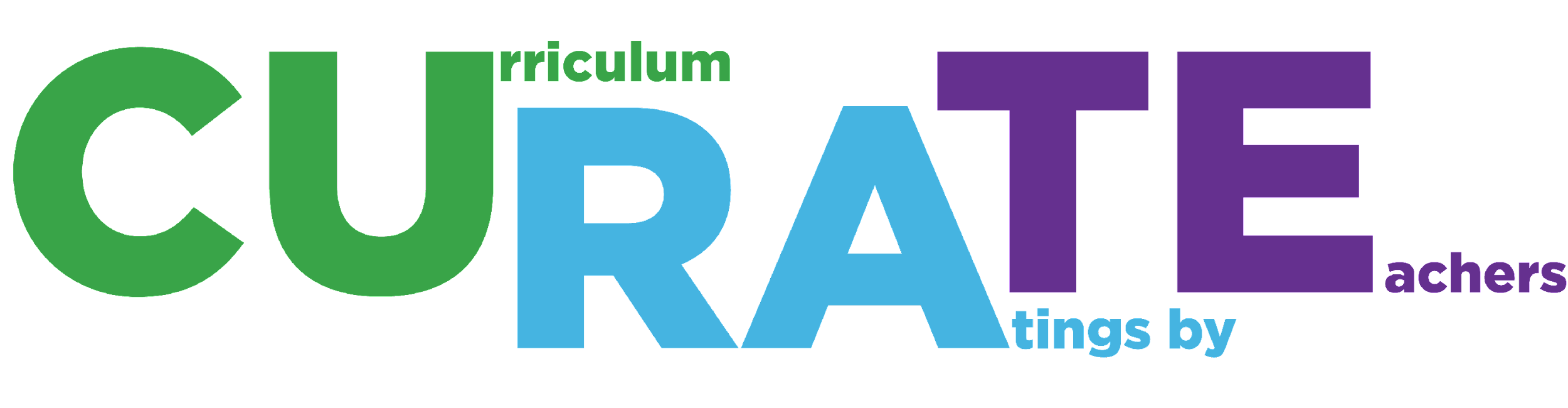
# Massachusetts CURATE Project: *Cu*rriculum *Ra*tings by *Te*achers

Science and Technology/Engineering Rubric

Purpose of the Rubric

The CURATE rubric is designed for use by CURATE panelists to evaluate core ***curricular***  
***materials*** for English Language Arts/Literacy; Mathematics; Science and  
Technology/Engineering; and Digital Literacy and Computer Science and may also be  
used by educators in other contexts.

***Core curricular materials*** are comprehensive resources designed for use with *all* students to access grade level content and standards in a given class over the course of a year or semester.

Through the use of the rubric, CURATE aims to elevate curricular materials that are high quality. A further distinction to clarify is connected to skillful implementation and aligned professional learning. The CURATE rubric evaluates for the content of the materials but **does not and is not intended** to measure implementation or professional learning. The Massachusetts Department of Elementary and Secondary Education (DESE) believes ***high quality instructional materials (HQIM)***are aligned to the Massachusetts content and practice standards, empower culturally and linguistically sustaining practice, and exhibit a coherent sequence of target skills, instructional practices, and understandings. These materials are accessible for all students, including students with disabilities, students working above and below grade level, English learners (ELs), and students of color. HQIM should strongly support teachers in their everyday work to be inclusive and culturally and linguistically sustaining.Curricular programs that receive an overall rating of ***“meets expectations”***or ***“partially meets expectations”*** via CURATE are considered HQIM. Although materials may be rated “high quality” this does not mean they are perfect. Materials rely on the skillful implementation of teachers who need to consider their local contexts and student needs. Schools or districts should also consider their local priorities and their student and teacher needs when analyzing CURATE reports since the challenges reported may impact districts differently.

## Guidelines for Review

* Review and document all evidence before deciding on ratings.
* Consider quantity as well as quality of evidence for each indicator.
* Consider evidence of high quality as well as evidence of low quality.
* Do not feel compelled to weigh each indicator and criterion equally.
* Do not consider provided examples to be exhaustive or restrictive.
* If evidence is lacking for an indicator, flag it for further data collection.

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## Sources of Evidence

* The product itself: unit and lesson plans, teacher guides, student-facing resources, associated software, and other components
* Other credible and comprehensive reviews of materials, such as those by [EdReports](https://edreports.org/),
* Perceptual data, such as survey responses and focus group findings, from educators with experience using the product in schools
* Information—such as product specifications and videos of teachers using the product—provided by its developers or publishers
* Research findings: see criterion 5 below for guidance on how to evaluate and interpret research on a product’s efficacy

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## Definitions of Ratings

* **3: Meets Expectations** – Most or all evidence indicates high quality; little to none indicates low quality. Materials may not be perfect, but Massachusetts teachers and students would be well served and strongly supported by them.
* **2: Partially Meets Expectations** – Some evidence indicates high quality, while some indicates low quality. Teachers in Massachusetts would benefit from having these materials but need to supplement or adapt them substantively to serve their students well.
* **1: Does Not Meet Expectations** – Little to no evidence indicates high quality; most or all evidence indicates low quality. Materials would not substantively help Massachusetts teachers and students meet the state’s expectations for teaching and learning.
* **?: Insufficient Evidence** – More evidence is needed before a rating can be justified. If you are unsure about a rating because you lack relevant information, be sure to choose this option instead of “defaulting” to a rating of Partially Meets Expectations.

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## Rubric Structure

| ***Domains*** | Standards Alignment | | Classroom Application | | |
| --- | --- | --- | --- | --- | --- |
| ***Criteria*** | Scope and Progression | Approach to Instruction | Accessibility for Students | Usability for Teachers | Impact on Learning |

## Rubric

| **Domain: Standards Alignment** | | | |
| --- | --- | --- | --- |
| **Criterion** | **Indicator** | **Notes and Tips** | **Further Reading** |
| **1. Scope and Progression**  *Note:* This rubric was developed for the CURATE project, which evaluates materials that have previously been reviewed for alignment to college- and career-ready standards. If using this rubric to review materials not already screened for some degree of standards alignment, consider adding or expanding indicators to ensure a comprehensive evaluation. | 1. **Materials’ expectations align to grade-level standards:**  * **Disciplinary Core Ideas are addressed at appropriate levels.** * **Science and Engineering Practices are addressed at appropriate levels.** * **Massachusetts-specific standards are addressed (e.g., technology/ engineering in K-8).** | * Focus on a comprehensive review of alignment to the MA standards. The MA standards generally reflect, but do not always exactly match, the [Next Generation Science Standards (NGSS)](https://www.nextgenscience.org/). MA specific elements are found in the crosswalk documents and are identified in the standard as coded with (MA) at the end (e.g., 6.MS-ETS1-6(MA), HS-PS2-9(MA), etc). * The goals of the Science and Engineering Practices (SEPs) are to engage students in the habits of mind of scientists and engineers and to help students understand how scientific knowledge develops. The SEPs should be evaluated to the depth of the grade-band. * MA’s adaptation of the NGSS middle school (grades 6-8) standards were assigned to specific grades (e.g., 7.MS-LS2-3); the NGSS for middle school are not assigned to specific grades (e.g., MS-LS2-3). Although the grade level alignment of standards should not factor into the overall rating of a curriculum product, the grade level in which the curriculum addresses standards may be important to note (e.g., in a curriculum, if all Earth & Space Science (ESS) standards are addressed in grade 6). | * [MA 2016 STE Curriculum Framework](http://www.doe.mass.edu/frameworks/current.html) * [MA-NGSS Crosswalks](https://www.doe.mass.edu/stem/ste) identify where MA standards differ from the NGSS   + [PK-5](https://www.doe.mass.edu/stem/ste/prek-5-crosswalk-ngss.xlsx) *(download)*   + [6-8](https://www.doe.mass.edu/stem/ste/6-8-crosswalk-ngss.xlsx) *(download)*   + [High School Earth and Space, Biology, Chemistry, Physics, and Engineering/Technology](https://www.doe.mass.edu/stem/ste/hs-crosswalk-ngss.xlsx) *(download)* * <https://ngss.nsta.org/PracticesFull.aspx> - Practices progression * [Science & Technology Engineering Standards: Connections to the Mathematics and English Language Arts /Literacy Standards](https://www.doe.mass.edu/stem/ste/mrste-connections.docx) *(download)* aligns MA standards with NGSS Disciplinary Core Ideas (DCIs) and grade-band Science and Engineering Practices (SEPs) to math and ELA/literacy standards. Instructional Guides   + [PK-Kindergarten](https://www.doe.mass.edu/sfs/earlylearning/resources/gpkle.docx)   + [3-5](https://www.doe.mass.edu/stem/ste/g3-g5.pdf)   + [6-8](https://www.doe.mass.edu/stem/ste/g6-g8.pdf)   + [HS Biology](https://www.doe.mass.edu/stem/ste/hs-biology.pdf)   + [HS Physics](https://www.doe.mass.edu/stem/ste/hs-intro-phys.pdf) * [Design Principles for Engaging MLLs in Three-Dimensional Science](https://files.eric.ed.gov/fulltext/ED603928.pdf) (Wisconsin Center for Education Research) |
| 1. **Materials facilitate coherent progressions of learning within and across grade levels:**  * **Concepts build on one another.** * **Students take increasing responsibility for practices.** | * Coherence in STE can be exemplified in the following ways:   + Within a grade level - when standards are logically and purposefully bundled into units that build upon and relate to one another – in content knowledge, language learning, and use of the practices.   + Across grade levels – when units are logically and purposefully bundled by grade, and standards are addressed fully throughout the full sequence (e.g., a standard may be revisited over multiple grade levels because it is foundational, or because more depth can be attained by revisiting) * Investigating, sensemaking, and critiquing by students should progressively become more sophisticated, both in content and linguistic demand. | * DESE resources for coherent progression of standards:   + [STE Strand Maps](http://www.doe.mass.edu/stem/standards/StrandMaps.html)   + [Standards Navigator](http://www.doe.mass.edu/frameworks/search/) * [MA 2016 STE Curriculum Framework](http://www.doe.mass.edu/frameworks/current.html)   + [Appendix I](https://www.doe.mass.edu/frameworks/scitech/2016-04.pdf#page=101): Science and Engineering Practices Progression Matrix   + [Appendix III](https://www.doe.mass.edu/frameworks/scitech/2016-04.pdf" \l "page=134): Disciplinary Core Idea Progression Matrix * [Coherence From the Student Perspective](https://sites.nationalacademies.org/cs/groups/dbassesite/documents/webpage/dbasse_180270.pdf) (Reiser, Novak & McGill, 2017) * [Language Demands and Opportunities for ELLs](https://ul.stanford.edu/sites/default/files/resource/2021-12/03-Quinn%20Lee%20Valdes%20Language%20and%20Opportunities%20in%20Science%20FINAL.pdf) (Stanford University) |

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| **2. Approach to Instruction** | 1. **Materials use anchoring phenomena to build student understanding:**  * **Student questions and experiences drive learning.** * **Understanding and explaining phenomena are the goals of learning.** * **Phenomena connect concepts purposefully.** | * Anchoring phenomena require students to develop understanding of and apply multiple student-owned observations and investigations of events that can be explained by concepts in one or more of the STE standards. The standards that help explain the phenomena are the focus of the unit, and the anchoring phenomenon is revisited throughout the unit. Supporting investigations are analyzed by students to explain components of the anchoring phenomenon. Anchoring phenomena should not be limited to a “hook.” * Consider the extent to which student questions and experiences drive learning at the beginning and throughout a unit, how students are supported to engage with the phenomenon using their diverse cultural and linguistic resources, how new questions are generated after an investigation, and how those questions lead to the next investigation. * Materials may also use engineering design problems to build student understanding. In this case, supporting investigations should consistently revisit the design problem in order to help to define the design problem or evaluate and/or refine the design solution. * Using anchoring phenomena to build student understanding can be exemplified when the phenomenon leading a unit is supported by investigations throughout the unit, the results of those investigations are interpreted and applied, and the components of the phenomena are explained by students. | * [Quick Reference Guide: Phenomena in the Classroom](https://www.doe.mass.edu/stem/ste/qrg-phenomena.docx) *(download)*  STEM Teaching Tool #26: [Evaluating Curriculum Materials for Alignment with the New Vision for K-12 Science Education](http://stemteachingtools.org/brief/23)   * STEM Teaching Tool #28: [Qualities of a Good Anchor Phenomenon](http://stemteachingtools.org/assets/landscapes/STEM-Teaching-Tool-28-Qualities-of-Anchor-Phenomena.pdf) * STEM Teaching Tool #31: [How to Launch STEM Investigations that Build on Student the Community Interests and Expertise](http://stemteachingtools.org/brief/31) * [Engaging Multilingual Learners in Science](https://drive.google.com/file/d/1a_2OF52TlfRAHMlxvQ9eDLrLAADzd6aW/view) (WIDA) * [Science Guidelines: Area of Focus 1; Interdependence of Science and Language Learning p.8](https://assets-global.website-files.com/5b43fc97fcf4773f14ee92f3/63583dfce1ea050576a1b335_ELSF_Science_Guidelines-02b.pdf) (The English Learner Success Forum, ELSF) |
| 1. **Materials purposefully and effectively integrate Science and Engineering Practices (SEP) with Disciplinary Core Ideas (DCIs):**  * **SEPs are used for specific, content-driven purposes.** * **SEPs are used for investigating, sense-making, and critiquing.** | * Consider using the [Science and Engineering Practices Progression Matrix](http://www.doe.mass.edu/frameworks/scitech/2016-04.pdf#page=111) to identify the quality and grade appropriateness of the use of practices in student tasks. * Practices must be integrated with content and cannot stand alone. * Although the MA standards are written to integrate a practice with the content, the content in the standard can be taught (or assessed) in combination with any practice. The practice integrated in the standard is a guide and is not the only practice that can be paired with that standard for instruction or assessment purposes. * Students use the practices to investigate, sense-make, and critique in culturally and linguistically inclusive ways:   + Investigating practices focus on students asking questions, planning, and carrying out investigations, and using mathematics and computational thinking to produce data that students can use to sense-make.   + Sensemaking practices focus on analyzing and interpreting data (e.g., to look for patterns and relationships), and constructing explanations or developing models to show understanding.   + Critiquing practices focus on engaging in argument from evidence, and evaluating and communicating information to deepen student understanding, and potentially lead to identifying additional investigations. | * [MA 2016 STE Curriculum Framework](http://www.doe.mass.edu/frameworks/current.html)   + [Appendix I](https://www.doe.mass.edu/frameworks/scitech/2016-04.pdf#page=101): Science and Engineering Practices Progression Matrix   + [Appendix III](https://www.doe.mass.edu/frameworks/scitech/2016-04.pdf" \l "page=134): Disciplinary Core Idea Progression Matrix * [Instructional Leadership for Science Practices](https://www.sciencepracticesleadership.com/) resources and tools * STEM Teaching Tool Practice Brief #3: [The Practices Should Not Stand Alone](http://stemteachingtools.org/brief/3) * [Doing and Talking Science: Meaning Making with ELs](http://stem4els.wceruw.org/resources/WIDA-Doing-and-Talking-Science.pdf) (STEM4ELs) * [Multilingual Learners as Scientists](https://www.cesa2.org/whitepapers/Multilingual-Learners-as-Scientists.pdf) (Language and Culture: Center of Excellence) |
| 1. **Materials purposefully and effectively integrate literacy and math in service of science:**  * **Reading and writing science-specific texts are used to interpret and explain science concepts.** * **Math is used as a tool to help students interpret and explain science concepts.** | * Consider the explicit integration of science concepts with math, ELA/literacy, and/or other discipline standards, and with language development. * The connections should be meaningful to students, cohesive and intentional throughout the unit, and strengthen the learning and doing of science and engineering. * Literacy and language practices should be integrated with content standards and relate most directly to the following SEPs: constructing explanations; engaging in argument from evidence; and obtaining, evaluating, and communicating information. * Mathematics practices should be integrated with content standards and relate most directly to the following SEPs: analyzing and interpreting data; and using mathematics and computational thinking. | * MA 2016 STE Curriculum Framework – [Appendix II](http://www.doe.mass.edu/frameworks/scitech/2016-04.pdf#page=128): Essential Role of Language, Literacy, and Mathematics for Science and Technology/Engineering * [Science & Technology Engineering Standards: Connections to the Mathematics and English Language Arts /Literacy Standards](https://www.doe.mass.edu/stem/ste/mrste-connections.docx) aligns MA standards with NGSS’s DCIs and grade-band Science and Engineering Practices (SEPs) to math and ELA/literacy standards. * STEM Teaching Tool Practice Brief #62 [What does Subject Matter Integration Look Like in Elementary Instruction? Including Science is Key!](https://stemteachingtools.org/brief/62) |

| **Domain: Classroom Application** | | | |
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| **Criterion** | **Indicator** | **Notes and Tips** | **Further Reading** |
| **3. Accessibility for Students**  *Note:* While no one set of materials can serve all students’ needs, they should strongly support teachers tasked with doing so. Standard II of the [MA model teacher evaluation rubric](http://www.doe.mass.edu/edeval/model/PartIII_AppxC.pdf) sets expectations for teaching all students. | 1. **Materials provide for varied means of accessing content, helping teachers meet the diverse needs of students with disabilities and those working above or below grade level.** | * Consider whether materials provide differentiated strategies and/or activities to meet the diverse needs of students working below proficiency, English Learners (ELs), and those of advanced learners. * Focus here on access to grade level content, not intervention or remediation. * Consider whether materials provide [multiple means of representation](http://udlguidelines.cast.org/representation) and opportunities for collaborative learning (e.g., partner work). * Consider intentional and varied points of access as an important strategy for ELs. * Materials should include multiple entry points for learning and leverage the strengths of all learners, including English learners. | * Guidebook for Inclusive Practice, [Example Artifact List](http://www.doe.mass.edu/edeval/guidebook/5b-exartifacts.pdf): illustrates ways in which instructional materials can support *inclusive practice*, which encompasses Universal Design for Learning (the focus of these two indicators), Positive Behavioral Interventions and Supports, and Social and Emotional Learning * [Universal Design for Learning Guidelines](http://udlguidelines.cast.org/?utm_medium=web&utm_campaign=none&utm_source=cast-about-udl) (CAST, 2018) * STEM Teaching Tools Practice Brief #59 [Creating Science Learning Experiences that Support Learners Receiving Special Education Services](https://stemteachingtools.org/brief/59) * [Science Guidelines: Area of Focus 2; Leveraging Student Assets](https://assets-global.website-files.com/5b43fc97fcf4773f14ee92f3/63583dfce1ea050576a1b335_ELSF_Science_Guidelines-02b.pdf) (ELSF), **p.9** |
| 1. **Materials provide for varied means of demonstrating learning, helping teachers meet the diverse needs of students with disabilities and those working above or below grade level.** | * Consider whether materials provide students the support needed to succeed on tasks and activities, helping meet the diverse needs of students with disabilities, English Learners, and those below and above grade level. * Focus here on demonstration of grade level learning, not intervention or remediation. * Consider whether materials provide [multiple means of action and expression](http://udlguidelines.cast.org/action-expression) and opportunities for students to make choices. * Materials should include multiple modes of assessment to demonstrate learning. * Consider intentional means of demonstrating learning as an important strategy for ELs. |
| 1. **Materials help teachers ensure that students at various levels of English proficiency have access to grade-level content, cognitively demanding tasks, and opportunities to develop academic language in English.** | * Materials should offer supports specific to English learners, (e.g., references to cognates, as-needed scaffolding, and entry points to amplify—rather than simplify—complex language) as well as supports that benefit ELs among other learners (e.g., repeated exposure to academic vocabulary, and opportunities to develop academic language in English). * Materials should support teachers to [develop ELs’ content knowledge and English proficiency simultaneously](https://wida.wisc.edu/resources/implementation-guide-wida-eld-standards-framework) by using the WIDA standards framework to identify the language expectations, forms, and features students need to communicate information, ideas and concepts necessary for academic success in the science content. * Materials should support teachers to [differentiate language demands for ELs while maintaining cognitive demand](https://wida.wisc.edu/resources/implementation-guide-wida-eld-standards-framework) and access to grade level content. * Supports could be language specific, language family generalized, and/or inclusive of home languages. | * DESE’s [EL Blueprint for Success](https://www.doe.mass.edu/ele/blueprint/dashboard.html) * [Multilingual Learners as Scientists: The synergy of NGSS and WIDA](https://www.cesa2.org/whitepapers/Multilingual-Learners-as-Scientists.pdf) * STEM Teaching Tools Practice Brief #27 [Engaging English Learners in the Science and Engineering Practices](https://stemteachingtools.org/brief/27) * [The 2020 Edition](https://wida.wisc.edu/teach/standards/eld/2020) (WIDA Consortium) * [Examples of relevant resources](https://wida.wisc.edu/resources/implementation-guide-wida-eld-standards-framework) (WIDA Consortium):   + Sensory supports (e.g., real-life objects, manipulatives, videos)   + Graphic supports (e.g., charts, tables, graphs, timelines)   + Interactive supports (e.g., pair and group work, software) * [Science Guidelines: Area of Focus IV; Supports and Structures for Science and Language Learning](https://assets-global.website-files.com/5b43fc97fcf4773f14ee92f3/63583dfce1ea050576a1b335_ELSF_Science_Guidelines-02b.pdf) (ELSF, p.11) |
| 1. **Materials include questions and tasks that affirm and value diverse identities, backgrounds, and perspectives.** | Questions to consider:   * Do the materials consistently elevate diverse backgrounds, perspectives, languages, and identities to deepen learning? * Do the materials consistently promote recognition of the validity and worth of all cultures and languages? * Do the materials consistently provide factual, historical recognition of the contributions of scientific thinkers from a broad variety of cultures to the development of concepts and applications related to the content? * Do the materials consistently support teachers to recognize their own biases? * Do the materials consistently include real-world data that reveal systemic inequities? * Do the questions and tasks help teachers to actively draw upon students’ diverse backgrounds to help them:   + deepen learning   + make real-life connections   + examine their perspectives and learn about others’   + help them advance their thinking and actions about equity, power, and anti-racism? | * [Assessing Bias in Standards and Curricular Materials](https://greatlakesequity.org/resource/assessing-bias-standards-and-curricular-materials) (Coomer, Skelton, Kyser, Thorius, & Warren, 2017) * [The Culturally Responsive-Sustaining STEAM Curriculum Scorecard](https://steinhardt.nyu.edu/sites/default/files/2021-02/CRSE-STEAMScorecard_FIN_optimized%20%281%29.pdf) (New York: Metropolitan Center for Research on Equity and the Transformation of Schools, NYU, 2021) * MA 2016 STE Frameworks – [Guiding Principles](https://www.doe.mass.edu/frameworks/scitech/2016-04.pdf#page=17) * [Culturally & Linguistically Sustaining Practices (mass.edu)](https://www.doe.mass.edu/instruction/culturally-sustaining/default.html) * STEM Teaching Tools Practice Brief #15 [Overview: How Can We Promote Equity in Science Education?](https://stemteachingtools.org/brief/15)   [DESE is collecting samples of openly available curricular materials that exemplify valuing diverse backgrounds, perspectives, and identities. To nominate a resource to be featured here, contact [DESE-CURATE@mass.gov](mailto:DESE-CURATE@mass.gov).] |
| **4. Usability for Teachers**  *Note:* Materials should strongly support teachers in their everyday work. Standard I of the [MA model teacher evaluation rubric](http://www.doe.mass.edu/edeval/model/PartIII_AppxC.pdf) defines expectations for teachers related to curriculum, planning, and assessment. | 1. **Lessons and tasks advance student learning with clear purpose.** | Consider whether:   * The intended purpose of each lesson and task is clear, and content and language learning are interdependent. * Lessons and tasks serve their intended purposes effectively. | * Next Generation Science Storylines Curricular [Routines](https://www.nextgenstorylines.org/tools) * [Science Guidelines: Area of Focus 1; Interdependence of Science and Language Learning](https://assets-global.website-files.com/5b43fc97fcf4773f14ee92f3/63583dfce1ea050576a1b335_ELSF_Science_Guidelines-02b.pdf) (ELSF)   [DESE is collecting samples of openly available curricular materials that exemplify valuing diverse backgrounds, perspectives, and identities. To nominate a resource to be featured here, contact [DESE-CURATE@mass.gov](mailto:DESE-CURATE@mass.gov).] STEM Teaching Tool #26: [How Can Assessments be Designed to Engage Students in the Range of Science and Engineering Practices?](http://stemteachingtools.org/brief/23)   * [Science Guidelines: Area of Focus IV; Supports and Structures for Science and Language Learning](https://assets-global.website-files.com/5b43fc97fcf4773f14ee92f3/63583dfce1ea050576a1b335_ELSF_Science_Guidelines-02b.pdf) (ELSF, p.10) * [Science and Technology/Engineering: Massachusetts Curriculum Frameworks 2016](https://www.doe.mass.edu/frameworks/scitech/2016-04.pdf) (p.23) |
| 1. **Materials support teachers with suggested classroom routines and structures (e.g., grouping strategies).** | * High leverage *instructional practices* and *routines* should appear with regularity and consistency (e.g., the classroom set up, norms, and protocols for scaling student discussions from small groups to a full class discussion to make sense of observations/data obtained during an investigation) in the materials.   + *Routines* should encourage equitable and inclusive student participation that support the simultaneous development of language and content learning. * *Structures* (e.g., pair work, stations, talk protocols, speaking prompts, listening/note taking tools, group work roles) may include best practices for set up and cleanup of lab materials, teacher prep prior to class, timing and structure of a typical lesson, classroom norms and appropriate groupings for components of the lesson (e.g., large group, small group, partner, independent).   + Structures should be designed to broaden participation and cultivate collaboration among students, including English learners. * Materials provide resources to support productive student discourse. * Materials provide resources to actively avoid potential bias in grouping strategies. |
| 1. **Pacing is reasonable and flexible; the curriculum can be implemented effectively within a typical school year.** | Consider whether:   * Time estimates for lessons and units are accurate. * Required number of minutes per day and days per year are feasible. * Flexible options exist for a variety of school schedules and unforeseen circumstances. |
| 1. **Materials include informal and formal assessments that help teachers measure learning and adjust instruction.** | Consider whether:   * Assessments help provide multiple opportunities to identify students’ misconceptions and gaps in content knowledge or language learning. * Materials guide teachers toward next steps based on assessment data (e.g., reteaching, reassessing, continued practice). |
| 1. **Materials include rubrics, exemplars, or other resources to help teachers set clear and high expectations for students.** | In addition to rubrics and exemplars, relevant resources might include:   * Checklists for students to use in peer or self-assessments * Annotated student work at various levels of achievement, including non-exemplars, or student work at different levels of English development |
| 1. **Materials include guidance and resources designed specifically to build teachers’ knowledge.** | Relevant supports might bolster aspects of *content knowledge* (e.g., explaining disciplinary core ideas, demonstrating science and engineering practices) as well as *pedagogical content knowledge* (e.g., appropriate instruction for student engagement in science and engineering practices in order to investigate, sense-make, and critique), or of culturally and linguistically sustaining practice.   * Do the materials provide a range of supports for teachers that include both topic understanding, language development, and specific lesson/standards guidance?   + Formats might vary: consider callout boxes and annotations in lessons, videos of classroom instruction, implementation guides, and more. * Do the materials support teachers to recognize their own pedagogical biases? * Do the materials provide context for teachers to develop their sociocultural consciousness by contextualizing historical frames and providing various cultural developments for similar concepts? * Do the materials provide teachers with guidance on how to approach, enhance, and customize lessons to be inclusive and responsive to the diverse identities of students, inclusive of linguistic, racial, ethnic, and gender diversity? | * Subject Matter Knowledge (SMK) Guidelines set expectations for Massachusetts educators’ content knowledge. Information about SMKs is available on DESE’s [educator preparation page](http://www.doe.mass.edu/edprep/resources/guidelines-advisories/). * [Designing Educative Curriculum Materials to Promote Teacher Learning](http://www.project2061.org/research/ccms/site.archive/documents/Promote_Teacher_Learning.pdf) (Davis & Krajcik, 2005) |
| **5. Impact on Learning**  *Note:* For CURATE reviews, DESE’s research office determines ratings for this indicator and criterion. | 1. **Research demonstrates that the materials have a positive impact on student learning.** | * Research that meets expectations:   + Falls into evidence tiers 1, 2, or 3 as [defined by ESSA](https://www2.ed.gov/policy/elsec/leg/essa/guidanceuseseinvestment.pdf).   + Concerns the specific product under review, not just pedagogical strategies the product incorporates.   + Is conducted by an independent, disinterested party. | * DESE’s [“How Do We Know?” Initiative](http://www.doe.mass.edu/research/howdoweknow/) helps educators gather, assess, and use evidence to make informed decisions about programs and practices. |