HKDSE Biology & Combined Science (Biology) SBA

Teachers' Conference (2019/2020)

Date: 26 October 2019

Venue: School Hall, Lok Sin Tong Yu Kan Hing Secondary School, 3 Fu Yue Street, Wang Tau Hom

Program (Tentative)

9:00 –9:10	Registration	
9:10 – 10:15	Introduction New initiatives	Mr. Ben Tsui (HKEAA)
10:15 – 10:30	Break	
10:30 – 11:45	Supervisor's Remark	
11:45 – 12:00	Meeting with DCs (In classroom)	District Coordinators

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Content **Page**

A. SBA Requirements for 2020 & 2021 DSE Bio and CS(Bio) SBA

	Minimum No. of Assessment per student			
Biology	**S5**		**S6**	
	Practical Skills(A)	Report Writing(B)	Practical Skills(A)	Report Writing(B)
	1	1	1	1
CS(Bio)	**S5 & S6**			
	Practical Skills (A)		Report Writing (B)	
	1		1	

- The final SBA mark of a student composed of four marks:
  - ✓ the best two marks from Area A **(regardless of types)**; and
  - ✓ the best mark from area B in S5 and the best mark from area B in S6; the two reports should come from reports of different topics; **reports with guided discussions are accepted**. #

  # For 2022, the mark selection for area B is subject to change. Please refer to the updated handbook which will be available from HKEAA website in November.

- On-line mark submission system will be used. Teacher should keep a record of the experiment list, task sheets and assessment records. The system allows the entry of 5 A and 3 B marks for S5; 4 A and 2 B marks for S6. If you carried out assessments more than that, please choose those which best represent the performance of the students.

- Handling repeater / transfer / switch students
  SBA results obtained in S5 in the form school will not be counted. For both Biology and CS Biology, they will need to submit one A mark and one B mark.

- Language medium
  Please indicate the language medium used by the students in completing the reports. The language medium should following the school's own policy.

- S6 submission
  - ✓ **Submission period: 8 Jan –7 Feb 2020**
  - ✓ Submit Mark Data File for Principal's endorsement
  - ✓ Submit student work:
    - > Marked reports of 6 students, chosen by the HKEAA, is to be submitted. Only those reports with marks submitted are required. There is no need to submit biological drawings or other reports which are not assessed for SBA.
    - > One file for each student (zip to one single file if there are more than one file) with size is to be submitted. File name convention: [subject Abbreviation][(6-digit student document number)].[file extension], e.g. Bio(123456).zip, CSBIO(234567).pdf, etc.
    - > Attach task sheet in the student work file for the convenience of checking by District Coordinators.
    - > The following points should be noted about the student work:
      - ☐ Please advice students to use ***dark colour ball pen*** to complete their work for scanning
      - ☐ ***Black and white scanning*** should be used instead of colour scanning.
      - ☐ Make sure that ***ALL images are upright***.
      - ☐ For each report, the ***mark should be should using 10 point scale***.
      - ☐ ***Attached the task sheet (and checklist if any)*** to the student work.
      - ☐ Put all the reports in one image/pdf file instead of 1 file 1 image.

- It has been noted that the some schools use very simple tasks for assessment of Area B. The task itself only involves simple observation that addresses a 'yes or no' question. There is not much experimental design, data presentation or analysis involved. As a result, not much good performances can be shown in these reports and the mark award should not exceed 5 marks. These experiments include:

  - ✸ If light / chlorophyll / carbon dioxide necessary for photosynthesis
  - ✸ If heat is produced during seed germination
  - ✸ Compare the air composition of inhaled air and exhaled air
  - ✸ Simple food tests for identification of unknown solutions

  Experiments of these types put emphasis on the demonstration of a certain phenomenon. They can be used as demonstration for teaching of theories or for assessment of Area A, but not appropriate for assessment of Area B.

B. Making Assessment

	A	B
Student's work	Performing practical work, including the following types of work: (a) investigative practical work (group work allowed) (b) microscopic examination (c) dissection of animals / animal organs (d) ecological field work (group work allowed) (e) biological drawing	Individual reports on investigative practical work including: • objective of investigation • design of investigation and its underlying principles • procedure • presentation of findings • interpretation and discussion of results • conclusion
Assessment	Assess practical skills of individual students within each group during practical sessions according to the assessment criteria listed in the SBA Handbook	Mark individual investigation reports according to the assessment criteria listed in the SBA Handbook
Teacher's work	> Keep the assessment task sheets (with dates) > Keep assessment records for A > Mark students' written report	

Ability Area A – Practical skills

- Checklist should be developed for making assessment.
- **No student samples for Ability Area A will be collected. However, assessment records should be kept for handling of internal appeal cases before mark submission**.

Ability Area B – Report Writing

- For assessment on Ability Area B, teachers may choose to discuss with students the salient points in the design based on the generic guidelines provided on the task sheet before students write their design. Teachers may distribute the relevant task sheets to students in advance and this will not be considered as help given. **However, the provision of a detailed procedure about the experimental task is not allowed**.
- **The design and planning of the investigation has to be completed within class time and under the supervision of the teacher**. For the part about discussion and conclusion, teachers may choose to let students complete the task within class time or take home.
- Shared data can be accepted if data are generated by data-logger (but leave room for students to put in title and axes for graphs if the data logger also generate graphs) or data are collected on a group basis, or data are compiled for statistical analysis.
- Teachers are advised to train their students for writing a full report even guiding questions are involved in the task sheets. For report that involves only Q & A, students' responses will be matched with the descriptors (P.5 and 6). If only simple and straightforward responses are involved, only basic performance will be fulfilled and the reports will not score high marks.
- Teachers are encouraged to widen students' experience by exposing them to various types of experiments (qualitative and quantitative) so that their analytical skills can be sharpened and reflected in the written exams.

C. Support from District Coordinators

- Teachers may submit the tentative task lists to the District Coordinators and seek advice from District Coordinators if needed.
- Teachers shall submit their experiment list and task sheets to the District Coordinators two weeks after the S5 submission. District Coordinators will provide feedback on the level of difficult if needed.
- District Coordinators will conduct school visit and collect feedback. 4 schools from each group will be selected randomly each year until all schools in the group list have been visited.

D. Other useful websites

1. References and resources for Biology, Science Education Section, EDB (http://www.edb.gov.hk/en/curriculum-development/kla/science-edu/ref-and-resources/biology.html)
2. EDB One-stop Portal for Learning and Teaching Resources – Science Education (http://minisite.proj.hkedcity.net/edbosp-sci/eng/home.html)
3. NSS Biology Edblog (http://edblog.hkedcity.net/nssbio)
4. Practical Biology of Nuffield Biology (http://www.nuffieldfoundation.org/practical-biology)
5. Serendip Studio – Hands-on activities for teaching biology to high school or middle school students (http://serendip.brynmawr.edu/sci_edu/waldron/)

2019 DSE Bio and CS (Bio) SBA Report

Biology:

All school candidates sitting for HKDSE Biology Examination have to participate in SBA. A total of 12,978 Biology students from 440 schools submitted SBA marks this year. The schools were divided into 24 groups and the implementation of SBA by the teachers in each group was monitored by a District Coordinator (DC). The DCs were also responsible for reviewing the samples of students' work which were submitted.

The statistical moderation method was adopted to moderate the SBA scores. Outlier schools after statistical moderation were identified for further follow-up by the SBA Supervisor. 72.3% of schools fell into the 'within the expected range' category, while 17.3% of schools had marks higher than expected, and 10.4% of schools had marks lower than expected. Among those schools with marks higher or lower than expected, the majority only deviated slightly from the expected range. These figures indicate that the majority of the teachers had a good understanding of the SBA requirements, and that the marking standards were appropriate. However, a number of schools had moderated SBA scores which were significantly higher or lower than their raw scores, which indicates that the marking standards of the teachers concerned were either too strict or lenient as judged by the supervisor and the DCs. Teachers should pay due attention to this discrepancy and adjust their marking standards in the future.

Combined Science (Biology):

All school candidates sitting for HKDSE Combined Science (Biology) Examination have to participate in SBA. A total of 374 Biology students from 28 schools submitted SBA marks this year. The schools were divided into 24 groups and the implementation of SBA by the teachers in each group was monitored by a District Coordinator (DC). The DCs were also responsible for reviewing the samples of students' work which were submitted.

The statistical moderation method was adopted to moderate the SBA scores. Outlier schools after statistical moderation were identified for further follow-up by the SBA Supervisor. 69.2% of schools fell into the 'within the expected range' category, while 28.2% of schools had marks higher than expected, and 2.6% of schools had marks lower than expected. Among those schools with marks higher or lower than expected, the majority only deviated slightly from the expected range. These figures indicate that the majority of the teachers had a good understanding of the SBA requirements, and that the marking standards were appropriate. However, a number of schools had moderated SBA scores which were significantly higher or lower than their raw scores, which indicates that the marking standards of the teachers concerned were either too strict or lenient as judged by the supervisor and the DCs. Teachers should pay due attention to this discrepancy and adjust their marking standards in the future.

Feedbacks:

Some schools were visited by the DCs to gather first-hand information on the implementation of the Scheme in schools. According to the feedback of teachers and the DC's reports, the assessment process was smooth and effective in general. SBA marks were submitted on time and all requirements were met. The major observations on this year's SBA are:

Some schools conducted biotechnology investigations for SBA, such as DNA extraction from strawberries and DNA fingerprinting with electrophoresis. Biotechnology experiments are valuable as part of teaching and learning about the relevant curricular contents. However, teachers need to consider whether the experiments can draw on and show important SBA inquiry skills. The extraction of DNA from fruit seems too simple for SBA, for example. Biotechnology experiments tend to be cookbook type since they involve sophisticated equipment and complex procedures. Nonetheless, teachers can still ask students to design some procedures, or at least show understanding of them. For instance, in paternity DNA tests, students can be asked whose DNA fingerprints are needed in order to determine the biological father of a boy, the contents of different wells of gel electrophoresis, and whether the wells are placed close to the negative or positive electrodes.

Instead of requiring students to write a full report with little guidance, teachers can set questions on the task sheet to ask about specific investigative skills. This reduces the writing demands on students and enhances the overall quality of the investigation. For instance, when estimating the water potential of potato tissue, the issue of sampling potato tissues is often not touched upon in a full report, but they can be asked about in a task sheet. In some task sheets, the questions about the design of the investigation are left to the Discussion section. This is undesirable since these questions have to be addressed in order to write out the appropriate procedure.

Teachers are encouraged to let students try out the experimental procedure before writing out the design and procedure. This is particularly important for procedures that are complex and new to students. For instance, when using floating leaf discs as a measure of photosynthetic rate, the process of extracting air from the leaf discs is difficult to understand without trying it out. In addition, when students are allowed to try out the experiments, they are more able to work out the correct procedure. Teachers may consider letting students carry out their own procedure rather than the one provided. This not only gives students greater ownership, but also makes the discussions of the design and results more meaningful.

Students should complete the assessment tasks honestly and responsibly in accordance with the stipulated requirements. They will be subject to severe penalties for proven malpractice, such as plagiarising others' work. The HKDSE Examination Regulations stipulate that a candidate may be liable to disqualification from part or the whole of the examination, or suffer a mark penalty for breaching the regulations. Students can refer to the information leaflet HKDSE Examination - Information on School-based Assessment (http://www.hkeaa.edu.hk/DocLibrary/Media/Leaflets/SBA_pamphlet_E_web.pdf) for guidance on how to properly acknowledge sources of information quoted in their work.

Information given on the SBA Moderation Report

In the report, two comments are given in addition to the mean and standard deviation of the SBA scores before and after moderation. The first comment relates to the mean of the SBA scores awarded by your teachers as a whole. If your school's SBA scores were within the expected range, only minimal adjustments were made. More adjustments were necessary for schools with means that were higher or lower than expected. The second comment is about the distribution of the SBA scores submitted by your school. If the spread of the SBA scores was within the expected range, minimal adjustments were needed, while more adjustments were made to scores of schools with wider or narrower spreads than expected. Tables 1 and 2 below show what the comments mean.

Table 1: Implication of the comment on the mean

(D = difference between the means of the moderated and raw SBA scores)

Comment	**Magnitude of D**
Within the expected range	$0 \leq D < 6$
Slightly lower / higher than expected	$6 \leq D < 12$
Lower / higher than expected	$12 \leq D < 18$
Much lower / higher than expected	$D \geq 18$

Table 2: Implication of the comment on the spread

(R = ratio of the standard deviations of the moderated and raw SBA scores)

Comment	**Magnitude of R**
Within the expected range	$0.78 < R < 1.1$
Slightly wider than expected	$0.74 < R \leq 0.78$
Wider than expected	$R \leq 0.74$
Slightly narrower than expected	$1.1 \leq R < 1.2$
Narrower than expected	$R \geq 1.2$

The information provided in the attached SBA Moderation Report is for teachers' reference only and should not be divulged to students or parents, or the general public as the feedback is aimed at giving information for teachers to improve their teaching and assessment in the future.

2019年香港中學文憑考試生物科及組合科學(生物)科校本評核報告

生物科

所有香港中學文憑生物科的學校考生均參與校本評核。本年，來自 440所學校的 12, 978 位學生呈交了校本評核分數。這些學校共分成 24 組，每組由一位分區統籌員監察校本評核的落實執行，以及負責審閱學校所呈交的學生課業樣本。

學校所呈交的校本評核分數會根據統計方法作出調整，如有異常個案，則交由校本評核監督跟進。72.3% 學校呈分屬於「合乎預期範圍」類別，17.3% 學校呈分稍高於預期，而10.4% 學校呈分較預期稍低。但是，這些呈分稍高於預期或較預期稍低的學校中，大部分只是稍為偏離預期範圍。數據顯示大部分的教師明瞭校本評核的執行，並且有恰當的給分標準，這結果實在令人鼓舞。然而，有少數學校的校本評核調整分數明顯高於或低於原始分數，這反映個別教師的評分過於嚴謹或寬鬆，教師宜多加注意，並在將來調節評分準則。

組合科學(生物)科

所有香港中學文憑組合科學(生物)科的學校考生均參與校本評核。本年，來自 28所學校的374 位學生呈交了校本評核分數。這些學校共分成 24 組，每組由一位分區統籌員監察校本評核的落實執行，以及負責審閱學校所呈交的學生課業樣本。

學校所呈交的校本評核分數會根據統計方法作出調整，如有異常個案，則交由校本評核監督跟進。69.2% 學校呈分屬於「合乎預期範圍」類別，28.2% 學校呈分稍高於預期，而2.6% 學校呈分較預期稍低。但是，這些呈分稍高於預期或較預期稍低的學校中，大部分只是稍為偏離預期範圍。數據顯示大部分的教師明瞭校本評核的執行，並且有恰當的給分標準，這結果實在令人鼓舞。然而，有少數學校的校本評核調整分數明顯高於或低於原始分數，這反映個別教師的評分過於嚴謹或寬鬆，教師宜多加注意，並在將來調節評分準則。

回饋

分區統籌員亦造訪了部分學校，以蒐集校本評核施行情況的第一手資料。就統籌員以及參與教師的評語所見，校本評核整體運作暢順有效。教師能準時呈交校本評核分數，並合乎各項要求。以下為本年校本評核的主要觀察:

部分學校以生物科技探究作為校本評核，例如：從草莓提取DNA、利用電泳進行DNA指紋鑑定等。生物科技實驗作為相關課程內容的一部分，是難能可貴的。然而，以它作校本評核時，教師需要考慮到實驗是否能讓學生運用和展示主要的探究技巧。從水果提取DNA作為校本評核似乎過於簡單。生物科技實驗有如範本實驗，因當中涉及先進的儀器和複雜的程序。儘管如此，教師還是可以要求學生設計部分程序，或者要求學生展示他們對程序之了解。例如，在親子基因鑑定檢測中，教師可考問學生誰人的DNA指紋需用作判斷孩童的生父、凝膠電泳中各種井的含量，以及該些井是靠近陰電極還是陽電極等 。

與其要求學生在最少的指引下撰寫完整的報告，教師不如在工作紙上擬定問題以考查學生的具體探究技巧。這不但可降低對學生寫作能力的要求，亦提高探究的整體質素。以估計馬鈴薯組織的水勢為例，整體報告往往不會觸及採樣的馬鈴薯組織的議題，但教師可利用工作紙提出具體的問題。在部分工作紙中，有關探究設計的問題會留待討論部分去討論，這做法並不理想，因為這類問題要先解決，才可擬定適當的程序。

教師宜讓學生在擬出實驗設計和程序前試行實驗程序，這對於複雜、新奇（對學生而言）的程序尤其重要。例如：當使用浮葉盤量度光合作用比率時，若沒進行試行，則難以了解從葉盤提取空氣的過程。再者，容許學生試行實驗，他們會更易於擬出正確的程序。因此，與其為學生提供標準的程序，教師不如考慮讓學生自行設計程序，這不但給予學生更大的自主權，也令設計及結果的討論更有意義。

學生應按既定的要求，誠實及負責任地完成校本評核的課業。若抄襲等違規行為一經證實，學生將會被嚴懲。香港中學文憑考試規則清楚說明，若考生違反考試規則，他們可能被罰扣減分數、降級或取消部分或全部科目的考試資格。
學生可參考《香港中學文憑考試校本評核簡介》(http://www.hkeaa.edu.hk/DocLibrary/Media/Leaflets/SBA_pamphlet_C_web.pdf)附錄內有關註明課業中所引用資料出處的示例。

分數調整報告提供的資料

報告內，除了調整前後的校本評核平均分與標準差外，亦包括兩項評語。第一項評語跟校本評核平均分有關，若教師所評的平均分數合乎預期範圍，分數只會被輕微調整；若平均分數高於或低於預期範圍，則需要較大的調整。第二項評語跟校本評核分數的分布有關，若教師所評分數的分布合乎預期範

圍，分數的分布只會被輕微調整；若分布高於或低於預期範圍，則需要較大的調整。下列表一與表二說明該兩項評語的含義。

表一：第一項評語的含義

(D=調整後與調整前校本評核平均分的差距)

評語	**D的幅度**
合乎預期範圍	$0 \leq D < 6$
略低於/略高於預期範圍	$6 \leq D < 12$
低於/高於預期範圍	$12 \leq D < 18$
明顯低於/高於預期範圍	$D \geq 18$

表二：第二項評語的含義

(R=調整後與調整前校本評核分數標準差的比率)

評語	**R的幅度**
合乎預期範圍	$0.78 < R < 1.1$
稍寬於預期範圍	$0.74 < R \leq 0.78$
寬於預期範圍	$R \leq 0.74$
稍窄於預期範圍	$1.1 \leq R < 1.2$
窄於預期範圍	$R \geq 1.2$

分數調整報告的保密

校本評核報告內分數調整的數據，以每個組別學生的整體表現作為依據，旨在為教師提供回饋，幫助教師提升教學素質，改善評核。因此，只供教師及學校參考，不宜及不應讓學生、家長或校外人士察閱。因為一般公眾人士對校本評核及其統計方法並不熟悉，而他們對統計方法的錯誤理解往往容易導致信息混亂和引起不必要的猜測。

Descriptions of performance for the assessment of investigative report

Descriptions of basic performance	Descriptions of good performance	Descriptions of excellent performance
The **aim/problem** of the investigation is correctly stated.		
When the investigation attempts to answer a "why" question, appropriate **hypothesis and **prediction** are put forward. (In the case that the report puts forward a "hypothesis" when it is actually not required, teachers should not take it as a mistake.)*		**Problem, hypothesis and prediction are clearly differentiated and logically connected.*
• The **design** of the investigation is stated, which can address the problem in general. • The rationales and relevant biological principles of the design are mentioned. • The variables (IV, DV, control) are identified.	• The design can validly address the problem. • The rationales and relevant biological principles of the design are clearly explained. • Variables are distinguished from measures and treatments. • Significant control variables are identified.	• ** Significant assumptions behind the design, if any, are identified and discussed.* • ** Limitations of the design, if any, are identified and discussed.*
The **procedure** of the investigation is stated, which basically follows the design.	• The procedure is clearly and logically stated. • Appropriate apparatus are chosen. • Quantities are stated accurately. • Necessary precautions to minimize errors, uncertainties and accidents are stated. • Confounding variables are carefully controlled.	
The **results** of the investigation are properly shown, and when appropriate, in the form of tables and/or graphs and/or diagrams.	• When a table is needed, data are well organized and clearly shown in the table with a proper title. • **When graphs are needed, data are presented with appropriate graph.* • **When necessary, appropriate diagrams are drawn to accurately describe the results.* • **When necessary, appropriate calculations of data are done to address the research problem.*	
The results are **described, interpreted**, and **discussed** in relation to the problem (hypothesis and prediction, if any).	• **Trends and patterns in data, if any, are recognized and interpreted.* • Significant improvements of the investigation are suggested.	• **Significant errors, uncertainties and biases of the investigation, if any, are recognized and discussed.* • **Significant anomalous data and observations, if any, are recognized and discussed.*
A **conclusion** is drawn with reference to the results and the problem (hypothesis and prediction, if any) of the investigation.	The conclusion can clearly answer the question of the investigation. ** When there is a hypothesis, the conclusion can clearly indicate if the hypothesis is supported, refuted, or remains undetermined according to the results.*	The conclusion is a reasoned judgment made in consideration of the validity and reliability of the data, the limitations of the design, and the relevant theories.

*required only when appropriate

Mark range	Quality of Work	Performance
9–10	Excellent	The report shows <u>most of the basic</u> performances and <u>many</u> of the good performances.
6–8	Good	The report shows <u>most of the basic</u> performances and <u>some</u> of the good performances.
3–5	Fair	The report shows <u>some</u> of the basic performances and <u>a few</u> of the good performances.
1–2	Poor	The report shows <u>a few</u> of the basic performances.

For a report that shows some of the **excellent performances**, teachers should consider giving it **additional marks**. Nonetheless, these excellent performances are not the requisites for awarding 9 or 10 marks to a report.

探究實驗報告評核的表現描述

基礎表現的描述	良好表現的描述	優秀表現的描述
正確寫出探究的**目標/問題**		
*當探究涉及回應「為什麼」時，報告有提及假說及預測。(遇有毋需假說的探究，就算學生寫了假說，老師不宜當作錯誤扣分。)		* 清楚及有條理地交代探究問題、假說及預測。
• 探究的設計大致上能回應探究的問題。 • 有寫出背後原理及相關的生物學原理。 • 辨別有關的變項(自變項、應變項和控制變項)	• 探究的設計能有效地回應探究的問題。 • 清晰地說明背後原理及相關的生物學原理。 • 明確辨別有關的變項，並能分辨變項的量度及處理。 • 指出重要的控制變項。	• * 列出並討論探究設計的假設(如有)。 • * 列出並討論探究設計的限制(如有)。
探究步驟基本上依從設計。	• 清楚及有條理地交代探究步驟。 • 選擇合適的儀器。 • 準確列出所需數量。 • 列出可以減低誤差、不確定因素及意外的預防措施。 • 小心控制可影響實驗結果的變項。	
適當展示探究結果，在適當時使用合宜的表格、圖表或/及圖像。	• 當有需要時，清楚及有系統地把數據表列出來，並附以適當的標題。 • * 當有需要時，適當地把數據以圖表展示。 • * 當有需要時，適當地以圖像準確地表 達數據。 • *當有需要時，適當地計處理算數據，以回應探究問題。	
描述及分析探究結果，並依探究的問題(如有假說及預測)作出相關的討論。	• * 辨認數據的趨勢和模式(如有)，並加以分析。 • 提出探究的重要改善。	• * 列出並討論重要的誤差、不確定因素及偏倚(如有)。 • * 列出並討論異常的數據及觀察 (如有)。
按探究問題及實驗結果(如有假說及預測)得出結論。	結論清楚回應探究問題。 * 若有假說時，結論能清晰地指出實驗結果是支持假說、駁倒假說或是未能決斷。	結論是考慮數據的效度和信度，以及設計的限制，和相關的理論下很出的有理據的判斷。

* 當有需要時才適用

分域	作業水平	相關表現
9–10	優異	實驗報告顯示大多數的基礎表現及很多良好表現。
6–8	良好	實驗報告顯示大多數的基礎表現及部分的良好表現。
3–5	平平	實驗報告顯示部分的基礎表現及少數的良好表現。
1–2	差劣	實驗報告顯示少數的基礎表現。

實驗報告顯示優秀表現時，老師可考慮加分，但這些優秀表現並非獲取9分或10分的必要條件。