

e-Textbook Writing Guidelines for Science (Primary 1-6) of Science Education Key Learning Area

1. Introduction

- 1.1 The purpose of this set of guidelines is to familiarise interested e-textbook publishers with the curriculum aims and targets and related principles for writing e-textbooks of the Primary Science, etc. in a bid to ensure that the e-textbooks are written in accordance with the specific requirements of the curriculum and the “The Seven Learning Goals of Primary Education” (www.edb.gov.hk/en/curriculum-development/7-learning-goals/primary/index.html). For details, please refer to the *Primary Education Curriculum Guide (Pilot Version)*(2022)(Chinese version only).
- 1.2 The *Values Education Curriculum Framework (Pilot Version)* was released in 2021 and ten priority values and attitudes (PVA) were introduced. The PVA have been optimised since 2023 with the PVA “Care for Others” extended to “benevolence” and two PVA (i.e. “Filial Piety” and “Unity”) added. It is suggested that publishers reinforce the learning elements of values education in the textbooks where appropriate. For details, please refer to the *Values Education Curriculum Framework (Pilot Version)* (2021) (Chinese version only) (www.edb.gov.hk/en/curriculum-development/4-key-tasks/moral-civic/ve-curriculum-framework2021.html) and the EDBCM on *Enriching the Values Education Curriculum Framework (Pilot Version) – Optimisation of “Priority Values and Attitudes”* (applications.edb.gov.hk/circular/upload/EDBCM/EDBCM23183E.pdf).
- 1.3 The *Curriculum Framework of National Security Education in Hong Kong* was released in 2021. Publishers should reinforce the learning elements of national security education in the e-textbooks where appropriate. They may also refer to the government website “National Security Education Day” for more information such as major fields of national security. For details, please refer to the *Curriculum Framework of National Security Education in Hong Kong* (www.edb.gov.hk/en/curriculum-development/kla/pshe/national-security-education/index.html) and the government website “National Security Education Day” (www.nsed.gov.hk/index.php?l=en).
- 1.4 For the general principles and requirements for writing e-textbooks and the requirements for submission of e-textbooks for review, publishers should refer to the latest edition of the *Guiding Principles for Quality Textbooks and Guidelines on Submission of e-Textbooks for Review* available on the EDB’s Textbook Information website (www.edb.gov.hk/textbook).

2. Curriculum Aims and Objectives

Publishers should refer to the latest Science Education KLA Curriculum Guide, as well as the Curriculum and Assessment Guide, curriculum documents and supplementary documents of the respective subjects.

3. Guiding Principles

- When writing e-textbooks for Primary Science, it is important to align with the curriculum rationale, curriculum aims, learning targets and objectives, and suggested learning and teaching activities of the latest Science (Primary 1-6) Curriculum Framework. Additionally, it is advisable to refer to the curriculum aims in the *Science Education Key Learning Area Curriculum Guide (Primary 1 - Secondary 6) (2017)*, as well as the learning targets for each key stage and strand. e-Textbook design should include a holistic plan of learning themes that covers the knowledge, skills, values, and attitudes listed in the Curriculum Framework, as well as the essential learning content from the four interrelated learning areas, to support a student-centred learning approach.
- Science (Primary 1-6) Curriculum provides students with diversified learning experiences to establish a knowledge foundation in Science Education Key Learning Area, and progressively cultivates students' proper values, positive attitudes and generic skills, so as to facilitate smooth interface between different key stages / year levels and develop continuity.
- The e-textbook review items for the Science (Primary 1-6) Curriculum include: (1) e-textbooks and (2) scientific inquiry activity e-booklets that are part of the e-textbooks. The total number of e-textbooks for the Science (Primary 1-6) Curriculum shall not exceed 12. In addition, the EDB does not accept any e-booklets for experiments or e-booklets for assignments submitted for review for this curriculum.

3.1 Content

- Cultivate students' scientific thinking, enhance students' curiosity and desire for knowledge about the world, and stimulate their interest and motivation in learning.
- Fully and appropriately cover all essential learning content in the four interrelated strands "Life and Environment", "Matter, Energy and Changes", "Earth and Space" and "Science, Technology, Engineering and Society", so as to achieve the curriculum aims and learning targets.
- Emphases should be placed on the lateral coherence and vertical continuity of the learning themes of each year level to help students construct

knowledge systematically, cultivate proper attitudes and develop generic skills.

- The level of depth is suitable for the age, interest and cognitive level of students at that level, and takes into consideration the students' prior knowledge and caters to their learning needs. New concepts should be built on students' prior knowledge.
- Closely related to students' daily life and start from their own experiences.
- Appropriately integrate learning elements of mathematics, arts, technology, and engineering, and organically promote interdisciplinary learning.
- Excessive factual information, fragmented information and unnecessary repetitions should be avoided.
- The concepts presented should be correct. Examples and explanations given should be appropriate. Issues should be holistically interpreted from multiple perspectives and different viewpoints. Biased or over-generalisation should be avoided.
- Any form of labeling, discrimination, or exclusion based on gender, age, race, culture, occupation, socioeconomic status, religion, nationality, disability, or any other aspect of individuals or matters should be avoided.

3.2 Information

- Information provided should be appropriate for the age of students and interesting so as to enhance students' learning motivation, inspire and facilitate their learning.
- Information provided should be accurate. Information provided should be objective and general examples should be used. Publishers should avoid showing brand names of commercial items in the illustrations (if applicable). They should also pay special attention to the legal liabilities related to intellectual property rights. In addition, the illustrations and content should be suitable for students' psychological development and deliver positive and healthy messages.
- Illustrations should reflect the actual size of an object and in appropriate proportion. Maps should include relevant information and labels, such as title, coordinates, scale and legend.
- While e-textbooks are positioned as self-contained learning materials, publishers may provide booklists of reasonable and appropriate amount of reference materials to encourage and facilitate students' reading and self-directed learning. This allows students to access information further and

expand their reading scopes.

3.3 Learning Activities

- The design should be appropriate, meaningful and diversified to enhance students' learning motivation and interest.
- Allow students to progressively construct knowledge and develop various levels of cognitive abilities, such as searching and collecting information, mastering and organising the main points, analysing information / data comprehensively, etc.
- Emphasise inquiry-based learning to cultivate students' science process skills and basic engineering thinking, and develop students' ability to integrate and apply knowledge and skills. Examples of activities include scientific inquiry, design and make, data collection, fieldwork, case studies, problem-solving activities, and STEAM-related learning activities.
- Guide students to show care to the environment and things in their surroundings using different topics. Develop critical thinking skills, analytical skills and problem-solving skills as well as cultivate proper values and attitudes among students through their daily practices and experiences.
- Promote popular science reading and learning.
- Develop students' self-directed learning abilities, such as the use of learning tools and educational technology.
- Make good use of community resources for life-wide learning.
- Remind students to observe and follow safety rules and regulations. Relevant instructions, tools, graphs / charts and photos, etc. should also comply with safety requirements.
- Enhance students' understanding of national development in science and technology, understanding of our country's conditions, and strengthen their sense of national identity.

3.4 Assessment

- Align with the learning targets, learning content and the learning and teaching process.
- Diversified assessment strategies (e.g. practical assessment, oral presentations, science journals, project learning, concept maps) should be used.

- The design of assessment questions and assessment activities should not only focus on rote memorisation of knowledge but students' ability to understand and apply knowledge as well.
- Reflection, self-assessment, peer assessment and group assessment, etc., could be introduced based on the learning content to help students improve their learning.
- Promote formative assessment and the use of Assessment for Learning and Assessments as Learning.
- Set up more open-ended questions or assessment activities without predetermined answers to stimulate students' thinking and understanding as well as unleashing their creativity.

3.5 Structure and Organisation

- The structure should be clearly delineated with a table of content, chapter titles, topics / headings and outlines.
- For the preface, **simple** guidelines for students could be provided to guide students how to use the e-textbook for their learning.
- For each learning theme, an overview of the learning targets or prior knowledge are to be included. The concluding summary should be consistent with the content of each module / chapter.
- The table of content should show clearly the topics and related sub-topics. The themes should align with the learning content. The headings should be attractive and reader-friendly.

3.6 Language

- The language used is of an appropriate level of difficulty. Reference could be made to the "*Lexical Items with English Explanations for Fundamental Chinese Learning in Hong Kong Schools*" (2009).
- e-Textbook content should be well structured to facilitate students' understanding of knowledge.
- New vocabulary items should match the relevant topics. The key words and concepts should be highlighted for easy recognition.
- Mixed mode of Chinese and English languages should not be used. Consistency is needed for all terms used. Language use should be clear and accurate.

- Appropriate hints should be provided to facilitate students' understanding and use of subject specific terms and vocabulary.
- The audio files provided should give correct, authentic, clear and fluent pronunciation.
- For the Chinese translation of English terms commonly used in the teaching of science, publishers should refer to the *Glossary for Science Subjects* (www.edb.gov.hk/en/curriculum-development/kla/science-edu/ref-and-resources/glossary.html) compiled by the Education Bureau.
- The International System of Units (SI) should be used. For detailed guidance on units and symbols, please refer to “*Signs, Symbols and Systematics: The ASE Companion to 5-16 Science*” published by the Association for Science Education (1995), UK: ASE, 《高等學校教學參考書－物理量與單位》杜荷聰、王啟堯、袁楠(1986)著，中國計量出版社出版， or the latest information announced by the General Conference on Weights and Measures (CGPM).
- If necessary, the translation of English / Chinese terms should be placed at the end of the e-textbook.

3.7 Pedagogical Use of e-Features

- Provide hypertexts of the key topics and words. Hypertexts mean explanations on some key points and key words, both accessible online and / or offline .
- Provide hyperlinks of subject-related information, such as of 3D models and virtual reality.
- Multimedia, such as photographs, illustrations, pictures, graphs, videos and simulation, should be relevant to the text and be accurate with appropriate descriptions to stimulate and facilitate learning. They should serve to direct students to the instructional focus rather than to distract them from it.
- Interactive assessment tasks could be included in the e-textbook to facilitate assessment for learning, if necessary.
- Over-reliance on simulated experiments should be avoided. Students should not be deprived from the opportunities to develop science process skills by conducting hands-on activities.

3.8 Technical and Functional Requirements

- Please refer to the latest edition of the “*Guiding Principles for Quality*

Textbooks” for the relevant requirements.

4. Others

- 4.1 When writing e-textbooks, publishers have to ensure that the content and information provided in the materials should be correct, complete, up-to-date, objective and impartial. The source and the date of the information should be provided as appropriate. The information in the illustrations and images should avoid showing the brand names of commercial items unless they are necessary.
- 4.2 All URLs and hyperlinks (including the publisher’s self-developed learning materials and the learning and teaching resources developed by the third party) in the e-textbooks should be linked to the publisher’s website for the publisher’s easy management. For the third party resources, the URLs or hyperlinks should be linked to the websites with high credibility, such as the official websites and the websites of academic institutions, and avoid linking to commercial or social media platforms. In case problems arise from the hyperlinked content (including the third party resources), the publisher should take immediate follow-up actions and bear the relevant liabilities.
- 4.3 Publishers should avoid putting excessive hyperlinks that provide additional references in the e-textbooks so as not to violate the self-containment principles. Publishers may put the hyperlinks of their self-developed supplementary learning materials or the learning and teaching resources developed by the third party on their website. Publishers may also provide their website’s URL in the Teacher’s Book for teachers’ reference to facilitate lesson preparation or design of learning and teaching activities. Publishers should be accountable for the learning and teaching resources they provide.
- 4.4 The maps included in the e-textbooks should be accurate and only contain essential information suitable for student learning. Reference should be made to the requirements and standard maps of the Ministry of Natural Resources of the People’s Republic of China for all maps of China included in the e-textbooks.
- 4.5 When using images of the national flag, national emblem, regional flag and regional emblem, the following points should be noted:
 - **avoid drawing** the national flag, national emblem, regional flag and regional emblem on your own;
 - use real photos to show the national flag, national emblem, regional flag, regional emblem, etc.;
 - use the files of the national flag, national emblem, regional flag and regional emblem downloaded from the Protocol Division Government Secretariat

and follow the relevant requirements stipulated by the Protocol Division Government Secretariat on the use of these images.

- 4.6 It is mandatory for the publishers to ensure that all proof-reading work, including that for e-features, language, punctuation, information, illustration, pagination, etc., is completed and the e-textbooks are error-free before submitting them for review.
- 4.7 Publishers should review the e-textbook content from time to time. When necessary, publishers can make amendments to the e-textbook content with the EDB's consent. The EDB may also require publishers to make amendments when needs arise.
- 4.8 Publishers should clear all copyright issues of the e-textbooks as appropriate.
- 4.9 The suggested time allocation set out in the curriculum documents should be taken into consideration to ensure that the learning content is designed with an appropriate quantity and level.
- 4.10 If publishers submit other versions (such as Chinese version or printed version) of the same textbook title for review at the same time, they should duly check the consistency of the content among all the versions. If another version is to be submitted at a later stage, the suggestions in the Textbook Review Reports for the previously submitted version should be duly followed before submission.
- 4.11 The font type should be consistent throughout the whole set of e-textbooks. The font size should be appropriate. For details of the standard written forms of Chinese characters, please refer to the "*List of Graphemes of Commonly-used Chinese Characters*" published by the Education Bureau in 2012. The spacing and margin should be appropriately arranged for easy reading.
- 4.12 Safety precautions when conducting learning activities and outdoor activities should be clearly specified in a concise manner where appropriate. The main point is to remind teachers and students to stay alert and take precautions against all potential hazards and to avoid accidents. For more information about the safety measures of learning activities, please refer to the latest version of related official documents such as the chapter on "*Safety precautions and guidelines*" in the "*School Administration Guide*" (updated regularly).

Science Education Section
Education Bureau
March 2024