

# **Chief Executive’s Award for Teaching Excellence (2021/2022)**

## **Excellence Indicators for Teaching Practices for the Science Education Key Learning Area**

### **Foreword**

The *Excellence Indicators for Teaching Practices for the Science Education Key Learning Area* are compiled for use as reference in assessing nominations for the Chief Executive’s Award for Teaching Excellence (CEATE) (2021/2022).

In drafting the Indicators, we have consulted a number of references, including school curriculum documents (see References on page 12). The Indicators have been formulated and structured in a way that reflects the complexity of teachers’ work and the diverse nature of teachers’ competencies.

For the purposes of the CEATE, teaching excellence means teaching practices that are:

- (i) outstanding and/or innovative and proven to be effective in enhancing students’ motivation and/or in helping students achieve the desired learning outcomes; or  
creatively adapted from exemplary teaching practices elsewhere to suit the local (i.e. school-based and/or student-based) context, with proven effectiveness in enhancing students’ learning outcomes;
- (ii) based on a coherent conceptual framework and inclusive of reflective practices;
- (iii) inspiring and capable of being disseminated among peers to improve the quality of education; and
- (iv) instrumental in achieving the learning targets of the Science Education Key Learning Area (KLA) (i.e. developing students’ curiosity and interest in science, scientific literacy as well as creativity; equipping students with the ability to inquire and solve

problems; fostering students' ability to integrate and apply knowledge and skills with other related disciplines; enriching students' understanding on the latest developments of science and technology and nurturing students to become lifelong learners in science for personal development).

The Indicators fall within four domains, namely, (1) Professional Competence, (2) Student Development, (3) Professionalism and Commitment to the Community, and (4) School Development. The first two domains focus on recognising teaching excellence and the other two on fostering teachers' professional development and building a culture of teaching excellence.

The Indicators are to be used only as a framework for recognising excellent teaching practices; they are not intended to prescribe a rigid model of excellence for every teacher. The examples of excellence cited for each Indicator are provided for illustration only and should not be regarded as a checklist. We hope that the Indicators will not only serve as an assessment tool, but may also highlight the qualities of an accomplished teacher in the area of Science Education, so as to motivate teachers to pursue professional excellence.

All awardees must possess the essential qualities of a professional teacher, such as professionalism and a loving concern for students. Each nomination will be assessed according to the four domains mentioned above by adopting a **holistic approach** based on professional knowledge and judgment. However, as the focus of CEATE is on learning and teaching, we seek to identify inspiring, exemplary and effective teaching practices that can be shared with peers. In assessing group nominations, we look at the effectiveness of teamwork by considering the contribution of each group member, their interactions, and how their concerted efforts have contributed to the desired outcomes.

The Assessment Working Group  
Chief Executive's Award for Teaching Excellence (2021/2022)  
October 2021

# **Excellence Indicators for Teaching Practices for the Science Education Key Learning Area**

## **1. Professional Competence Domain**

Area	Performance Indicators	Examples of Excellence
Curriculum	1.1 Curriculum Planning and Organisation	<p>The teacher is able to:</p> <ul style="list-style-type: none"> <li>• achieve the curriculum aims; keep abreast of the trend in the development of Science Education (SE) and the major renewed emphases of school curriculum; ensure vertical continuity and lateral coherence in accordance with the central curriculum framework; and develop a school-based curriculum from the perspectives of the school as a whole as well as the SE Key Learning Area (KLA) in the light of school context and learner diversity;</li> <li>• adapt the curriculum to make it student-centred, coherent, balanced, innovative and diversified in order to cater for learner diversity, foster the development of students’ generic skills, promote self-directed learning, and further enhance the interface between different learning stages;</li> <li>• provide students with diversified learning opportunities in and out of class, strengthen the connections between different subjects under the SE KLA, and develop diversified learning and teaching activities to allow students to apply their scientific knowledge and skills and problem-solving principles to solve real problems in daily life;</li> <li>• promote cross-curricular STEM<sup>1</sup> education by effectively fostering cross-disciplinary and cross-KLA collaboration to help students connect and apply knowledge across KLAs, and to strengthen their ability to integrate and apply knowledge and skills (including “hands-on” skills);</li> <li>• comprehensively plan SE learning and teaching activities in and out of class, and nurture students’ generic skills in an integrative manner so as to help them develop positive values and attitudes;</li> <li>• adopt a learner-centred approach, make use of technology, information technology and e-learning, and arrange life-wide learning activities to enhance students’ scientific literacy and provide them with quality learning</li> </ul>

<sup>1</sup> STEM is an acronym combining the first letters of four academic disciplines, namely Science, Technology, Engineering and Mathematics. In local context, STEM education is promoted through Science, Technology and Mathematics Education KLAs.

Area	Performance Indicators	Examples of Excellence
		<p>experiences; and</p> <ul style="list-style-type: none"> <li>• adapt the school curriculum in the light of students’ abilities and needs, such as incorporating challenging learning elements into the curriculum, planning a differentiated curriculum or setting slightly higher but achievable learning targets, in order to cater for students of different learning needs, interests and competences under the SE KLA.</li> </ul>
	1.2 Curriculum Management	<p>The teacher is able to:</p> <ul style="list-style-type: none"> <li>• establish an effective mechanism to monitor and evaluate curriculum implementation, take forward concrete follow-up measures and initiate sharing of experiences with peers, with a view to improving the quality of education;</li> <li>• understand the latest developments in science education and curriculum at the local, national and international levels, and incorporate the appropriate changes into the school science curriculum;</li> <li>• take a leading role in working closely with members of other subject panels and other SE KLA teachers to devise a holistic plan for the development of a school-based curriculum and STEM education to ensure that subjects under the SE KLA are vertically and laterally linked to subjects under other KLAs;</li> <li>• establish a mechanism for collegial exchange and knowledge management, maintain close communication and collaboration with team members, and appropriately collect, develop, share and leverage good practices, with a view to improving learning and teaching effectiveness; and make flexible and effective use of internal and external resources to cater for learner diversity and enrich students’ learning experiences; and</li> <li>• formulate a clear and structured evaluation mechanism for monitoring the implementation of curriculum in a timely and effective manner to ensure close alignment between curriculum planning, learning and teaching as well as assessment, while informing curriculum planning and formulation of learning and teaching strategies.</li> </ul>

Teaching	1.3 Strategies and Skills	<p>The teacher is able to:</p> <ul style="list-style-type: none"> <li>• design appropriate learning and teaching activities with hands-on and minds-on tasks that allow students to integrate and apply knowledge and skills in solving problems;</li> <li>• adopt a learner-centred teaching strategy to provide students with different learning experiences so that they can construct knowledge, develop positive values and attitudes, and contribute to the world of science and technology in the 21st century;</li> <li>• adopt appropriate teaching and learning strategies to enhance students' scientific knowledge and thinking so that they can explain scientific phenomena, plan scientific investigations, interpret scientific evidence and data, and assess science-related information from different sources for informed decision; and help students understand the nature of science and develop science process skills to improve their scientific literacy;</li> <li>• set appropriate learning targets according to students' abilities, and adopt different teaching approaches with the flexible combination of a variety of teaching and learning strategies (including teaching via information technology) in the light of learning targets and learner diversity, in order to provide students with a myriad of meaningful and interesting learning experiences and promote deep learning and self-directed learning;</li> <li>• demonstrate good classroom practices, pay attention to students' learning needs and performance, and maintain a safe, harmonious, interactive and inspiring learning environment while co-constructing knowledge with students;</li> <li>• provide a wide range of learning activities to boost students' learning motivation and strengthen their science process skills;</li> <li>• review and revise teaching strategies to cater for learner diversity and different learning needs;</li> <li>• use teaching languages in a clear and accurate manner, deliver fluent, lively and organised lessons, provide clear instructions and demonstrations, ask layered questions to effectively stimulate students' thinking, and provide timely and specific feedback to clarify concepts and facilitate students' improvement; and</li> <li>• make good use of different assessment strategies and tools to gather evidence about student learning, and appropriately adjust teaching tempo, learning contents, as well as teaching strategies and pace in the light of students' learning progress.</li> </ul>
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Area	Performance Indicators	Examples of Excellence
	1.4 Professional Knowledge and Attitudes	<p>The teacher is able to:</p> <ul style="list-style-type: none"> <li>• have a thorough grasp of current curriculum emphases, subject contents and pedagogies, and make effective use of such knowledge in teaching with the help of technology, information technology and e-learning;</li> <li>• nurture students’ scientific literacy so that they can rationally discuss issues related to science, technology, society and environment on the basis of scientific data;</li> <li>• contribute as an educator who proactively reflects on his/her teaching practices in order to effectively integrate education or learning theories with teaching practices for providing feedback to learning and teaching and thus promoting continuing professional development in the school;</li> <li>• create favourable contexts that facilitate students in conducting scientific investigations, testing scientific theories, and actualising scientific ideas;</li> <li>• provide learning opportunities for students to enrich their understanding of the latest scientific and technological developments;</li> <li>• show care and respect to students as individuals, and set appropriate expectations for them; and</li> <li>• build a teacher-student relationship that is based on trust and rapport to promote student learning.</li> </ul>

Area	Performance Indicators	Examples of Excellence
Performance Assessment	1.5 Assessment Planning and Use of Information	<p>The teacher is able to:</p> <ul style="list-style-type: none"> <li>• establish an effective assessment mechanism; and incorporate assessment into teaching and learning by making effective and systematic use of a variety of assessment modes and tools in the light of curriculum plans, learning contexts, students’ learning progress and other student-based or school-based factors;</li> <li>• gather evidence of student learning in terms of knowledge, skills and attitudes by effectively employing the strategies of “Assessment as Learning” and “Assessment for Learning” to reflect the effectiveness of STEM-related learning activities;</li> <li>• adopt diversified assessment modes and systematic methods to collect assessment data, and make effective use of internal and external assessment data and results to improve learning and teaching, monitor students’ learning progress, cater for learner diversity, and evaluate pedagogical practices, with a view to informing pedagogical planning and design and reflecting students’ performance or progress in science learning;</li> <li>• give timely, useful and positive feedback to students to help them sustain their momentum in learning and identify their strengths and weaknesses, guide them in building on their strengths and overcoming their weaknesses, and cater for their diversity; and</li> <li>• capitalise on student self-assessments and peer assessments or other e-assessment tools to facilitate students’ self-reflection and review of their learning progress, thus reinforcing and improving their learning.</li> </ul>

## 2. Student Development Domain

Area	Performance Indicator	Examples of Excellence
Student Development	2.1 Values and Attitudes	<p>The teacher is able to:</p> <ul style="list-style-type: none"> <li>• focus on student learning and equip students with the agility to deal with changes in the future;</li> <li>• spark students’ curiosity and interest in science, thus instilling in them a passion on issues related to science, technology, society and environment, planning and conducting scientific investigations and seeking solutions that benefit the community at large;</li> <li>• encourage students to pay attention to the latest scientific and technological developments, develop their interest in science and technology, and nurture them as lifelong learners in science for the benefit of personal development;</li> <li>• help students develop scientific thinking and guide them in examining scientific theories and hypotheses through logical reasoning and experimentation, so that they can sensibly deal with problems and matters related to rapid scientific and technological advancement;</li> <li>• engage students in appreciating the beauty and wonders of nature, and foster their respect and care for living things and the environment;</li> <li>• nurture students’ positive values and attitudes towards actively conserving and cherishing the environment;</li> <li>• develop students’ understanding of the impacts of science on society, ethics, economy, environment and technology, and inculcate in them the attitude expected of a responsible citizen; and</li> <li>• encourage students to remain fair, objective and rational in expressing their opinions, respect others’ views, and readily collaborate and share ideas with others.</li> </ul>
	2.2 Knowledge and Skills	<p>The teacher is able to:</p> <ul style="list-style-type: none"> <li>• develop students’ scientific literacy and information literacy so that they are able to conduct scientific investigations and experiments, carry out research using a wide range of data, evaluate evidence and engage in open discussions; and familiarise them with the language of science for communicating science-related</li> </ul>



Area	Performance Indicator	Examples of Excellence
		<p>concepts;</p> <ul style="list-style-type: none"> <li>• foster students’ ability to make informed judgments based on scientific evidence and solve problems in everyday life by applying scientific knowledge and perspective skillfully;</li> <li>• develop students’ abilities in constructing knowledge and “learning to learn” capability, and help them realise their potential in science;</li> <li>• enhance students’ understanding of the connections between science and other STEM subjects in order to prepare them for further studies or a future career in the fields of science, technology and engineering;</li> <li>• enhance students’ scientific thinking, equip them with knowledge about the nature of science and help them acquire science process skills, thus enabling them to build a strong foundation of knowledge and skills;</li> <li>• cultivate students’ interest in studying science, encourage student interaction and collaboration, promote self-directed learning, and strengthen students’ information literacy in the process with the help of technology, information technology and e-learning; and</li> <li>• strengthen students’ ability to integrate and apply knowledge and skills, and nurture their creativity as well as collaboration and problem-solving skills, with a view to fostering their innovative thinking and entrepreneurial spirit.</li> </ul>

### 3. Professionalism and Commitment to the Community Domain

Area	Performance Indicator	Examples of Excellence
Professionalism and Commitment to the Community	3.1 Contribution to the Profession and the Community	<p>The teacher is able to:</p> <ul style="list-style-type: none"> <li>• have good moral character and positive values, and observe rules and the law;</li> <li>• strive to enhance his/her professional competence, proactively reflect on his/her teaching practices, and pursue continuous self-improvement;</li> <li>• perform the three professional roles of a teacher, namely a “caring cultivator” who supports students’ all-round growth, an “inspirational co-creator” who constructs knowledge together with students, and a “committed role model in teaching profession” who shows his/her professionalism;</li> <li>• daringly innovate and readily share exemplary teaching plans and practices with peers as reference;</li> <li>• promote the culture of educational research by taking part in research and writing articles on relevant subjects, conducting action research, planning or organising effective learning and co-curricular activities, and benefiting students and the school with the findings/outcomes;</li> <li>• promote professional exchange by actively participating in and organising local, national and international professional development training, sharing and exchange activities within or outside the territory, supporting cross-school or cross-territory collaboration, and establishing communities of learning and practice; and</li> <li>• proactively and enthusiastically organise or participate in the activities of subject societies, professional institutions, education-related community service groups or professional organisations, and take part in the work of government advisory bodies (including the formulation, implementation and review of education policies) by offering constructive advice, with a view to promoting education development and giving back to society.</li> </ul>

## 4. School Development Domain

Area	Performance Indicator	Examples of Excellence
School Development	4.1 Support to School Development	<p>The teacher is able to:</p> <ul style="list-style-type: none"> <li>• inspire peers and other stakeholders to work together to improve learning and teaching under the SE KLA;</li> <li>• promote a sharing and collaborative culture in the school by strengthening cross-subject collaboration, thus transforming the campus into a harmonious professional learning community;</li> <li>• dedicatedly assist the school in forging close links with the community and stakeholders, so as to secure support for student learning and school development;</li> <li>• actively promote home-school collaboration and foster mutual trust with parents for the benefit of student learning;</li> <li>• guide and assist peers in identifying with and realising the school’s vision and mission and promote continuous school development by sharing teaching exemplars and experiences, and highlight the essence of the school’s culture and ethos through a variety of effective means;</li> <li>• make effective use of internal and external resources to provide students with diversified learning experiences; and pursue continuing professional development through self-learning and with the sharing and assistance of professional learning communities, local community and science-related professional organisations, in order to contribute to the school’s long-term development and innovation and prepare well for future changes; and</li> <li>• actively promote STEM education and collaborate with teachers of different KLAs to empower all teachers and promote the overall development of the school.</li> </ul>

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