman



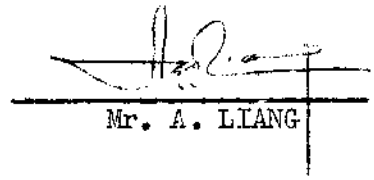
Mr. D. LEUNG — Member



Mr. J. TAAM — Member



Mr. S.W. WONG — Member



Mr. A. LIANG — Secretary

22nd May, 1979

# Report on Workload Survey of a Laboratory Technician over a period of one week

School : Belilios Public School

Laboratories : Physics Laboratory and
General Science Laboratory

| | | |
|---|---|---|
| Syllabuses adopted : | F1 - 2 | Junior Secondary Science |
| | F3 - 5 | Traditional |
| | F6 - 7 | HKU Advanced Level |

Comments by inspectors : The workload of the Laboratory Technicians was found heavy but manageable. However, at present, there are only two science streams in F4-5 and only one stream at the Matriculation level and it is expected that the Laboratory Technicians will have to work overtime to maintain the same quality of work if more science streams appear and the teacher assessment scheme in Advanced Level Chemistry is introduced.

Date : 22.2.79 (Day 5)

| Lab. Period | Time | Activities |
|---|---|---|
| | 7:55 - 8.35 | Preparation of hydrogen gas for pupils' experiments.<br>Filling hydrogen gas into 60 test-tubes.<br>Preparing wooden splints, PH papers, lime water, HCL and Zn for experiments. |
| 1. 2P(Sci)/5B(Phy) | 8:35 - 8:55 | Prep. of expt. for F.3p re uses of hydrometers. Different kinds of solutions were required. |
| | 8:55 - 9:10 | Setting up apparatus for demonstration (F.5B) on electrostatics. Gold leaf electro-scopes, glass and elbonite rods, silk and fur pads, electrophorous were examined and assembled. The Van de Graaff generator was also examined before use. |
| 2. 2P(Sci)/5B(Phy) | 9:10 - 9:40 | Assembling and soldering materials for upper six experiments. |
| 3. 2S(Sci) | 9:40 - 9:50 | Telephone call from supplier re purchase of Daniell Cells. |
| | 9:50 - 10:00 | Continue to prepare upper six experiments. |
| | 10:00 - 10:10 | Clear the materials for F.3p and F.5B experiments. |
| 4. 2S(Sci) | 10:10 - 10:40 | Preparing 60 test-tubes of H2 and refilling lime-water for F.2S pupils' experiments. |
| | 10:40 - 11:00 | Call from General Office re supply of digital meter.<br>Contact supplier by phone to enquire the date of delivery. |
| Recess | 11:00 - 11:30 | Complete clearance of materials for previous experiments and putting these items back to their proper storage space. |
| 5. 1K(Sci)/4B(Phy) | 11:30 - 11:40 | Preparing set-up for F.4B experiments on optics and pressure. Plane mirrors, optical pins, plasticine, cardboard, ice, weights and wires were provided to each group. |
| | 11:40 - 12:15 | Preparing and setting up apparatus for experiment on diffusion. The materials and apparatus required were : powder, oil, copper sulphate, crystals and microscopes. |
| 6. 1K(Sci)/4B(Phy) | 12:15 - 1:00 | Assembling materials for upper six experiments. |
| | 1:00 - 2:00 | Lunch |
| 7. 1P(Sci) | 2:00 - 2:25 | Adjusting the microscopes so that Brownian motion of smoke particles can be seen. |
| 8. 1P(Sci) | 2:25 - 3:30 | Preparing upper six experiments. |

Date : 23.2.79 (Day 6)

| Lab. Period | Time | Activities |
|---|---|---|
| 1. 2K(Sci)/U6S(Phy) | 8:05 - 8:15 | Solder thermistor to appropriate position for experiment |
| 2. 2K(Sci)/U6S(Phy) | 8:15 - 8:40 | Prepare 60 test-tubes of hydrogen for F.2K experiment |
| 3. 2G(Sci)/U6S(Phy) | 8:40 - 10:00 | Assist the teacher in supervising U6S experiments |
| 4. 2G(Sci)/U6S(Phy) | 10:00 - 10:25 | Prepare another 60 test-tubes of hydrogen for F.2G experiment |
| 5. 1G(Sci)/3S(Phy) | 10:25 - 11:30 | Give support to U6S experiments, physical presence in the laboratory is required |
| 6. 1G(Sci)/3S(Phy) | 11:30 - 12:00 | Preparing materials for experiment on Brownian motion for F.1G |
| 7. 1H(Sci)/3G(Phy) | 12:00 - 1:05 | Put the materials for U6S experiments back to their normal place |
| 8. 1H(Sci)/3G(Phy) | 1:05 - 2:00 | LUNCH |
| | 2:00 - 2:30 | Preparing material for experiment on Brownian motion for F.1H. Adjusting microscopes |
| | 2:30 - 2:50 | Lavatory |
| | 2:50 - 3:05 | Ordering large tubings, lead shorts etc. by phone |
| | 3:05 - 3:35 | Repairing galvanometer, removing shunts from new galvanometers |
| | 3:35 - 3:55 | Discuss L6S experiments with Mrs. Lin (the Physics teacher) |
| | 3:30 - 4:15 | Clear all the items involved in previous experiments in the laboratories and setting the apparatus required for upper six experiments in different 'stations' |
| | 4:15 | Purchasing thermistors from Po Lin Radio Company after office hour |

Date : 26.2.79 (Day 1)

| Lab. Period | Time | Activities |
|---|---|---|
| | 8:00 - 8:20 | Preparing set-up for F.1S experiment. Title of the experiment is : 'Diffusion and Brownian movement'. |
| 1. 1S(Sci) | 8:20 - 9:00 | Buying beans for F.1S and F.1P experiments. |
| 2. 1S(Sci) | 9:00 - 9:40 | Cutting glass tubings for resonance tubes, wetting up sonometers and electric motor for vibrating string experiment (F.5 experiments). |
| 3. 1P(Sci)/5P(Phy) | 9:40 - 11:10 | Preparing materials for lower experiments. |
| 4. 1P(Sci)/5P(Phy) | 11:10 - 11:30 | Clearing of the materials for previous experiments (F.5P, F.1S, F.1P) |
| 5. ) | 11:30 - 12:00 | Repairing keys and resistance boxes for lower six experiments. |
| 6. ) Speech Day | 12:00 - 1:00 | Solder crocodile clips to wires for lower six experiments. |
| ) (No School) | 1:00 - 2:00 | LUNCH |
| 7. ) | 2:00 - 3:45 | Clear the materials for F.1B experiment. Putting these apparatus into appropriate shelves. Sorting the beans according to their sizes assembling the materials and set up apparatus for lower six experiments in the Physics Laboratory. |
| 8. ) | | |

Date : 27.2.79 (Day 2)

| Lab. Period | Time | Activities |
|---|---|---|
| | 8:00 - 8:25 | Prepare and fill 60 test-tubes of hydrogen; also prepare wooden splints, zinc, magnesium, sodium and potassium for F.2B class experiment |
| 1. 2B(Sci)/L6S(Phy) | 8:25 - 8:55 | Setting up discharge tubes of hydrogen, mercury and sodium for lower six experiment |
| 2. 2B(Sci)/L6S(Phy) | 8:55 - 9:30 | Prepare and fill 60 test-tubes of hydrogen; also prepare the same materials used by F2B for F2P |
| | 9:30 - 9:50 | Preparing materials for experiment on refraction of light (F 4B)<br>Materials required: drawing papers, glass blocks, prism, pins |
| 3. 2P(Sci) | 9:50 - 10:15 | Discussion with the people in the office re close of the financial year, invoices and money to be spent |
| | 10:15 - 10:30 | Checking of items not yet delivered |
| 4. 2P(Sci) | 10:30 - 10:45 | Telephone to Central Scientific Co. for immediate delivery of goods to school |
| | 10:45 - 11:10 | Remove the apparatus in the Physics Laboratory |
| 5. 1K(Sci)/4B(Phy) | 11:30 - 11:45 | Placing gas jars, beakers, test-tubes, rubber and beans on pupils' benches for experiment on diffusion |
| 6. 1K(Sci)/4B(Phy) | 11:45 - 12:15 | Sorting the beans mixed according to their sizes |
| | 12:15 - 12:35 | Discussion with office staff regarding refund of petty cash spent on purchasing consumables for the laboratory |
| | 12:35 - 12:45 | Telephone home to ask the bank account number and treasury number so that refund of petty cash can be paid to bank |
| | 12:45 - 1:00 | Entering ledger on goods previously bought |
| | 1:00 - 2:00 | LUNCH |
| 7. | 2:00 - 2:15 | Clear and reshelf the materials for F.4B class experiment |
| | 2:15 - 2:30 | Receive and examine the apparatus from Central Scientific company |
| | 2:30 - 2:40 | Entering ledger on goods delivered |
| 8. | 2:40 - 2:50 | Sending invoice to office |
| | 2:50 - 3:30 | Preparing materials for electronics club workshop (held after school hour) |
| | 3:30 - 5:05 | Supervising the production of dot display units by electronics club |

Date : 28.2.79 (Day 3)

| Lab. Period | Time | Activities |
|---|---|---|
| | 8:00 - 8:30 | Assembling materials for pupils' experiment (F.2H) on 'Test and preparation of hydrogen' |
| 1. 2H (Sci) | 8:30 - 8:50 | Charging battery for lower six practical work on Day 4 |
| | 8:50 - 9:15 | Preparing set up for lower six experiment |
| 2. 2H (Sci)<br>3. 2K (Sci)<br>4. 2K (Sci) | 9:15 - 9:45 | Assembling materials for pupils' experiment (F.2K) on 'Test and preparation of hydrogen' |
| | 9:45 - 11:10 | Soldering of wires for lower six experiments and testing some meters |
| | 11:10 - 11:30 | Clear the materials for F.2H & F.2K experiments |
| 5. 1G (Sci)<br>6. 1G (Sci) | 11:30 - 12:50 | Place 12 x 2 sets of lower form six experimental set-ups into drawers and cabinets |
| | 12:50 - 2:00 | Lunch |
| 7. 2S(Sci)/4P(Phy) | 2:00 - 2:20 | Assembling plane mirrors, glass blocks, prisms and pins for experiment on reflection and refraction |
| 8. 2S(Sci)/4P(Phy) | 2:20 - 3:55 | Repairing D.C. power supply |

# Report on Workload Survey of a Laboratory Technician over a period of one week

School : Belilios Public School

Laboratories : Biology Laboratory and Chemistry Laboratory

Syllabus adopted : F.1-2 Junior Secondary Science

F.3-5 Traditional

F.6-7 H.K.U. Advanced Level

Comments by inspectors :

The workload of the Laboratory Technicians was found heavy but manageable. However, at present, there are only two science streams in F.4-5 and only one stream at the Matriculation level and it is expected that the Laboratory Technicians will have to work overtime to maintain the same quality of work if more science streams appear and the teacher assessment scheme in Advanced Level Chemistry is introduced.

Date : 22.2.79 (Day 5)

| Period | Time | Activities |
|---|---|---|
| | 7.50 - 8.20 | Preparation of Biology experiment:<br>(i) Experiment to show heat is given out by germinating seed.<br>(ii) Anaerobic respiration.<br>(iii) Fermentation of yeast.<br>(iv) carbon dioxide is given out by germinating seed.<br>(v) carbon dioxide is given out by living plant. |
| | 8.20 - 8.50 | Preparation of electrolysis of conc. NaCi, dilute NaCl and Copper Sulphate, using carbon, platinum and copper plates as electrodes. |
| 1<br>3P(Chem)<br>L6S(Bio) | 8.50 - 9.25 | Preparation of indicators, litmus, methyl orange and phenopthalein for the use of experiment on porperties of dilute acid. |
| 2<br>3P(Chem)<br>L6S(Bio) | 9.25 - 10.00 | Continue preparation of Biology experiment on seed germination. |
| 3<br>5B(Chem)<br>4H(Bio) | 10.00 - 10.35 | Preparation of titration experiment: Analysis of Aspirin tablets.<br>This is one of the teacher assessment scheme experiment which involves the preparation of standard alkali and acid and other test reagents. |
| 4<br>5B(Chem)<br>4H(Bio) | 10.35 - 11.10 | Same as above |
| Recess | 11.10 - 11.30 | |
| 5<br>3G(Chem)<br>U6S(Bio) | 11.30 - 12.10 | Trial test of experiment on analysis of Aspirin tablets. |

| Period | Time | Activities |
|---|---|---|
| 6<br>3G(Chem)<br>U6S(Bio) | 12.10 - 12.50 | Preparation of glassware: cutting glass rod, preparing flame test rods, etc. |
| Lunch | 12.50 - 2.10 | |
| 7<br>5P(Chem)<br>4P(Bio) | 2.10 - 2.50 | To set up the auxanometer. |
| 8<br>5P(Chem)<br>4P(Bio) | 2.50 - 3.30 | To assist students to perform the qualitative test on auxanometer. |
| After school | 3.30 - 4.15 | Calculation of Aspirin analysis and supply solution data.<br>telephone order of ignition tube, living cockroach.<br>To set up an experiment on germination of broad beam seedling in beakers so that to obtain straight radicle for growth experiment.<br>Return the unused chemicals to the bottle and proper cupboards. |

Date : 23.2.79 (Day 6)

| Lab. Period | Time | Activities |
|---|---|---|
| 1. 2K(Sci)/U6S(Phy) | 8:05 - 8:15 | Solder thermistor to appropriate position for experiment |
| 2. 2K(Sci)/U6S(Phy) | 8:15 - 8:40 | Prepare 60 test-tubes of hydrogen for F.2K experiment |
| 3. 2G(Sci)/U6S(Phy) | 8:40 - 10:00 | Assist the teacher in supervising U6S experiments |
| 4. 2G(Sci)/U6S(Phy) | 10:00 - 10:25 | Prepare another 60 test-tubes of hydrogen for F.2G experiment |
| 5. 1G(Sci)/3S(Phy) | 10:25 - 11:30 | Give support to U6S experiments, physical presence in the laboratory is required |
| 6. 1G(Sci)/3S(Phy) | 11:30 - 12:00 | Preparing materials for experiment on Brownian motion for F.1G |
| 7. 1H(Sci)/3G(Phy) | 12:00 - 1:05 | Put the materials for U6S experiments back to their normal place |
| 8. 1H(Sci)/3G(Phy) | 1:05 - 2:00 | LUNCH |
| | 2:00 - 2:30 | Preparing material for experiment on Brownian motion for F.1H. Adjusting microscopes |
| | 2:30 - 2:50 | Lavatory |
| | 2:50 - 3:05 | Ordering large tubings, lead shorts etc. by phone |
| | 3:05 - 3:35 | Repairing galvanometer, removing shunts from new galvanometers |
| | 3:35 - 3:55 | Discuss L6S experiments with Mrs. Lin (the Physics teacher) |
| | 3:30 - 4:15 | Clear all the items involved in previous experiments in the laboratories and setting the apparatus required for upper six experiments in different 'stations' |
| | 4:15 | Purchasing thermistors from Po Lin Radio Company after office hour |

| Period | Time | Activities |
|---|---|---|
| Lunch | 12.50 - 2.10 | |
| 7<br>U6S(Chem)<br>4B(Bio) | 2.10 - 2.50 | Preparation of Chemicals : Filling up of chemical reagent bottles on student benches. |
| 8<br>U6S(Chem)<br>4B(Bio) | 2.50 - 3.30 | Set up the soil analysis experiment. |
| After School | 3.50 - 4.15 | Preparation of Biology Physiology experiment : To determine the enzyme reaction of detergent on photographic film in various pH solutions. |

Date : 26.2.79 (Day 1)

| Period | Time | Activities |
|---|---|---|
| | 7.50 - 8.20 | Setting up of Biology experiment: Determination of enzyme activity of household detergent in various pH medium.<br>Set up the PA system in Biology Lab. |
| 1<br>U6S(Bio) | 8.20 - 9.25 | Preparation of ammonia gas for demonstrating fountain experiment and various chemical tests. |
| 2<br>U6S(Bio) | 9.25 - 10.00 | Preparation of apparatus for the experiment to prepare amonia water. |
| 3<br>4B(Chem)<br>U6S(Bio) | 10.00 - 10.35 | Preparation of experiment: Effect of composition on the boiling point of a mixture of liquids. |
| 4<br>4B(Chem)<br>U6S(Bio) | 10.35 - 11.10 | Discussion with teacher to plan route for the field trip to Lamma island on the project 'Pollution on various areas of Hong Kong'.<br>Telephone enquiries to the suppliers about the delivery of apparatus and Biology specimens. |
| School Annual Speech Day (No school) | 11.10 - 1.00 | Preparation of Biology experiments :<br>(i) To compare the drainage and retentivity of three different soil materials.<br>(ii) To compare the capillary action of three different soil materials.<br>(iii) To analyse a soil sample by sedomentation.<br>(iv) To demonstrate the flocculation of clay soil.<br>(v) To determine the air content of a soil sample. |
| Lunch | 1.00 - 2.00 | |
| | 2.00 - 4.00 | Remove the set up on experiment on respiration: the mercury column has to be washed and treated with acid in order to remove the dirt and neutralize the alkaline. |

Date : 27.2.79 (Day 2)

| Period | Time | Activities |
|---|---|---|
| | 7.50 – 8.20 | Setting up of experiment: Effect of composition of the boiling point of a mixture of liquids.<br>Setting up the skeleton of rabbit. |
| 1<br>U6S(Chem)<br>5H(Bio) | 8.20 – 9.10 | Assist the students in working with the experiment of boiling point of mixtures. |
| 2<br>U6S(Chem)<br>5H(Bio) | 9.10 – 9.50 | Fill in sample tubes for qualitative analysis for F6 experiment. |
| 3<br>U6S(Chem)<br>3P(Bio) | 9.50 – 10.30 | Setting up of a demonstration on the germinating stages of seedlings.<br>Continue to assist the students in the experiment.<br>Telephone enquiry about the supply of cockroaches. |
| 4<br>U6S(Chem)<br>3P(BIO) | 10.30 – 11.10 | Continue to assist the students in the experiment. |
| Recess | 11.10 – 11.30 | |
| 5<br>L6S(Chem)<br>4S(Bio) | 11.30 – 12.10 | Setting up the Biology experiment on soil:<br>(i) To compare the drainage and retentivity of three different soil materials.<br>(ii) To compare the capillary action of three different soil materials.<br>(iii) To analyse a soil sample by sedementation.<br>(iv) To demonstrate the flocculation of clay soil.<br>(v) To determine the air content of a soil sample. |
| 6<br>L6S(Chem)<br>4S(Bio) | 12.10 – 12.50 | Setting up experiment on qualitative analysis: Preparation of alkali solutions to react on metallic ions and oxides. |

| Period | Time | Activities |
|---|---|---|
| Lunch | 12.50 - 2.10 | |
| 7<br>3K(Chem)<br>L6S(Bio) | 2.10 - 2.50 | Prepare solution for experiment of alkali on metallic ion and oxide. |
| 8<br>3K(Chem)<br>L6S(Bio) | 2.50 - 3.30 | Setting up apparatus for the experiment: properties of dilute acid.<br>Mount the mouth part of cockroach for demonstration, including preparation of mountant and dissolving tissue chemical. |
| After school | 3.30 - 4.30 | As the L6S student cannot finish on time, continue to stay and assist them in mounting the cockroach mouth part slide. |

Date : 28.2.79 (Day 3)

| Period | Time | Activities |
|---|---|---|
| | 7.50 - 8.20 | Setting up experiment: Reaction of alkali on metallic ions and oxides. |
| 1<br>5B(Chem)<br>B6S(BIO) | 8.20 - 9.10 | Arrange slides for microscopic drawing.<br>Prepare experiment on properties of soil. |
| 2<br>5B(Chem)<br>L6S(Bio) | 9.10 - 9.50 | Prepare stock solution of common bench solution:<br>NaOH, $NH_4OH$, lime water, dilute sulphuric acid, dilute hydrochloric acid, dilute nitric acid. |
| 3<br>L6S(Bio) | 9.50 - 10.30 | Continue above preparation. |
| 4<br>L6S(Bio) | 10.30 - 11.10 | Prepare chemical samples for qualitative analysis experiment on unknown samples. |
| Recess | 11.10 - 11.30 | |
| 5<br>3H(Chem) | 11.30 - 12.10 | Setting apparatus for the experiment :<br>(i) To show water contains dissolved gas.<br>(ii) To show oxygen is required for burning.<br>(iii) To show the conditions required for rusting.<br>Refill the bench solutions. |
| 6<br>3H(Chem) | 12.10 - 12.50 | Repair broken glass apparatus.<br>Repair the table lamp.<br>Rearrange the slides and insert them into proper places. |
| Lunch | 12.50 - 2.10 | |
| 7<br>3B(Chem) | 2.10 - 2.50 | Setting up Biology demonstration Seed dispersal |
| 8 3B(Chem) | 2.50 - 3.30 | Preparation of experiment: Action of heat and alkaline on ammonium salt. |
| After school | 3.30 - 4.00 | To remove the sepcimens from the demonstrating bench and return them to proper cupboards. |

# Report on Workload Survey of a Laboratory Technician over a period of one week

School : Bishop Hall Jubilee School

Laboratories : Physics Laboratory
Biology Laboratory

Syllabuses adopted : F1-3 Junior Secondary Science
F4-5 C.D.C.
F6-7 HKU Advanced Level

Comments by inspectors :

The Laboratory Technicians were fully occupied in their work. The syllabuses adopted (F1-3 Junior Secondary Science, F4-5 C.D.C. syllabus) are experiment-oriented and frequent use of laboratories are expected. The two Laboratory Technicians were found fully engaged in assembling materials for experiments, removing apparatus from the laboratories and replacing new sets of experimental set-ups for classes to follow. They rarely had time to assist the teachers in supervising the pupils even when potentially dangerous experiments were performed.

It is recommended that one Laboratory Technician should be added to a school adopting the Junior Secondary Science and C.D.C. syllabuses in view of the following :

(a) The physical presence of the laboratory technicians in the laboratory is essential when potentially dangerous experiments are performed. With the present laboratory staff strength, this is not feasible.

(b) Laboratory technicians can seldom find time to try out experiments first before the pupils perform them. Consequently, time is wasted and some experiments fail, thus seriously hampering the practical approach to science education.

(c) Laboratory technicians have to supervise and sometimes work together with the laboratory attendants in the removal and despatch of apparatus. This is inevitable in schools of which the laboratory schedule is heavily loaded.

(d) If laboratory technicians had not been fully occupied, they could have contributed a great deal in going with the teacher round the class in the laboratory guiding the pupils in proper techniques of setting up and proper use of equipment. Moreover, the expensive equipment could have been properly maintained.

To sum up, a school with its curricular adoption and class structure similar to those of Bishop Hall Jubilee School is in need of an additional Laboratory Technician if

(a) Safety in pupils' practicals is seriously considered;

(b) the quality of science education is to be maintained.

Date : 26.2.79

| Period | Time | Activities |
|---|---|---|
| | 8.15a.m. | Setting up overhead projector and screen for L6S in the Phy. Lab. on 1st floor. |
| | 8.25 | Arranging a class expt. on folliation for F.5 in the Bio. Lab. on 2nd floor; despatching apparatus and flowers to 42 students. |
| 1st<br>8.30 - 9.10<br>5A (Bio.) | 8.30 | (School Starts) |
| | 8.40 | Arranging and preparing apparatus for 2nd period expts on 'Internal resistance of cell, Ohm's Law and Relation between length/cross-sectional area and resistance of wire. |
| | 9.00 | Testing accumulators before being used (20) |
| 2nd<br>9.10 - 9.50 | 9.10 | Charging up the accumulators (4) |
| | 9.15 | Laying out the prepared apparatus in Phy. Lab. for the students. |
| 4C (Phy. Lab.)<br>5A (Bio. Lab.) | 9.20 | Back to the preparation room to continue performing charge-up of the accumulators. |
| | 9.25 | Assisting Phy. teacher to try out an expt. on 'Effect of temp. on resistance of wire' to be done by students in the afternoon. |
| | 9.40 | Assembling Daniell cells (4)<br>Preparing solution of zinc sulphate and copper sulphate, scratching zinc rods and copper cans with sand paper. |
| 3rd<br>9.50 - 10.30 | 10.00 | Testing the voltage of Daniell cells assembled. |
| | 10.05 | Assisting the students to set up the apparatus laid on benches in Phy. Lab. (42 students in the class) |
| 4C (Phy. Lab.)<br>5B (Bio. Lab.) | 10.25 | Getting an ammeter for the teacher |
| | 10.30 | (Recess) |
| | 10.35 | Assembling and preparing specimen for U.6 (58 specimens) to be identified by students in the afternoon |
| 4th<br>10.45 - 11.25 | 10.45 | Removing the overhead projector and screen from U6 Sci. Lab. to Phy. Lab. |
| | 11.00 | Getting a resistance box for the teacher |
| 4D (Phy. Lab.)<br>5B (Bio. Lab.) | 11.05 | Back to preparation room to assemble and prepare the U6 specimens |

| Period | Time | Activities |
|---|---|---|
| 5th<br>11.25 - 12.00<br>4D (Phy. Lab.)<br>5C (Bio. Lab.) | 11.40 | Trying out an expt. on transistor characteristics for demonstration the next day |
| 6th<br>12.00 - 12.35 | 12.00 | Removing apparatus from the phy. lab. to the preparation room and restoring them to their proper places after expts. by F.4C |
| 5C (Bio. Lab.) | 12.15p.m. | Winding 6 coils of copper wire for phy. expt. in the afternoon |
| | 12.35 | (LUNCH) |
| | 1.30 | Laying out the prepared specimens in U6 Sc. Lab. and setting up dissection apparatus to students (30) |
| 7th<br>1.45 - 2.25<br>4B (Phy. Lab.)<br>5D (Bio. Lab.) | 1.45 | Preparing and laying out phy. apparatus in phy. lab. for 3 expts :<br>i) Effect of temp on resistance<br>ii) Ohm's Law<br>iii) Resistance connections |
| | 2.15 | Assisting students to set up apparatus for the expt. above in the phy. lab. |
| 8th<br>2.25 - 3.05 | 2.30 | Going up Bio. lab. to check the P.T.C. papers prepared the day before. |
| | 2.40 | Back to phy. lab. to assist the students with their expts. |
| 4B (Phy. Lab.)<br>5D (Bio. Lab.) | 2.50 | Trying out the expt. on transistor characteristics again in the preparation room. Setting up the wiring and components of the circuit so as to facilitate the teacher demonstration the next day. |
| | 3.05 | Removing apparatus from the phy. lab. to the preparation room and restoring them to their proper places. |
| 9th<br>3.05 - 3.45 | 3.20 | Checking the transistor characteristics circuit board and relabelling it |
| | 3.45 | School ends |

Date : 27.2.79

| Period | Time | Activities |
|---|---|---|
| | 8.10 | Checking instructions given by teachers to ensure apparatus and materials had been packed and prepared for the expts. for the day. |
| | 8.25 | Setting up overhead projector and screen in phy. lab. |
| 1st<br>8.30 - 9.10 | 8.30 | ( School starts )<br>Continuing charge-up of accumulators. |
| | 8.35 | Going up the bio. lab. on 2nd floor to prepare P.T.C. papers. |
| | 8.45 | Preparing 2½ lit. sodium bicarbonate solution for expt. on photosynthesis the next day. |
| | 9.10 | Preparing 2½ lit. conc. potassium hydroxide solution. |
| 2nd<br>9.10 - 9.50<br>5C (Phy. Lab.) | 9.15 | Removing overhead projector and screen from phy. lab. to the preparation room after lesson. |
| | 9.20 | Moving oscilloscope, signal generator and other equipment to the phy. lab. for teacher demonstration on transistor characteristics.<br>Assisting teacher to connect the circuit for the above purpose. |
| | 9.45 | Back to the preparation room to continue preparing the potassium hydroxide solution. |
| 3rd<br>9.50 - 10.30 | 9.55 | Up the roof top to collect green plant for destarching. |
| 5C (Phy. Lab.) | 10.00 | Making a black cover for the green plant to destarch it; one for each leaf of the plant (20 covers). |
| 4th<br>10.45 - 11.25 | 10.45 | Getting slide projector and screen from 2nd floor. |
| 5th<br>11.25 - 12.00<br>5D (Phy. Lab.)<br>U6 (U6 Sc. Lab.) | 10.55 | Setting up slide projector and screen in the U6 Sc. Lab. |
| | 11.10 | Preparing and packing phy. apparatus and materials for L6 for the afternoon (15 different expts. and about 10 items of equipment for each expt.) |

| Period | Time | Activities |
|---|---|---|
| 6th<br>12.00 - 12.35 | 12.05p.m. | Up the bio. lab. to prepare slides of spirogyra for F.3 students this afternoon and to check the microscope (15 microscopes). |
| 5D (Phy. Lab.)<br>U6 (U6 Sc. Lab.) | 12.35 | ( LUNCH ) |
| 7th<br>1.45 - 2.25<br>L6S(Phy. Lab.) | 1.45 | Setting up equipments in phy. lab. |
| | 2.00 | Up the bio. lab. to assist F.3 students setting and adjusting the focus of the microscopes (42 students). |
| | 2.15 | Back to phy. lab. to assist students with their practical (L6). 30 students in the class. |
| 8th<br>2.25 - 3.05<br>L6S(Phy. Lab.)<br>3A (Bio. Lab.) | 3.00 | Preparing slides and specimens for L6 bio. practical the next morning. |
| 9th<br>3.05 - 3.45<br>L6S(Phy. Lab.)<br>3A (Bio. Lab.) | 3.35 | Back to the phy. lab. to see if students need any help. |
| | 3.45 | ( School ends ) |
| | 3.50 | Removing the phy. apparatus to the preparation room and restoring them to their proper places after expts. |
| | 4.10 | Up the bio. lab. to remove the equipments back to the preparation room after expt. |

Date : 28.2.79

| Period | Time | Activities |
|---|---|---|
| | 8:20 | Laying out slides and specimens and microscopes (15 microscopes and 58 specimens) on benches in U6 Sc. lab. for their practical. |
| 1st<br>8:30 - 9:10<br>L6 (U6 Sc. Lab.) | 8:30 | (School Starts) |
| | 8:40 | Restoring balances to their proper places after being used. |
| | 8:45 | Preparing expts. on photosynthesis under different conditions: in the absence of sunlight, carbon dioxide under high temp. and in artificial light. |
| | 9:00 | Getting slide projector from 2nd floor. |
| | 9:10 | Packing and preparing apparatus on light for F.3 expts. for eight groups of students. (6 items of apparatus for each group) |
| 2nd<br>9:10 - 9:50<br>L6 (U6 Sc. Lab.)<br>3B (Bio. Lab.)<br>3D (Phy. Lab.) | 9:15 | Laying out slides and microscope on benches for F.3B bio. expts.<br>Placing the slides on stages of microscopes and forcussing for them. |
| | 9:35 | Preparing slides and dissection apparatus for U6 bio. expts. this afternoon.<br>The labelling of each slide had to be covered up for students to identify (20 such slides) |
| 3rd<br>9:50 - 10:30<br>L6 (U6 Sc. lab.)<br>3B (Bio. Lab.)<br>3D (Phy. Lab.) | 10:00 | Up the bio. lab. to instruct F.3B students how to use the microscope. |
| | 10:10 | Back to the preparation room to continue covering the labels of the slides up. |
| | 10:30 | (Recess)<br>Removing microscopes, slides and specimens from U6 Sc. lab. to the preparation room and restoring them to their proper places. |
| 4th<br>10:45 - 11:25<br>3C (Bio. Lab.)<br>3S (Phy. Lab.) | 10:40 | Putting slides back to the bio. lab. on 2nd floor. |
| | 10:45 | Back to the preparation room to cover up the labels of slides. |

| Period | Time | Activities |
|---|---|---|
| 5th<br>11:25 - 12:00<br>3C (Bio. Lab.)<br>3S (Phy. Lab.) | 10:55 | Laying out slides and microscopes on benches for F.3C in bio. lab.<br>Instructing students how to use the microscopes during their practical. |
| | 11:15 | Preparing pectoral girdle of rabbit by assembling pieces of bones together to be identified by students. |
| | 11:40 | Dissecting an ox eye for students to identity. |
| | 12:05 | Removing slides and microscopes from bio. lab. after expt. by F.3C |
| | | ( LUNCH ) |
| 6th<br>1:15 - 1:55<br>U6 (U6 Sc. Lab.)<br>4B (Bio. Lab.) | 1:15 | Laying out dissection apparatus, and dispatching earthworms and microscopes to U.6.<br>Laying slides and specimens on benches. |
| | 1:30 | Going out to collect alocacia leaves for expts. on photosynthesis (10 min. walk from school). |
| | 1:45 | Preparing and packing apparatus and materials for expts. on light by F.4 in the 8th periods (8 groups of students, 6 items of apparatus per group). |
| 7th<br>1:55 - 2:35<br>U6 (U6 Sc. Lab.)<br>4B (Bio. Lab.)<br>3A (Phy. Lab.) | 2:00 | Laying out the prepared apparatus on benches in phy. lab. for F.3A. |
| | 2:10 | Up the roof top to collect broad bean leaves for expts. on photosynthesis for the next morning. (F.4E) |
| | 2:15 | Making black covers for the broad bean leaves (20). |
| 8th<br>2:35 - 3:15<br>U6 (U6 Sc. Lab.)<br>3A (Phy. Lab.) | 3:00 | Removing phy. apparatus after expts. by F.3A and restoring them to their proper places. |
| | 3:15 | (School ends) |

Date : 1.3.79

| Period | Time | Activities |
|---|---|---|
| | 8:15 | Exposing the green plant to sunlight for photosynthesis expt.<br>Inserting leaves into a conical flask filled with potassium hydroxide soln. to investigate photosynthesis in absence of carbon dioxide. |
| 1st<br>8:30 - 9:10 | 8:30 | ( School starts )<br>Setting the overhead projector and screen in phy. lab. |
| | 8:40 | Going out to collect fresh aleacia leaves (10 min. walk from School) |
| | 9:10 | Grinding the collected leaves with sand in a mortar to extract sugar from the leaves. |
| 2nd<br>9:10 - 9:50<br>4A (Bio. Lab.) | 9:25 | Putting the ground material in the centrifuge to separate the sugar solution extracted. |
| | 9:40 | Laying out the equipment and materials for photosynthesis expts. for F.4A (10 items for each group; 8 groups in the class) |
| | 9:50 | Packing and preparing equipments and materials for **U6 phy. practical this afternoon. (16 different expts. about** 10 items for each expt.) |
| 3rd<br>9:50 - 10:30<br>4A (Bio. Lab.) | 9:55 | Setting up slide projector in phy. lab. and removing overhead projector from phy. lab. to preparation room. |
| | 10:00 | Back to preparation room to prepare the U6 phy. equipments. |
| | 10:25 | Up the bio. lab. to remove the equipment and materials after expt. to the preparation room. |
| | 10:30 | (Recess) |
| | 10:35 | Packing and preparing F.3 expts. on light. 8 groups for the class and each group required 8 items of equipment. |
| 4th<br>10:45 - 11:25<br>3C (Phy. Lab.)<br>4C (Bio. Lab.) | 10:45 | Up the bio. lab. to prepare equipment and materials for F.4C bio. practical on photosynthesis in the 4th period. The materials and equipment had to be laid on benches. |
| | 11:05 | Back to preparation room to prepare and pack equipment for U6 phy. practical. |

| Period | Time | Activities |
|---|---|---|
| 5th<br>11:25 - 12:00<br>3C (Phy. Lab.)<br>4C (Bio. Lab.) | 11:30 | Connecting a piece of wire to each crocodile clip (20 crocodile clips)<br>Soldering required. |
| | 12:00 | Up the bio. lab. to remove and restore equipments after expt. by F.4C. |
| | 12:05 | ( LUNCH ) |
| | 1:15 | ( Afternoon lessons started ) |
| 6th<br>1:15 - 1:55<br>3B (Phy. Lab.)<br>4D (Bio. Lab.)<br>U6 (U6 Sc. Lab.) | 1:25 | Preparing and assembling spectrometer, sodium lamp, prism and other relevant equipment for F.3 phy. demonstration in phy. lab. Also preparing equipment for group expt. on critical angle and refractive index of liquid. (8 groups for the class, 5 items of equipment for each group) |
| | 1:35 | Up the bio. lab. to prepare equipment and materials for F.4D expts. on photosynthesis under different conditions.<br>Laying out the equipment/materials on benches. |
| | 1:50 | Back to phy. lab. to assist teachers to carry out demonstration on the spectrometer. |
| 7th<br>1:55 - 2:35<br>3B (Phy. Lab.)<br>4D (Bio. Lab.)<br>U6 (U6 Sc. Lab.) | 2:00 | To the U6 Sc. lab. assisting students with their expts. in setting up apparatus. |
| | 2:35 | Removing the spectrometer, sodium lamp and prism and other equipment from the phy. lab. to the prep. room and restoring them to their proper places. |
| 8th<br>2:35 - 3:15<br>U6 (U6 Sc. Lab.) | 2:40 | Up the bio. lab. to remove equipment after expts. by F.4D to the preparation room. |
| | 2:55 | Back to U6 Sc. lab. assisting students with their expts. |
| | 3:15 | ( School end ) |
| | | Removing U6 phy. equipments to the preparation room and restoring them to their proper places. |

Date : 2.3.79

| Period | Time | Activities |
|---|---|---|
| | 8:15 | Setting up equipments (oscilloscope, signal generator, transistor circuit board and others) in the phy. lab. for demonstration on transistor characteristics. |
| | 8:25 | Looking for an unoccupied classroom for U6 to watch a TV program on electricity. |
| 1st<br>8:30 - 9:10<br>4B (Phy. Lab.) | 8:35 | Filling up 16 accumulators with distilled water. |
| | 8:55 | Charging up the accumulators (8 at a time). |
| 2nd<br>9:10 - 9:50<br>3D (Phy. Lab.)<br>3D (Bio. Lab.) | 9:15 | Up the bio. lab. to prepare 16 slides of spirogyra and microscopes for F.3D.<br>Instructing students how to use the microscopes. |
| | 9:45 | Winding up copper wires to make 8 solenoids (20 turns of wire for each solenoid). |
| 3rd<br>9:50 - 10:30<br>3B (Phy. Lab.)<br>3D (Bio. Lab.) | 10:15 | Up the bio. lab. to remove slides and microscopes back to preparation room after expt. by F.3D. |
| | 10:30 | ( Recess )<br>Removing oscilloscope, signal generator, transistor circuit board and others back to preparation room after demonstration. |
| 4th<br>10:45 - 11:25 | | ( Assembly ) |
| | 11:00 | Up the bio. lab. to prepare slides of spirogyra and microscopes for F.3S. |
| | 11:15 | Setting up overhead projector and screen in the phy. lab. |
| 5th<br>11:25 - 12:00<br>3S (Bio. Lab.) | 11:30 | Preparing the Falling plate apparatus to determine the frequency of a tuning fork.<br>Covering the plate with soot and sticking a piece of copper wire to the tuning forks. |
| | 11:55 | Up the bio. lab. to supervise the F.3S expts. |

| Period | Time | Activities |
|---|---|---|
| 6th<br>12:00 - 12:35<br>3S (Bio. Lab.) | 12:10 | Cleaning the lenses of 30 microscopes (3 objectives and 3 eye-pieces for each microscope). |
| | 12:25 | Removing slides/microscopes from bio. lab. to the preparation room after expt. by F.3S. |
| | 12:35 | Removing overhead projector back to preparation room after lesson. |
| | | ( LUNCH ) |
| | 1:30 | Preparing L6 expt. on dissection of cockroaches (14 groups, each group required 10 items of equipment). |
| 7th<br>1:45 - 2:25<br>L6S (Bio. Lab.) | 1:55 | Setting up oscilloscope, signal generator, transistor and other equipments in the phy. lab. for demonstration on transistor characteristics. |
| | 2:10 | Back to preparation room to clean the lenses of the microscopes (Only 2 had been cleaned in the morning). |
| 8th<br>2:25 - 3:05<br>L6S (Bio. Lab.) | 3:00 | Up the bio. lab. on 2nd floor to assist L6 students with their dissection. |
| 9th<br>3:05 - 3:45<br>L6S (Bio. Lab.) | 3:10 | Removing the oscilloscope, signal generator and others to the preparation room after demonstration. |
| | 3:15 | Cleaning the lenses of the microscopes again. |
| | 3:45 | School ended. |

## Report on Workload Survey of a Laboratory Technician over a period of one week

School : Bishop Hall Jubilee School

Laboratories : Chemistry Laboratory and General Science Laboratory

Syllabuses adopted : F.1-3 Junior Secondary Science
F.4-5 C.D.C.
F.6-7 HKU Advanced Level

### Comments by the Inspectors

The Laboratory Technicians were fully occupied in their work. The syllabuses adopted (F.1-3 Junior Secondary Science, F.4-5 C.D.C. syllabus) are experiment-oriented and frequent use of laboratories are expected. The two Laboratory Technicians were found fully engaged in assembling materilas for experiments, removing apparatus from the laboratories and replacing new sets of experimental set-ups for classes to follow. They rarely had time to assist the teachers in supervising the pupils even when potentially dangerous experiments were performed.

It is recommended that one Laboratory Technician should be added to a school adopting the Junior Secondary Science and C.D.C. syllabuses in view of the following :

(a) The physical presence of the laboratory technicians in the laboratory is essential when potentially dangerous experiments are performed. With the present laboratory staff strength, this is not feasible.

(b) Laboratory technicians can seldom find time to try out experiments first before the pupils perform them. Consequently, time is wasted and some experiments fail, thus seriously hampering the practical approach to science education.

(c) Laboratory technicians have to supervise and sometimes work together with the laboratory attendants in the removal and despatch of apparatus. This is inevitable in schools of which the laboratory schedule is heavily loaded.

(d) If laboratory technicians had not been fully occupied, they could have contributed a great deal in going with the teacher round the class in the laboratory guiding the pupils in proper techniques of setting up and proper use of equipment. Moreover, the expensive equipment could have been properly maintained.

To sum up, a school with its curricular adoption and class structure similar to those of Bishop Hall Jubilee School is in need of an additional Laboratory Technician if

(a) Safety in pupils' practicals is seriously considered;

(b) the quality of science education is to be maintained.

Date : 26.2.1979

| Period | Time | Activities |
|---|---|---|
| | 8.00 - 8.30 | Set up Junior Science Practical for F.2A (Convection in metals) |
| 1<br>2A(JS) | 8.30 - 9.10 | Set up Chemistry Practical for F.2A (Convection in liquid and air) |
| 2<br>2A(JS)<br>3D(Chem) | 9.10 - 9.50 | Prepare methyl orange solution<br>Prepare reagents for L.6 Chemistry Practical on Thursday (Properties of carbonyl compounds)<br>Prepare dropping pipettes |
| 3<br>LA(JS)<br>3D(Chem) | 9.50 - 10.30 | Prepare reagents for L.6 Chemistry Practical on Thursday |
| Recess | 10.30 - 10.45 | Set up Chemistry Practical for F.3S |
| 4<br>2B(JS)<br>3S(Chem)<br>U6(Chem) | 10.45 - 11.25 | Prepare 2-4 Dinitrophenylhydrazine solution<br>Prepare carbonic acid<br>Prepare Fehling's solution |
| 5<br>2B(JS)<br>3S(Chem)<br>U6(Chem) | 11.25 - 12.00 | Prepare reagents for F.4D Chemistry Practical on Tuesday |
| 6<br>1C(JS) | 12.00 - 12.35 | Tidy up 3S Practical in Chemistry Laboratory<br>Set up L6 Chemistry Practical |
| Lunch | 12.35 - 1.45 | |
| 7<br>2C(JS)<br>L6(Chem) | 1.45 - 2.25 | Prepare carbonic acid<br>Prepare dilute sulphuric acid |

| Period | Time | Activities |
|---|---|---|
| 8<br>2C(JS)<br>L6(Chem) | 2.25 - 3.05 | Prepare dilute hydrochloric acid<br>Prepare sodium hydroxide solution<br>Prepare dilute acetic acid |
| 9<br>2S(JS)<br>L6(Chem) | 3.05 - 3.45 | Bend glass tubes<br>Compile purchase log record |
| | 3.45 - 5.00 | Tidy up L6 Practical in Chemistry Laboratory<br>Tidy up 2S Practical in General Science Laboratory |

Date : 27.2.1979

| Period | Time | Activities |
|---|---|---|
| | 8.00 - 8.30 | Set up Junior Science Practical for F.1D (Energy) |
| 1<br>1D(JS) | 8.30 - 9.10 | Set up Chemistry Practical for F.4D (Heat of neutralization)<br>Prepare 2M hydrochloric acid |
| 2<br>1D(JS)<br>4C(Chem) | 9.10 - 9.50 | Prepare reagents for U6 Chemistry Practical in the afternoon |
| 3<br>4C(Chem) | 9.50 - 10.30 | Prepare reagents for U6 Chemistry Practical in the afternoon<br>Prepare agar |
| Recess | 10.30 - 10.45 | Set up Chemistry Practical for F4B (Heat of neutralization) |
| Assembly | 10.45 - 11.15 | Prepare 2% bromine water<br>Prepare reagents for F5 Chemistry Practical on Wednesday |
| 4<br>1E(JS)<br>4B(Chem) | 11.15 - 11.55 | Prepare reagents for U6 Chemistry Practical in the afternoon |
| 5<br>1E(JS)<br>4B(Chem) | 11.55 - 12.35 | Set up U6 Chemistry Practical |
| Lunch | 12.35 - 1.45 | |
| 6<br>1B(JS)<br>U6(Chem) | 1.45 - 2.25 | Prepare standard solutions of dilute acid and alkali<br>Set up F4D Chemistry Practical |

| Period | Time | Acitivities |
|---|---|---|
| 7<br>1A(JS)<br>4D(Chem)<br>U6(Chem) | 2.25 - 3.05 | Demonstrate use of Colorimeter in U6 Laboratory<br>Repair Colorimeter |
| 8<br>1A(JS)<br>4D(Chem)<br>U6(Chem) | 3.05 - 3.45 | Prepare potassium chromate solution<br>Supervise U6 practical<br>Repair colorimeter again |
| | 3.45 - 5.00 | Tidy up 4D Practical in Chemistry Laboratory<br>Tidy up U6 Practical in U6 Laboratory<br>Tidy up 1A Practical in General Science Laboratory |

Date : 28.2.79

| Period | Time | Activities |
|---|---|---|
| | 8.00 - 8.30 | |
| 1<br>1F(JS) | 8.30 - 9.10 | Prepare reagents for F5D Chemistry Practical<br>Set up F5D Chemistry Practical (Reversible reactions)<br>Set up F2D Junior Science Practical (Voltage) |
| 2<br>2D(JS)<br>5D(Chem) | 9.10 - 9.50 | Prepare silver nitrate solution<br>Prepare sodium hydroxide solution<br>Prepare potassium permanganate solution |
| 3<br>2D(JS)<br>5D(Chem) | 9.50 - 10.30 | Prepare sodium thiosulphate solution<br>Set up F2S Junior Science Practical (Voltage) |
| Recess | 10.30 - 10.45 | Set up F5C Chemistry Practical (Reversible) |
| 4<br>2S(JS)<br>5C(Chem) | 10.45 - 11.25 | Demonstrate use of voltmeter in General Science Laboratory<br>Supervise Junior Science Practical of F2S |
| 5<br>2S(JS)<br>5C(Chem) | 11.25 - 12.05 | Supervise Junior Science Practical of F2S |
| Lunch | 12.05 - 1.15 | Set up F5B Chemistry Practical<br>Set up F1B Junior Science Practical |
| 6<br>1B(JS) | 1.15 - 1.55 | Demonstate use of energy conversion kit in General Science Laboratory |
| 7<br>1B(JS)<br>5B(Chem) | 1.55 - 2.35 | Set up 2 Kipp's apparatus for hydrogen sulphide |

| Period | Time | Activities |
|---|---|---|
| 8<br>9(JS)<br>5B(Chem) | 2.35 - 3.15 | Repair test **tube** stands |
| | 3.15 - 5.00 | Tidy up 5B Practical in Chemistry Laboratory<br>Tidy up 1B Practical in General Science Laboratory |

Date : 1.3.79

| Period | Time | Activities |
|---|---|---|
| | 8.00 - 8.30 | Set up C5 Chemistry Practical (Effect of concentration change on reversible reaction) |
| 1<br>2A(JS) | 8.30 - 9.10 | Set up F2A Junior Science Practical (Radiation and convection) |
| 2<br>2A(JS)<br>C5(Chem) | 9.10 - 9.50 | Prepare standard EDTA solution |
| 3<br>2S(JS)<br>C5(Chem) | 9.50 - 10.30 | Prepare nickel sulphate solution |
| Recess | 10.30 - 10.45 | Set up F3A Chemistry Practical (Reaction on metals) |
| 4<br>2B(JS)<br>3A(Chem) | 10.45 - 11.25 | Set up F3A Chemistry Practical (Reaction on metals) |
| 5<br>2B(JS)<br>3A(Chem) | 11.25 - 12.05 | Prepare 6M sulphuric acid |
| Lunch | 12.05 - 1.15 | Set up L6 Chemistry Practical (Properties of carbonyl compounds) |
| 6<br>L6 (Chem) | 1.15 - 1.55 | Supervise L6 Practical |
| 7<br>2C(JS)<br>L6(Chem) | 1.55 - 2.35 | Prepare ammonium hydroxide solution |
| 8<br>2C(JS)<br>L6(Chem) | 2.35 - 3.15 | Supervise L6 Practical |
| | 3.15 - 5.00 | Tidy up L6 Practical in Chemistry Laboratory<br>Tidy up 2C Practical in General Science Laboratory |

Date : 2.3.79

| Period | Time | Activities |
|---|---|---|
| | 8.00 - 8.30 | |
| 1<br>1E(JS) | 8.30 - 9.10 | Set up F3B Chemistry Practical (Reaction on metals)<br>Set up F1F Junior Science Practical (Variation within a species) |
| 2<br>1F(JS)<br>3B(Chem) | 9.10 -.9.50 | Prepare 2% starch solution |
| 3<br>1F(JS)<br>3B(Chem) | 9.50 - 10.30 | Prepare reagents for U6 Chemistry Practical in the afternoon |
| Recess | 10.30 - 10.45 | |
| Assembly | 10.45 - 11.15 | Set up F3C Chemistry Practical (Reaction on metals) |
| 4<br>2D(JS)<br>3C(Chem) | 11.15 - 11.55 | Set up Junior Science Practical for F2D (Conductors and insulators, Convection of liquid and air) |
| 5<br>2D(JS)<br>3C(Chem) | 11.55 - 12.35 | Prepare potassium chloride solution<br>Prepare ammonium chloride solution<br>Set up Chemistry Practical for C6 |
| Lunch | 12.35 - 1.45 | Set up Chemistry Practical for U6 |
| 6<br>2S(JS)<br>C6(Chem)<br>U6(Chem) | 1.45 - 2.25 | Set up Junior Science Practical for F1C<br>Supervise U6 Practical |

| Period | Time | Activities |
|---|---|---|
| 7<br>1C(JS)<br>C6(Chem)<br>U6(Chem) | 2.25 - 3.05 | Supervise U6 Practical<br>Repair Colorimeter |
| 8<br>1C(JS)<br>C6(Chem)<br>U6(Chem) | 3.05 - 3.45 | Supervise U6 Practical |
| | 3.45 - 5.00 | Tidy up U6 Practical in U6 Laboratory<br>Tidy up C6 Practical in Chemistry Laboratory<br>Tidy Up 1C Practical in General Science Laboratory |

APPENDIX II - (a)

# Report on a daily workload of a Laboratory Technician

School : Sha Tau Kok Government Secondary School

Laboratories : Senior Science Laboratory and Junior Science Laboratory

Syllabuses Adopted : F.1-3 Junior Secondary Science

F.4-5 C.D.C.

Comments by inspector :

The workload of the Laboratory Technician is not very heavy for the small number of classes in the school at present. There is no Laboratory Attendant, hence the Laboratory Technician has to do the part of cleaning and moving equipments in and out of the preparation room.

Moreover, location of the two laboratories causes a lot of tedious work of transferring equipments up and down, since the senior science laboratory is on the second floor and the junior science laboratory on the ground floor.

Date : 3.4.79

| Period | Time | Activities |
|---|---|---|
| | 8.30 | Going out in the rain in the football playground to collect 30 earthworms. |
| | 8.45 | Preparing chlorine gas to make chlorine water (100 c.c.) |
| 1st<br>8.50 - 9.30<br>F.5 (Phy.)<br>(Sen. Sci. Lab.) | 8.50 | School started<br>(F.5 Phy. Test in Sen. Sci. Lab.) |
| | 9.15 | Preparing 13 different kinds of solutions (100 ml. of each) for expt. in the 4th and 5th period. |
| 2nd<br>9.30 - 10.00<br>F.5 (Phy.)<br>(Sen. Sci. Lab.) | 9.45 | Labelling the prepared solutions |
| | 10.10 | Preparing chemicals for students to do expt. on qualitative analysis<br>(8 different kinds of chemicals required) |
| 3rd<br>10.10 - 10.50<br>F.4 (Phy.)<br>(Sen. Sci. Lab.) | 10.25 | Labelling the prepared chemicals. |
| | 10.35 | Washing the earthworms with water to remove the soil and preserving them in formalin solution. |
| Recess<br>10.50 - 11.10 | 10.50 | Bringing 4 trays from the junior science lab. to the senior science lab. |
| 4th<br>11.10 - 11.50<br>F.5 (Chem.)<br>(Sen. Sci. Lab.) | 11.05 | Packing the prepared chemicals and other solutions in trays and putting them on teacher's bench for expt. in 4th and 5th period |
| | 11.15 | Assisting teacher supervising students doing their practical |
| 5th<br>11.50 - 12.25<br>F.5 (Chem.)<br>(Sen. Sci. Lab.) | 11.30 | Preparing bromine water (100 c.c.) |
| | 12.25 | Removing equipment and chemicals back to preparation room. Cleaning up the Lab. benches and washing the glass wares after expt. |

| Period | Time | Activities |
|---|---|---|
| LUNCH<br>12.25 – 1.30 | | |
| | 1.20 | Setting up dissecting apparatus and pigs' hearts in the Lab. for F.4 Bio. expt. |
| 6th<br>1.30 – 2.10<br>F.4 (Bio.)<br>(Sen. Sci. Lab.) | 1.35 | Assisting teachers supervising the students and giving hands to them to dissect the pigs' hearts. (5 groups of students) |
| 7th<br>2.10 – 2.50<br>F.4 (Bio.)<br>(Sen. Sci. Lab.) | 2.15 | Making a phone call to scientific supplies co. to urge them to send in the bills. |
| | 2.20 | Keeping accounts of science materials purchased. |
| | 2.30 | Back to the senior science lab. to supervise the students. |
| 8th<br>2.50 – 3.30<br>3C (Chem.)<br>(Gen. Sci. Lab.)<br>3A (Bio.)<br>(Sen. Sci. Lab.) | 2.50 | Removing equipments/materials back to preparation room after expt. by F.4 |
| | 2.55 | Cleaning up the lab. benches for the next class<br>Preparing skeletons of animals to be shown to students<br>(No chem. practical for 3C) |
| | 3.30 | School ended |
| | 3.35 | Removing skeletons of animals and storing them in their proper shelves or cupboards |

APPENDIX II - (b)

# Report on a daily workload of Laboratory Technicians

School : Queen's College

Laboratories : Senior Biology Laboratory and Junior Biology Laboratory
Senior Chemistry Laboratory and Demonstration Room
Senior Physics Laboratory and Demonstration Room

Syllabuses adopted :

| | |
|---|---|
| F1-2 | Junior Secondary Science |
| F3-5 | Traditional |
| F6-7 | HKU Advanced Level |

Comments by inspectors : The day on which the survey took place was the day before the Easter holidays. Consequently, preparation for the following days' practical work was not required. Form 7 has gone and students of Form 5 were having their revision.

Date : 10.4.79

| Time | Class | Activities |
|---|---|---|
| 8.30 - 9.00 | | Prepare apparatus and material for F.3 experiments |
| 9.00 - 9.40 | F. 6 U(Bio.) | Receiving apparatus returned by Form 6 upper students. |
| 9.40 - 10.20 | F. 6U/F. 3N (Bio) | Selection and distribution of slides for Form 3 experiment, and |
| 10.20 - 11.00 | F. 6U/F. 3N (Bio) | preparation of wax pans |
| 11.00 - 11.55 | F. 6U Sci/F. 3S (Bio) | Sorting and placing of slides back after experiments |
| 11.55 - 12.35 | F. 6U Sci/F. 3S (Bio) | Preparing solutionas and refilling of reagent bottles |
| | LUNCH BREAK | |
| 1.50 - 2.30 | F. 3E (Bio) | Preserving dogfish and earthworms |
| 2.30 - 3.10 | F. 3E (Bio) | Quarterly stock checking |
| 3.10 - 3.50 | | Quarterly stock checking |
| 3.50 - 5.00 | | Arrangement of specimens which had been misplaced in the shelves |

Remarks: According to the Laboratory Technician, the work performed on this day is not representative of his daily routine work because upper six students are already in their pre-examination holiday and it is also the last day before a rather long Easter vacation.

Date : 10.4.79

| Classes in Laboratory/Demonstration Room | | Time | Activities |
|---|---|---|---|
| 9.00 - 9.40 | 6UE | 9.00 - 10.00 | Prepare reagents for student benches. |
| 9.40 - 10.20 | 6UE | 10.00 - 10.20 | Checking burettes |
| 10.20 - 11.00 | 6UE | 10.30 - 11.00 | Preparation for 6LS Chemistry Practical - Lassaigne Test. |
| RECESS | | 11.00 - 11.15 | Set up 6LS Chemistry Practical |
| 11.15 - 11.55 | 6LS, 4E | 11.15 - 12.35 | Repair electrolytic cells<br>Checking pipettes<br>Checking mirrors and lens |
| 11.55 - 12.35 | 6LS, 4E | | |
| LUNCH BREAK | | | |
| 1.50 - 2.30 | 6UM | 1.55 - 2.30 | Preparation of quarterly return on purchase of equipment |
| 2.30 - 3.10 | 6UM | 2.30 - 3.00 | Checking Stock List of Government Stores for reordering of Chemicals |
| 3.10 - 3.50 | 6UM | 3.00 - 3.30 | Construction and Checking of Home-made pipette filler. |
| | | 3.50 - 5.00 | Purchase razor blade and drawing paper for Advanced Level Practical Examination |

Date : 10.4.1979

| Classes in Laboratory/Demonstration Room | | Time | Activities |
|---|---|---|---|
| | | 8.50 - 9.00 | Instruct laboratory attendant to prepare practical work for 1A and 1C. |
| 9.00 - 9.40 | 6 LM, 1A | 9.00 - 10.00 | Helping teacher in supervising 6 LM physics practical work |
| 9.40 - 10.20 | 6 LM, 1A | | |
| | | 10.00 - 10.20 | Preparation for Advanced Level Physics Practical Examination |
| 10.20 - 11.00 | 1A | 10.20 - 10.30 | Setting 6 LM practical work |
| RECESS | | 10.30 - 11.15 | Helping teacher in setting up ripple tank for demonstration in lecture room |
| 11.15 - 11.55 | 6 LE, 4S | 11.15 - 11.55 | Measuring thickness of mirror with micrometer screw gauge |
| 11.55 - 12.35 | 6 LE, 4S | 11.55 - 12.05 | Consultation with science teacher re science practical work to be performed after the Easter holidays |
| | | 12.05 - 12.35 | Measuring and calculating radius of curvature of convex lens |
| LUNCH BREAK | | | |
| 1.50 - 2.30 | 6 LS, 1C | 1.50 - 2.30 | Helping teacher in supervising 6LS Physics practical work |
| 2.30 - 3.10 | 6 LS, 1C | 2.30 - 3.10 | Measuring and calculating radius of curvature of convex lens |
| 3.10 - 3.50 | 1C | 3.10 - 3.50 | Cleaning and labelling of lenses.<br>Consultation with Senior Laboratory Assistant re purchase of material for Advanced Level Physics Practical Examination. |
| | | 3.50 - 5.00 | Preparation for Advanced Level Physics Practical Examination |

APPENDIX II - (c)

## Report on a daily workload of Laboratory Technicians

Schoo : Yuen Long Public Middle School

Laboratories : (i) Physics/Biology Laboratory and Chemistry/ Integrated Science Laboratory

(ii) Integrated Science Laboratory

| | | |
|---|---|---|
| Syllabus Adopted : | F/M 1-2 | Junior Secondary Science |
| | F/M 3-5 | Traditional |
| | M6 | Chinese U. Matriculation |

Comments by inspectors :

The workload of the Laboratory Technician taking charge of the Physics/Biology Laboratory and the Chemistry/Integrated Science Laboratory in the main building was rather heavy since he had to look after two senior science laboratories. However, Form/ Middle 5 and Middle 6 students were just doing revision work getting ready to sit for public examinations. If not, the workload of the Laboratory Technician would be even much heavier.

The other Laboratory Technician who was in charge of just on Integrated Science Laboratory in the annex had a rather light workload. He was also assisted by a Laboratory Attendant in cleaning and transferring the apparatus.

Date : 2.4.79

Laboratories in the main building

| Period | Time | Activities |
|---|---|---|
| 1<br>M4(Bio) | 8.55 - 9.35 | Preparation and setting up apparatus to show :<br>i. Section pressure due to transpiration<br>ii. root pressure<br>iii. the transportation of water from the stem through xylem using methylene blue as the stain for this experiment |
| 2<br>M4(Bio) | 9.35 - 10.15 | |
| Recess | 10.15 - 10.30 | |
| 3<br>MA(Chem)<br>3B(Bio) | 10.30 - 11.10 | Preparation of chemical reagents for chemistry experiment.<br>Assist the Biology teacher in class demonstration. |
| 4<br>3A(Chem)<br>3B(Bio) | 11.10 - 11.50 | Preparation of various salt solutions. |
| 5 | 12.30 - 1.35 | |
| Lunch | 12.30 - 1.35 | |
| 6 | 1.40 - 2.20 | Preparation and sorting of glassware. |
| 7<br>F4(Chem) | 2.20 - 3.00 | Set up experiment on properties of alcohol using quickfit apparatus, ethanol, glacial acetic acid and potassium permangente. |
| 8 | 3.00 - 3.40 | Repairing of stolen microscopes returned by the police. |

Date : 2.4.79
The Integrated Science laboratory in the annexe

| Period | Time | Activities |
|---|---|---|
| | 8:50 | Preparing metals and non-metals (totally 10 items) for students to identify |
| 1st<br>8:55 - 9:35 | 8:55 | School Started |
| ID<br>(I.S. Lab.) | 9:00 | Preparing 6 measuring cylinders, sodium chloride and alcohol for expt. in 1st and 2nd period. |
| | 9:10 | Laying out prepared equipments on teacher's bench. |
| | 9:20 | Setting up a demonstration expt. on electrolysis and connecting up the required circuit in the Lab. |
| 2nd<br>9:35 - 10:15 | 9:30 | Assisting teacher supervising the studonts. |
| ID<br>(I.S. Lab.) | 10:15 | After expt. removing the equipments and chemicals back to the preparation room and restoring them to their proper shelves. |
| | 10:20 | Preparing hot water, potassium permanagamate solution for 1A (1 lit. each.) |
| RECESS | 10:30 | Preparing and packing equipments for 8 groups of students |
| 10:15 - 10:30 | 10:45 | Arranging and setting up 8 peices of apparatus on teacher's bench |
| 3rd<br>10:30 - 11:10 | 11:00 | Assisting students setting up the equipment |
| LA<br>(I.S. Lab.) | | |
| 4th<br>11:10 - 11:50 | 11:30 | Rinsing and recovering the mercury after expt. the day before and preparing it ready for the next day. This involved separating the mercury from some liquid and solid mixtures using a separating funnel and filtering paper. This had to be repated four times. |
| 1A<br>(I.S. Lab.) | | |

| Period | Time | Activities |
|---|---|---|
| 5th<br>11:15 - 12:30 | 12:00 | Cutting sodium metal into pellets about 40 of them and storing the piece of metal in paraffin oil for the expt. on reaction of metal with water the next day. |
| | 12:15 | Bringing a round bottomed flask to the teacher in the lab. |
| | | (No practical work for 1C, ETV Watching) |
| LUNCH<br>12:30 - 1:35 | 1:40 | Preparing small pieces or strips of metal, 5 different kinds, by cutting the corresponding metal foil with scissors (40 pieces of each metal required) |
| 6th<br>1:40 - 2:20 | 2:10 | Preparing potassium permanaganate solution and hot water (1 lit each) |
| 1C<br>(I.S. Lab.) | 2:20 | Laying out the equipments and chemicals on teachers' bench ready for the expt. the next period.<br>Making 7 labels for the chemicals |
| 7th<br>2:20 - 3:00 | 2:30 | Preparing expt. on acidity and alkalinity for the next day :-<br>Diluting 3 different kinds of acids (500 c.c. each)<br>500 c.c. of sodium and potassium hydroxide solutions. |
| 1B<br>(I.S. Lab.) | 2:50 | Prparing fresh lime-water, soap solution, a suspension of magnesium oxide (500 cc of each) |
| 8th<br>3:00 - 3:40 | 3:15 | Crushing aspim in powder form and disolving the powder in water. |
| 1B<br>(I.S. Lab.) | 3:25 | Checking stocks and re-enlisting non-inventory items |
| | 3:40 | School ended |
| | 3:45 | Removing the equipments and chemicals back to the preparation room and restoring them to their proper shelves. |

Report on a daily workload of a Laboratory Technician

School : Ho Tung Technical School for Girls

Laboratory : Biology Laboratory

Syllabuses adopted : F1 - 3 Junior Secondary Science

F4 - 5 C.D.C.

Comments by inspector : There are 20 classes at Ho Tung Technical School for Girls out of which 14 are taking either Science (Forms 1-3) or Biology (Forms 4-5). The single laboratory at the school is fully loaded so as to provide as many laboratory periods as possible for the pupils. Despite the fact that the laboratory technician is only in charge of one laboratory, workload is quite heavy. This may be due to the fact that the school has implemented the Junior Secondary Science syllabus and the C.D.C. Biology Syllabus, both of which advocate the experimental approach, providing more individual and small group experiments for pupils. Also contributing to the heavy workload of the laboratory technician at this school is the fact that there is no laboratory attendant. The work of the laboratory attendant, e.g. washing test tubes and glasswares, has also to be performed by the laboratory technician.

Date : 6.4.1979

| Classes in Laboratories | | Time | Activities |
|---|---|---|---|
| | | 8.00 | Turn on gas main |
| 8.45 - 9.25 | 1T | 8.00 - 8.30 | Set up Form 1T practical on emulsion and colloid |
| 9.25 - 10.05 | 1T | 9.00 - 9.30 | Checking Westminster Electromagnetic Kit |
| | | 9.45 - 10.00 | Prepare for Form 1G practical on saturated solution and crystallization |
| 10.05 - 10.45 | 1G | 10.05 - 10.15 | Tidy up Form 1T practical<br>Set up Form 1G practical |
| | | 10.15 - 10.30 | Wast test tubes, beakers, etc. |
| | | 10.30 - 10.45 | Prepare for Form 1S practical on digestion.<br>Set up water bath.<br>Attend to Form 1G practical. |
| RECESS | | 11.05 - 11.15 | Set up Form 1S practical.<br>Tidy up Form 1G practical<br>Wash test tubes, beakers, etc. |
| 11.05 - 11.45 | 1S | | |
| 11.45 - 12.25 | 1S | 11.45 | Repair pestle with adhesive |
| LUNCH BREAK | | 1.20 - 1.40 | Tidy up Form 1S practical<br>Wash test tubes, beakers, etc. |
| 1.40 - 2.20 | 2H | 1.40 - 1.50 | Set up practical for Form 2H on light. |
| 2.20 - 3.00 | 2S | 2.20 - 2.40 | Tidy up Form 2H practical<br>Set up Form 2S practical on sound |
| | | 2.40 | Prepare for practical of Form 1H on growing crystals |
| 3.00 - 3.40 | 1H | 3.00 - 3.10 | Set up practical for 1H on crystals. |
| | | 3.40 | Tidy up Form 1H practical |
| | | 3.45 - 4.00 | Demonstrate use of cathode ray tube, pupils' diode and discharge tube to teacher |
| | | 4.00 - 4.30 | Prepare culture solution on unicellular organisms.<br>Prepare Benedict's Solution. |
| | | 5.00 | Turn off gas mains. |

APPENDIX II - (e)

# Report on a daily workload of a Laboratory Technician

School : F.M.O. Aberdeen Secondary Technical School

Laboratory : General Science Laboratory

Syllabus adopted : F1-3 Junior Secondary Science

Date: 9.4.1979

| Period | Time | Activities |
|---|---|---|
| | 8.30 a.m. | Examine the agar plates and beef extract broth prepared by F.3A students. These have been kept in oven at 37°C since the last practical period. |
| 1 | 8.55 a.m.<br>9.00 a.m.<br><br>9.10 a.m. | Record E.T.V. F.1 CHINESE programme.<br>Go out to buy blood worm for the fish in General Science Laboratory.<br>Prepare the apparatus and materials used by F.1C students to make saturated sugar solution. (Beakers, galss rods, sugar, triple beam balance, etc.) |
| 2 & 3 (1C) | 9.20 a.m.<br><br>9.45 a.m. | Help the teacher to supervise the class.<br><br>Record E.T.V. F.2 CHINESE programme. |
| RECESS | 10.35 a.m. | Record E.T.V. F.3 CHINESE programme. |
| 4 | 10.55 a.m. | Record F.1C experiment on the Students' Practical Record Book.<br>Collect the apparatus and materials used by F.1C students.<br>Set up the apparatus, materials and reagents used by F.3A students in the experiment on "Pullutants in water".<br>(tumeric test paper, 10% ammonia solution, 10 ml. syringe, 500 ml. beakers, stop watch, guppy fish, etc.) |
| 5 & 6 (3A) | 11.20 a.m. | Help the teacher to supervise the class experiments.<br>Students examine the agar plates and beef extract broth which have been kept in oven at 37°C for several days. |
| LUNCH | 12.30 - 1.45 p.m. | |
| 7 | 1.45 p.m.<br><br><br><br>1.55 p.m.<br>2.10 p.m. | Record F.3A experiment on the Students' Practical Record Book.<br>Collect the apparatus and materials used by F.3A students.<br>Clean all the agar plates and beef extract broth with sterilizers.<br>Record E.T.V. F.1 SCIENCE programme<br>Prepare the apparatus and materials used by F.1B students to make saturated sugar solution (beaker, glass rods, sugar triple beam balance, thermometer, etc.) |
| 8 (1B) | 2.20 p.m. | Help the teacher to supervise the class experiments. |
| 9 | 2.55 p.m.<br><br>3.20 p.m. | Record F.1B experiment on the Students' Practical Record Book.<br>Collect and clean all the used apparatus and materials.<br>Record E.T.V. F.2 SCIENCE programme. |
| | 3.30 p.m.<br><br><br><br><br><br><br><br><br>4.10 p.m. | Preparation of some bench reagents :<br>Calcium hydroxide (lime water)<br>Sodium hydroxide solution<br>Dilute hydrochloric acid<br>Dilute sylphuric acid<br>Preparation of hydrochloric acid and sodium hydroxide solution for F.2 experiments on "Neutralisation"<br>Find the volume of acid required to neutralize 10 c.c. of sodium hydroxide solution.<br>Record E.T.V. F.3 SCIENCE programme. |

# Report on a daily workload of a Laboratory Technician

School : Tsuen Wan Government Secondary Technical School

Laboratories : Physics/Biology Laboratory and Chemistry/Integrated Science Laboratory

Syllabuses adopted : F.1-3 Junior Secondary Science

F.4-5 C.D.C.

Comments by inspector :

The workload of the Laboratory Technician for the period under survey is heavy but manageable. Some inconvenience arises due to the geographical location of the two laboratories being far apart from each other, which contributes some difficulties in management for one laboratory technician.

Since the F.5 students are already sitting for their mock certificate examination, the workload of the laboratory technician can be foreseeably more heavy during normal school days.

Date : 10.4.79

| Period | Time | Activities |
|---|---|---|
| 1<br>2D(IS) | 8.40-9.15 | Set up overhead projector and screen.<br>Set up sonometer. (Section 11 Sheet 7)<br>Set up sets of test tubes containing different volumes of water. (Section 11 Sheet 8)<br>Set up 'Bell in vacuum' experiment. (Section 11 sheet 8)<br>Provide solutions that are sweet, sour, salty and bitter. (Section 11 sheet 10) |
| 2<br>2D(IS) | 9.15-9.50 | Assist the teacher in performing the 'Bell in vacuum' experiment.<br>Soldering. (Connecting wires with clips and lampholders for circuit experiments)<br>Arrange oscilloscope experiment to demonstrate waves. |
| 3<br>3D(IS) | 9.50-10.25 | Assist in demonstration of rectified wave by oscilloscope.<br>Return used materials to preparation room. |
| Recess | 10.25-10.45 | Set up PA system for teacher. |
| 4<br>1B(IS) | 10.45-11.20 | Prepare materials for experiments in Section 5 sheet 10.<br>Provide hot water for experiments in sheet 10. |
| 5<br>1B(IS)<br>3A(IS) | 11.20.11.55 | Prepare a list of science apparatus to be purchased for the 3D C syllabus. |
| 6<br>3A(IS) | 11.55-12.30 | Assist practising teacher to set up sample tubes containing different chemical substances. |
| Lunch | 12.30-1.45 | |
| 7<br>1A(IS) | 1.45-2.20 | Prepare glasswares for the experiment on solubilities of various chemical substances.<br>Assist the practising teacher in performing the experiment and provide hot water. |
| 8<br>1A(IS)<br>2A(IS) | 2.20-2.55 | Prepare materials for the experiments on sound and light. (Section 11)<br>Assist the teacher in performing the experiment. |
| 9<br>2A(IS) | 2.55-3.30 | Set up experiments on electroplating for science club activities after school hour. |
| | 3.30-4.00 | Supervise science club activities. |

APPENDIX III

## An Extract of an Article in "Education in Science"

A Recommended Establishment for Science Technicians

One of the tasks of the sub-committee was to devise a simple formula by means of which the number of Science Technicians appropriate to a school could be calculated. After considerable discussion the formula given below has been devised:-

Number of Science Technicians =

$$\frac{\text{Unit Total} + (4 \times \text{Number of Pupils on Roll})}{3000}$$

The numbers in the formula are, of course arbitrary, but it was produced by first postulating model schools of various sizes, and then working out what seemed a fair allocation of assistance to the Science Department. The combination of Unit Total andthe Number of Pupils on the Roll is an attempt at compromise between the needs of the sixth from and those of large numbers of pupils taking science (experimental) courses in the lower age ranges.

The formula was then tested in several schools which were well-known to committee members and for which they felt they knew the 'right' number from other criteria, and it was then tested for all the schools in a large authority. The results gave the committee sufficient confidence to have it tested by a small number of Science Advisers in authorities administering schools in rural, urban and industrial areas. Their reports have been most encouraging. Some schools were easily identified as having assistance considerably at variance from that suggested and closer detailed investigation revealed that it was the formula that gave the fairer allocation.

It is a quick rule of thumb that the formula is particularly useful and, it must be emphasised that the formula makes no provision for the special needs of schools with split sites or other special factors. These would qualify for a higher rating and whether it would be sufficient simply to round up the figure from the formula can only be decided by those who know the schools themselves. It should also be pointed out that the figure is for assistance within the Science Department alone and makes no allowance for other work sometimes expected of the science technician.

The last stage in the committee's work is to have the formula tested by a larger number of Science Advisers in an even more representative sample. In this context the committee would be glad to receive the views of other interested parties on their recommendations.

At the present time the economic situation would appear to militate against the introduction of a recommended formula, but the sub-committee believes that its introduction is essential as a means of accomplishing a degree of parity and of maintaining standards in science education within our schools.

The Unit Total for a school, is calculated from the units allocated to the various age ranges and the number of pupils in each age range and is obtained from Form 7 which is submitted to the Department of Education and Science by each school every year. This total may be calculated from the following information :

| | | |
|---|---|---|
| For each pupil | under 14 years of age | 2 units |
| " " " | aged 14 and under 15 | 3 " |
| " " " " | 15 and under 16 | 4 " |
| " " " " | 16 and under 17 | 6 " |
| " " " " | 17 and over | 8 " |

The ages of the pupils are taken on 31st March of the particular year.

APPENDIX IV - (a)

A Submission from the Association of Laboratory Assistants and Technicians (E.D.) on a proposed manning scale of Laboratory Technicians

23rd February, 1979

Director of Education,
Education Department,
Lee Gardens,
Causeway Bay,
Hong Kong.

Re : Manning Scale of Laboratory Technicians in Education Department

Dear Sir,

With reference to our meeting on 13.2.1979, I enclosed herewith our suggestions on the improvement of manning scale for Laboratory Technicians in Education Department.

I should be grateful if you would forward these suggestions to the Working Party so that a fair justification could be made.

Your attention to this matter is much appreciated.

Yours faithfully,

Sgd.
(L.K. LEUNG)
Chairman.

# Manning scale of Laboratory Technicians in the Education Department

Proposed by the Association of
Laboratory Assistants and Technicians (E.D.)

## I. Secondary Schools

The changes of the science syllabuses in recent years have laid a great emphasis on the practical approach. On the other hand, the introduction of the floating-class system in a school also increases the number of classes in a standard school from 24 classes to 30 classes. These two events have considerably increased the workload of a L.T. who sometimes has to work overtime to cope with the work or has to work in a very hasty manner. Therefore the present manning ratio of 1 L.T. per 2 laboratories needs to be reviewed.

After a careful consideration, we propose that the number of Laboratory Technicians provided in a school should be based on the weighed laboratory periods of that school. The laboratory periods should be weighed because in the higher forms, the laboratory work requires more preparation and supervision than the lower forms; also the integrated science laboratory work is heavier than the conventional science laboratory work. We propose that the conventional laboratory periods of F.1 to F.3 be taken as standard and be multiplied by 1,

| | |
|---|---|
| I.S. | laboratory periods multiply by 1.5 |
| F.4-5 | laboratory periods multiply by 1.5 |
| F.6-7 | laboratory periods multiply by 2.0 |

After sorting out the number of laboratory periods in each category, we multiply them by the respective weights attached and then add the sums together to get the total number of weighed laboratory periods of that school. We feel that for each 70 weighed laboratory periods, one Laboratory Technician is required.

## II. Special Education Centre

At present there are 2 laboratory technicians in this centre giving services to (a) 2 service centres and (b) 18 Kowloon and 8 Hong Kong secondary and primary classes. In view of the great load of work, some of the repair works have got to pass to the G.P.O. Moreover, 2 more mobil service centres will soon be established. Hence in order to maintain reasonable workload in this area, we propose that 1 L.T. is required to man each service centre and 3 additional L.T.s should be designated to give services to the 18 Kowloon and 8 Hongkong classes respectively. This will increase the number of technicians in this centre from 2 to 7.

## III. Visual Aid Centre

In view of the great amount of work, we submit that the present staffing in this centre is not sufficient. We propose that 1 L.T. each should be provided to man the following:

a) Media Production Services Unit,
b) Photographic Unit,
c) Equipment/Film Library, and
d) Graphic Unit.

## IV. Special Remarks

It must be pointed out that laboratory preparations should be done in a steady and cautious manner. In the course of our work, we should always bear the 'Laboratory Safety Rules' in our minds. If the workload is too heavy, we are bound to work fast; and under such circumstance, we might sometimes overlook these safety rules. This will not only be dangerous to us, but will also cause unnecessary damage or breakage of the valuable and delicate apparatus.

A Submission from the Association of Laboratory Assistants and Technicians (E.D.) referring to its previous submission on a proposed manning scale of Laboratory Technicians

12th April, 1979

Director of Education,
Education Department,
Lee Gardens, Causeway Bay,
Hong Kong.

Dear Sir,

Manning Scale of Laboratory Technicians in E.D.

Thank you for your letter ref. ED(GR) 11/2006/75 of 15.3.1979.

From actual experience we have found that the time spent in the preparation and supervision of an Integrated Science or a F.4-5 laboratory period is about one and a half times that of the conventional F.1-3 laboratory period. The time so spent for F.6-7 laboratory period is about twice that of the F.1-3 laboratory period. A laboratory technician has to devote more time to a higher form laboratory period than that of the lower form period because:-

a) the experiments performed in higher forms often demand a higher degree of accuracy than that of the lower forms and hence more preparation work and supervision are needed in the higher forms;

b) for some topics, while demonstration is thought sufficient for lower forms, it is considered insufficient for higher forms. The latter often performs experiements in its place. Therefore it can be seen that a higher form laboratory period also absorbs more time of the laboratory technician in this respect.

A laboratory technician also finds that an Integrated Science laboratory period occupies more of his time than a conventional science laboratory period because the Integrated Science lays greater emphasis on the practical approach and consequently more experiments are performed under the Integrated Science syllabus than the conventional F.1-3 science syllabus.

We have made an examination on the incidents where a laboratory technician is required to cater for the various number of laboratory periods and have come to the conclusion that a laboratory technician can cater for about 70 weighed laboratory periods weekly. Above this "70 weighed laboratory periods", he will not have sufficient time to perform all his normal duties without having either to work too hasty or to work overtime.

Yours sincerely,

Sgd.

(FUNG Kai Kin)
Chairman,
A.L.A.T.

APPENDIX V

A Submission from the Hong Kong Laboratory Technicians' Association on amendments and additions to the Code of Aid in connection with proposed revision on the conditions of service and manning scale of Laboratory Technicians

1st March, 1979.

The Director,
Education Department,
Lee Gardens,
Hysan Avenue,
Hong Kong.

Dear Sir,

Code of Aid for Secondary Schools

We learnt from the Assistant Director Mr. T.L. Lam, that there is a working party reviewing the present Code of Aid for Secondary Schools. The Association finds that the present Code of Aid is out-dated and there are marked differences between conditions of service for teacher and laboratory technicians. The Association thinks that Laboratory Technicians should be more in line with teachers with regard to conditions of service. So we would like to have amendments and additions to be made to the Code of Aid as in our suggestions (please refer to attached copy).

It would be very kind of you to pass our suggestions to the working party for their reference.

Yours sincerely,

Sgd.
(Yeung Chi-hung)
President

Proposed amendments and additions to Code of Aid for secondary schools

1. Paragraph 20 shall apply to laboratory technician.
Salaries of all staff shall normally commence from the date of assumption of full duties, and shall normally cease immediately after the last day of performance of full duties, excepted as provided for at Appendices 5 and 17.

2. Paragraph 22b
On appointment to an aided secondary school, a laboratory technician shall receive incremental credit for full time previous working experience on the basis of one increment for each year of full-time service in a government or aided or government subvented teaching institute or, on and after 1st September, 1975, in a school receiving assistance to teachers and laboratory technicians or classroom aid. Service other than a government or aided school, including a school receiving assistance to teachers and laboratory technicians or classroom aid prior to 1st September, 1975, shall be created on the basis of one increment for two years' full-time service. Service in schools outside Hong Kong shall be assessed for purposes of increment at the discretion of the Director. Only post-qualification experience shall be counted for the purpose of increment. Increment may be awarded for approved training.

3. Paragraph 49(a)
A teacher or laboratory technician shall, on appointment to an aided secondary school, be furnished with a contract of service and, in addition, or alternatively, a letter of appointment. Such contract of service or letter of appointment shall be signed by the supervisor of the school or other member of the management committee authorised to sign on its behalf, and shall be countersigned by the teacher or laboratory technician on appointment.

4. Paragraph 49(c)
(v) whether such teacher or laboratory technician is to contribute a provident fund; and if so, what such contribution shall be;
(vi) the entitlement of such teacher or laboratory technician to paid sick leave or maternity leave;
(viii) the conditions relating to payment of salary on the resignation or dismissal of such teacher; and in the case of a teacher or laboratory technician recruited overseas, condition relating to recovery of cost of passage;
(ix) that such teacher or laboratory technician shall act in accordance with the terms of the Education Ordinance and of subsidiary legislation made under that Ordinance, of this Code of Aid and of such instructions as the Director may from time to time issue regarding the conduct of aided secondary schools.

5. Paragraph 50(a) Appointment to be initially on probation
A teacher or laboratory technician II/I on first appointment to an aided secondary school shall serve a probationary period of two years, after which the employment of such teacher or laboratory technician shall be permanent, subject to such provisions regarding termination of employment as may be contained in such teacher's or laboratory technician's contract of service or letter of appointment.

6. Paragraph 50(b)
Laboratory technician III is a probationary rank, the employment of a laboratory technician III shall be permanent and the appointee shall be promoted to laboratory technician II, subject to conditions for promotion as in Appendix 19.

7. Paragraph 51 and 52 shall apply to laboratory technician.

/8. .....

8. Appendix 3

3.5 Laboratory technicians

Laboratory technicians may be appointed in accordance with the following quotas: one technician per 8 classes having science lesson for Form 1 to 5. For Form 6 classes, a factor of 1.5 shall be multiplied to the actual number of science classes i.e. calculated no. of classes = no. of Form 1 to 5 classes having science lessons plus 1.5 x (no. of Form 6 science classes).

If the calculated no. of technician includes a fraction, it will be rounded up to the next whole no.

3.6 Laboratory attendants

With the approval of the Director, one laboratory attendant may be appointed for each laboratory.

9. Appendix 4 Notes 2

The combined laboratory assistant/Senior laboratory assistant scales apply to persons appointed before 1st September, 1972; the laboratory technician scales to persons appointed thereafter.

10. Appendix 5

"Teacher" shall be written as "Teacher or Laboratory Technician".

11. Appendix 19 Paragraph 6 (iii)

obtained the Hong Kong Polytechnic Laboratory Technician Certificate or an Ordinary Certificate or Certificate in appropriate field or equivalent.

12. Appendix 16 Paragraph 1

This is normally a promotion post for Laboratory Technician III. The conditions for promotion are set out in Appendix 19.

13. Addition to be placed as Paragraph 46b or under Appendix 19

A newly recruited Laboratory Technician III shall receive training, at the earliest possible time. Such training include the part-time day release Certificate course for Laboratory Technician in Hong Kong Polytechnic or any other qualification leading to the promotion of the staff from Laboratory Technician III to Laboratory Technician II as stated in Appendix 19.

APPENDIX VI

Theoretical Utilization of a Laboratory

| | Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|---|---|
| 1st Period | | | / | | / |
| 2nd Period | / | / | | / | / |
| 3rd Period | | | / | / | |
| Recess | | | | | |
| 4th Period | / | / | / | / | / |
| 5th Period | / | / | / | / | / |
| Lunch Break | | | | | |
| 6th Period | | / | / | | |
| 7th Period | / | | / | / | / |
| 8th Period | / | / | | | |

/ denotes practical periods (2 triple periods each for F.6 and F.7)

Total No. of Periods : 40

Maximum No. of Periods for Practical : 34

Maximum utilization rate = $\frac{34}{40}$ x 100% = 85%