



# Open Educational Practices and Culturally Responsive and Sustaining Practices in Four K–8 OER Programs

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# Executive summary

## Summary of evaluation purpose and methods

This evaluation examined the intersection of open educational resources (OER), open educational practices (OEP), and culturally responsive and sustaining practices (CRSP) in four K–8 OER programs that provide full online courses that are freely accessible and adaptable. While the OER movement has long been animated by principles of equitable access to education and social justice (Bali et al., 2020; Geser 2012), the OER field has evolved somewhat adjacent to the field of work by scholars and activists who are squarely focused on culturally responsive teaching and anti-racist education. OER focuses on the *materials* that are available to teachers and other educators, whereas OEP are the *practices* that contribute to empowering learners. Advocates of OEP have explored how the practices align with concepts of social justice, including a shift from academic content to the learning process and from teacher-centric to student-centric pedagogies (Bali et al., 2020). While OEP are not inherently focused on centering diverse racial/ethnic and linguistic cultures, some scholars, such as Lambert (2018), propose that OEP should be a space for “non-privileged learners who may be under-represented in education systems or marginalized in their global context” (p. 239).

Scholarship on both OEP and CRSP centers students and their cultural backgrounds and advocates for drawing from students’ cultural references to validate and affirm students’ linguistic and cultural heritage (Brown & Croft, 2020; Ehlers, 2011; Gay, 2002; Powell et al., 2016). Both bodies of literature emphasize the importance of building students’ sense of belonging and are oriented toward social constructivist pedagogy. CRSP thinkers, however, place more emphasis on building students’ identities as disciplinary scholars and on emancipatory stances (e.g., embracing an explicit social justice and activist stance) and collective empowerment (Freire, 1973/1998; Ladson-Billings, 1995). OEP researchers have described students as knowledge generators and contributors to the knowledge “commons” (DeRosa & Jhangiani, 2017), with more recent expansions into considering how OEP programs can more explicitly address and embed culturally responsive and anti-racist principles (Bali et al., 2020; Lambert, 2018).

The K–8 OER evaluation team sought to explore the connections between OEP and CRSP, specifically in K–8 online, openly accessible curriculum programs that each provide full-course materials for either English language arts, mathematics, or science. The team looked at the design, implementation, and desired impact of each program, focusing on how each program defined and implemented seven constructs that encompass OEP and CRSP: classroom culture of care, critical consciousness, free and open access, generating new knowledge, high and equitable standards, inclusive content, and student agency and ownership.

## Key findings

### Design

*OER programs focus on being open and accessible as part of program design and strive to embed culturally responsive components in materials and professional learning.*

The four programs in this evaluation each embed aspects of OEP and CRSP in their program design. Each program has licensing to meet its perceived needs, and each has both freely accessible and fee-based professional learning. For each program, external stakeholders

participated in the design process—in some cases, these stakeholders were district and state users of the materials. In other cases, they were curriculum and equity experts. Two programs provided descriptions of the organizational journey toward equity as part of the design process.

- **Program A:** Current editions of the curriculum and professional learning materials use the CC BY-NC license. The shift to noncommercial licensing has allowed flexibility in choosing distribution partners while still being free and open for education entities. Program A extends the importance of CRSP to its internal equity practices, noting that “equity can’t be an add on, it can’t be a standalone, it has to become immersive in the fabric of our organizational culture.”
- **Program B:** Resources were allocated to include multiple voices in the design process, from curriculum developers to state and local practitioners. Two OER design elements, free and open access and adaptability of materials, were key to the overall program design, which included collaborative design and ongoing revisions. The program uses a CC BY license, and its design principles incorporated key CRSP constructs, including classroom culture of care, high and equitable standards, inclusive content, and student agency and ownership.
- **Program C:** Materials currently use a CC BY license, while professional learning materials use a CC BY-NC license. Program C developers describe that as an organization, they have worked to develop a common understanding of CRSP; they say it all “starts with the idea that all students are capable learners.” The developers “don’t say that our curriculum itself is culturally responsive, we say that we’re supporting teachers who are implementing culturally responsive pedagogy with the resource of our curriculum ... we don’t intend to dictate what’s going to happen in the classroom itself but we do want to serve as a resource.”
- **Program D:** The K–5 openly licensed curriculum is still in development and is being licensed under CC BY-NC. The materials design emphasizes student agency and ownership, inclusive content, classroom culture of care, and high and equitable standards. The preK–5 curriculum writing team has also sought input from other perspectives and expertise, including content experts, curriculum design experts, and experts in universal design for learning and multilingual learners.

## Implementation

*Implementation of K–8 openly licensed curriculum requires teachers to examine their own practices, make pedagogical shifts toward student agency and active learning, and understand the connections between shifts and culturally responsive and sustainable practices; for all of this, professional learning and systemic support is critical.*

Implementation of all four OER programs demonstrated both the great potential of these programs for promoting pedagogical shifts among teachers toward student agency and active learning, and the challenges inherent in such an ambitious project. Each program provides professional learning to accompany its free materials with different types of fee structures, which raises questions about accessibility. Teachers described both excitement and challenges with the programs, and they described differing levels of comfort with culturally responsive and sustaining practices, particularly critical consciousness, or encouraging students to think critically about current or social justice issues.

- Originally, **Program A** developers viewed their free written curriculum materials as embedded professional learning, with teacher supports in each lesson, but found that teachers did not take full advantage of the resources. In response, they have expanded their suite of (mostly) fee-based professional learning offerings. The curriculum

materials are written with strong pedagogical and content strategies to increase intellectual capacity in students. Assignments are challenging without being evaluative and use nontraditional methods from the arts.

- To successfully implement **Program B**, both developers and users agreed on the importance of transforming teaching practices and noted the importance of professional learning opportunities and systemic support in that process. Teachers who we spoke with universally celebrated the changes they have made in their teaching practice through the program, while also expressing concern about their perceived lack of autonomy. In this evaluation, we spoke with educators who have the support of their district leaders and who have received support for professional learning as well as for the pedagogical shifts from fact-based learning toward promoting critical thinking among students. Teachers who adopt the materials independent of district support, or teachers in districts that offer less access to professional learning, may find it difficult to implement this program and its design principles.
- Multiple teachers described that the **Program C** curriculum has allowed them to shift their practice from teacher-led instruction to promoting greater student agency and ownership. Program 3 developers noted that professional learning as a means for teacher buy-in was important to the problem-based learning model that supports high and equitable standards. Teachers who had minimal professional learning support found it extremely difficult to implement the curriculum.
- Professional learning materials and supports for teachers are a key component of the current curriculum development process for **Program D**. Developers reason that by providing free and open access to the curriculum materials, districts and schools can shift their resources toward teacher professional development, which they see as key to changing teachers' practices and mindsets. While most of the direct professional learning content is fee-based, the hope is that the cost is offset by providing free materials.

## Impact

*OEP and CRSP components are being measured in each program through developmental and implementation evaluations that look at changes in teacher practice.*

Each program is at a different stage in the research and evaluation process. To date, most studies are formative, with the results used to revise the materials, and additional implementation studies focus on changes in teacher practice. Designing impact evaluations that focus on traditional student outcomes of high-stakes assessments raises the question as to whether typical quantitative outcomes of high-stakes assessment results would measure the changes that are part of each program's theory of change.

- For **Program A**, at least two external evaluation studies have examined program impact; both studies found a significantly positive impact on both teacher practices and student outcomes. Multiple internally led case studies that describe specific school-level changes have also been published.
- For **Program B**, extended pilot studies have been implemented to address formative questions about usability of the materials, and results have been used to make revisions. They have also been engaged in ongoing research with partners focused on implementation questions. To date, none of the research has included rigorous impact evaluations on student or teacher outcomes. When asked what impact they have seen or want to see, developers agreed that the largest impact is teacher learning to facilitate student engagement in active learning.



- To date, no external studies have explored the impact of **Program C**, although a number of case studies are in process and program staff hope to receive funding to conduct a quasi-experimental study in the future. Developers have created a number of tools for self-reflection at the classroom, school, and district level as a way to measure impact and implementation.
- **Program D** is in the design stage of its curriculum and so has not completed any evaluations.

## Synergies between open educational practices and culturally responsive and sustaining practices

The current landscape of K–8 OER education, as evidenced in the four programs in this evaluation, provides affordable and high-quality curriculum options with explicit commitments to culturally responsive and sustaining practices; however, it does not explicitly embrace OEP and only provides minimal resources for teacher and student exploration of how to think critically about current or social justice issues—a necessary component of CRSP.

The evaluation team found that each OER program has incorporated the seven constructs of OEP and CRSP in different ways. Each program has found a certain synergy in how the affordances of open education contribute to program implementation. Developers have a clear vision for how their programs take advantage of the affordances of OER—particularly free and open access and, to a lesser degree, the adaptability of materials. Each program had strengths in multiple constructs associated with CRSP, particularly student agency, building a classroom culture of care, and promoting high and equitable standards. The developers rarely connected those constructs with OEP, however. They all identified similar challenges around embedding critical consciousness in teaching and learning, addressing the disconnect between statewide assessments and curriculum content, and promoting adaptability while maintaining fidelity to curriculum principles. Among their challenges, they did not list deepening an awareness and understanding of OEP.

Curriculum users (teachers and students) also describe the key constructs of both OEP and CRSP in the context of culturally responsive practices rather than OEP. Teachers focused more on the quality of the curriculum materials than on their characteristics of being an openly accessible and adaptable resource. Although teachers may be effectively implementing the changes in teacher practice envisioned in each program, they are not implementing a vision that includes promoting OER principles such as promoting teacher autonomy to adapt materials, nor are they engaging with the broader principles of open education. Rather, teachers valued the materials for being innovative and high quality and for providing students with equitable access to rigorous learning opportunities. K–8 OER developers face the ongoing challenge of determining whether open educational principles are sufficiently embedded in teachers' understandings of their curriculum and CRSP, or whether they need to more explicitly communicate to teachers how open educational principles can improve their practice. If the latter, the synergies and differences between OEP and CRSP need to be more clearly articulated than they currently are.

## Attitudes toward material adaptations and collaborative learning

The programs we studied present innovative approaches to address the challenges of adapting materials to student context and promoting collaborative learning through OER by offering free materials with an open license and designing lessons to feature student-centered collaborative learning models, but the full implementation of these programs is hindered by high-stakes assessment systems.

The feature of adaptability in OER offers a promising vehicle for culturally sustaining OEP: What would K–8 curriculum materials look like if they were adapted for students of color to drive learning and shape the public knowledge commons? Instead of a static textbook written by a publishing company, a teacher could use their own pedagogy to customize online materials to incorporate their students' cultures. In alignment with OEP, these adaptations could then be shared between classrooms to strengthen materials based on user experience. Researchers identified varying attitudes toward adaptations within and across OER program developers. Some developers expressed concern that teacher adaptations would make materials less aligned to the standards, while others were concerned that teachers would abandon innovative elements like encouraging student curiosity and learning through exploration in favor of the standards portion of the materials.

In alignment with culturally sustaining OEP, the four OER programs are dedicated to moving from traditional lecturing to student-led collaboration. Teachers described how they have shifted from standing at the front of the room and lecturing for a full period to walking around the room to different student groups and asking them questions and engaging in dialogue. Some teachers expressed concern with students' content knowledge in their ability to score highly on exams, but teachers universally agreed that their students are building critical thinking and practical skills.

Several material developers noted that the pressure of preparing for standardized testing takes up limited class time and leads teachers away from collaborative learning, and they are incorporating professional learning that expands teachers' conceptions of formative assessment so that they can assess students' thinking by listening to them verbally solve problems. Developers from another program observed that the practice of constant assessment becomes especially problematic with students who are "below grade level" (often, these are students of color). When students are academically "behind," teachers more easily abandon the collaborative model and rely on a constant cycle of assessment and review of old material through drilling, which means students perpetually miss out on grade-level content. OEP and CRSP offer frameworks for envisioning a transformative education. Scholars from both fields have documented how top-down systems of education with restrictive testing requirements disadvantage students of color and restrict the generation of new knowledge.

## Transforming K–8 teacher practices through open educational resources

Teachers deserve both materials and professional learning experiences that address the decisions they are making with their students in the context of the actual materials they are using.

We learned some key takeaways from end users regarding openly licensed curriculum adoption and adaptation. Successful implementation, including changes in teacher practice, requires continuous professional learning supports aligned to the curriculum. Unsurprisingly, in districts

that could allocate more resources for professional learning throughout the school year, teachers described gaining confidence with the curriculum such that they could make it their own after a few years of teaching with the materials. When teachers are able to make these student-centered shifts and share the learning with their students by creating a space for discovery and problem-solving, students described feeling agency and ownership of their learning and participating in a classroom culture of care.

While teachers contend with understanding the openly licensed curriculum and integrating their knowledge and prior experience, they are also faced with understanding how the curriculum can meet the diverse needs of their students. Developers take a number of steps to provide supports in the materials for students with disabilities and multilingual learners, but teachers did not always describe using those supports to meet the challenges they face, and teachers may benefit from more guidance to implement them.

In focus groups, teachers rarely brought up teaching in culturally responsive ways, particularly centering students' race or ethnicity or having conversations related to equity, unless the interviewer directly asked such a question. Focus group responses indicate a perception that teaching and understanding openly licensed curriculum materials and utilizing culturally responsive and sustaining practices can and do happen independently of each other. This perception may be due in part to what is emphasized in the early introductions of the curriculum, such as how the curriculum is structured or paced. Given that teachers' ability to implement culturally responsive and sustaining practices, pay attention to social justice issues and facilitate discussions among and with their students depends on their beliefs and knowledge, OER programs may do well to more strongly emphasize to teachers the curriculum as a resource to center equity and implement culturally responsive and sustaining practices.

## Introduction

This evaluation examined the intersection of open educational resources (OER), open educational practices (OEP), and culturally responsive and sustaining practices (CRSP) in four K–8 OER programs that provide full online courses that are freely accessible and adaptable. While the OER movement has long been animated by principles of equitable access to education and social justice (Bali et al., 2020; Geser 2012), the OER field has evolved somewhat adjacent to the field of work by scholars and activists who are squarely focused on culturally responsive teaching and anti-racist education. OER focus on the *materials* that are available to teachers and other educators, whereas OEP are the *practices* that contribute to empower learners (Box 1). Advocates of OEP have explored how the practices align with concepts of social justice, including a shift from academic content to the learning process and from teacher-centric to student-centric pedagogies (Bali et al., 2020). While OEP are not inherently focused on centering diverse racial/ethnic and linguistic cultures, some scholars, such as Lambert (2018), propose that OEP should be a space for “non-privileged learners who may be under-represented in education systems or marginalized in their global context” (p. 239).

### Box 1. Key terms

**Open educational resources (OER)** are teaching and learning resources that have an open intellectual property license that permits their free use and repurposing. OER can include everything from full courses, course materials, or modules, to textbooks, videos, tests, and assignments. Instructors may adapt, adopt, curate, or create openly licensed materials to support the redesign of a course. (Griffiths et al., 2022).

**Open educational practices (OEP)** are instructional practices that use the affordances of OER to empower learners as co-producers of knowledge and to value and incorporate diverse learners’ backgrounds, needs, and voices in their learning (Griffiths et al., 2022).

**Culturally responsive and sustaining practices (CRSP)** include components that were originally conceptualized by Ladson-Billings (1995) as culturally relevant pedagogy. These components include a focus on providing access to rigorous content, affirmation of students’ social and cultural backgrounds and experiences, and development of sociopolitical consciousness. These ideas were further developed in culturally responsive pedagogy to recognize and leverage the assets that students of color bring to the classroom (Gay, 2018); culturally sustaining pedagogy that includes centering community knowledge and sustaining rather than erasing culture (Paris & Alim, 2017); and anti-racist, abolitionist teaching that is centered around Black joy and genius (Love, 2019).

Even as students of color now comprise a majority of U.S. public school enrollments, their communities’ ontologies, or ways of being and knowing, are too often excluded from the classroom. Culturally sustaining pedagogy (CSP) is a theory in education that demands the de-centering of white middle-class norms;<sup>1</sup> that is, norms that permeate curricular content, definitions, and measures of success and behavioral expectations. In building on Ladson-Billing’s (1995) original conception of culturally relevant pedagogy, CSP scholars view marginalized students’ cultures not only as a *means* for delivering educational content but also the very *content* that should be taught and sustained through schooling (Paris & Alim, 2017). In this definition, culture is both the long-standing practices and belief systems of communities of color, as well as youths’ contemporary reworkings of that knowledge “to meet their current cultural and political realities” (Paris & Alim, 2017, p. 8). CSP scholars further assert that

<sup>1</sup> Examples of white middle-class norms include favoring individualism over collectivism, indirect versus direct communication styles, and written traditions over oral traditions to reproduce knowledge.

schools should develop students' ability to critique dominant discourse about real-world contemporary issues that affect them; a concept that Ladson-Billings (2014) refers to as *sociopolitical consciousness*.

Scholarship on OEP has a natural affinity for the theoretical underpinnings of CSP. The OEP movement grew from OER, which are instructional materials with an open license that can be reused and adapted without permission from, or the need to pay royalties to, the copyright holder (Butcher, 2011). With the increased awareness and use of OER, OEP scholars are now pushing to expand definitions of openness beyond materials and content, toward practices and processes (Bali et al., 2020; Ehlers, 2011). Conceptualizations of OEP are expansive; however, most hinge on centering students as knowledge generators who shape the knowledge commons (DeRosa & Jhangiani, 2017). OEP include the usage, adaptation, and creation of OER, as well as collaborative pedagogies between students, between teachers, and between students and teachers (Ehlers, 2011).

While OEP are not inherently focused on centering diverse racial/ethnic and linguistic cultures, some scholars are pushing to explicitly reframe OEP through a social justice lens (Bali et al., 2020; Brown & Croft, 2020; Lambert, 2018). Lambert (2018) proposes a definition that OEP should be “primarily by and for the benefit and empowerment of non-privileged learners who may be under-represented in education systems or marginalized in their global context” (p. 239). Bali et al. (2020) suggest a social justice framework whereby OEP address economic, cultural, and/or political injustice.

As this literature is emerging, CSP offers a critical lens to OEP outside of dominant white perspectives, which can in turn expand conceptions of the knowledge commons. CSP situates many concepts of equitable education present in OEP within a sociopolitical understanding of how and why academic settings are not “open” to begin with. For example, OEP espouse a shift from teachers as the “dispensers of knowledge” to facilitators of student-centered learning (Geser, 2012, p. 40); CSP contextualizes that within a “legacy of genocide, land theft, enslavement, and various forms of colonialism,” this top-down system of education serves to assimilate communities of color to dominant ways of thinking (Paris & Alim, 2017). Why do most Americans learn about Westward expansion as “manifest destiny” and not about the genocide of Indigenous peoples through this process? If Indigenous perspectives were honored as part of the knowledge commons, these lessons would include a more expansive account of U.S. history. OEP, in which knowledge is viewed as a public good, rely on collaboration and open sharing; CSP situates this collaboration as a natural component of communities of color's lifeways that are denied by hyper-individualism in the United States. OEP encourage the constant updating of materials to ensure relevancy; CSP offers an understanding that culture is not static but is being constantly redefined by youth in real time and should be circularized in academic settings.

For the K–8 OER Evaluation, the team considered CSP together with culturally relevant pedagogies (Ladson-Billings, 1995), culturally responsive teaching (Gay, 2018), and additional work such as abolitionist teaching (Love, 2019) and others. Because in practice many educators are more familiar with one or another body of knowledge but not with all, we chose to use the term *culturally relevant and sustaining pedagogies* (CRSP; see Box 1) to acknowledge their combined value. We examined the components of each body of knowledge, together with the components of OEP, and identified seven constructs that we then looked for in each program. For this evaluation, we sought to explore the connections between OEP and CRSP, specifically in K–8 full-course, online, openly accessible curriculum programs. Each of the four participating OER programs provide full course materials for either English language arts (ELA), mathematics, or science.

In this report, we describe the evaluation methods, briefly summarize each of the four participating programs, and provide a synthesis of the evaluation findings. We have kept the identity of each of the four programs confidential; we provided a full and detailed internal summary of our findings to each program for their own use. We have also published three briefs focused on three key findings: synergies between OEP and CRSP, challenges to implementation given high-stakes assessments, and visions and practices for transformations in teacher practice. We include summaries of these briefs in the discussion section of this report.

## Evaluation methods

SRI Education engaged in an evaluation of how four K–8 OER programs describe and implement the affordances of open educational resources (OER), open educational practices (OEP) and culturally responsive and sustaining practices (CRSP), focusing in particular on how OER and OEP contribute to or are aligned with CRSP. The evaluation took place from summer 2021 through fall 2022.

## Research questions

To obtain results that would be relevant to the OER programs involved, the SRI evaluation team determined the evaluation questions and overall design in collaboration with the funder, one or two people from each OER program who served as liaisons to the programs, and a team of external equity experts (experts in curriculum and culturally responsive and sustaining practices). This collaboration contributed to meeting the goal of asking questions that were of interest to multiple stakeholders. From these meetings, we developed evaluation questions focused on program design or intent, implementation, and impact.

- **Design:** How do the programs allocate resources and design their materials and educator supports to embed components of CRSP? What are the OEP and CRSP design elements?
  - How does the program define CRSP? How are OEP programs designed to promote CRSP?
  - How are the programs described in terms of thinking about materials, resources, practices? How are they designed to be different from non–open education programs?
  - How do program developers describe the role of stakeholder engagement (external experts, district leaders, teachers, and students) in the incorporation of CRSP in OER? How does stakeholder engagement reflect CRSP?
- **Implementation:** How do programs envision implementation of the components of OEP and CRSP? How do users describe implementation of the components of OEP and CRSP?
  - What supports are provided (e.g., professional learning, communities of practice, online resources), and how do they promote CRSP and/or take advantage of open education components?
  - What changes to teacher practice and student experiences are envisioned in the OER program? How do teachers implement the CRSP embedded in the program design? How does OEP contribute to that?

- How does the open licensing of materials contribute to adaptations of materials that expand or detract from CRSP implementation?
- What are the barriers to effectively using OEP? What are the barriers to effectively implementing CRSP?
- **Impact:** How are the components of OEP and CRSP being measured or not being measured?
  - What is measured (e.g., implementation of CRSP practices, use of OEP components)? How is it measured? How are the desired outcomes for students defined? Are those outcomes connected to CRSP? How do you capture culture, identity, and belonging?

## Evaluation design

In collaboration with the funder, the SRI team identified OER programs that met the following criteria: they are fully OER (that is, open, free, and adaptable), their developers design K–12 materials, and they are full course rather than supplemental. Developers from four programs agreed to participate in the evaluation. While these programs were chosen from among all K–12 programs, the evaluation focused on curricula in grades 4–8. Three of the four programs have been implementing the curriculum materials for at least two years, and the fourth was still in development, and agreed to share their draft materials with us.

An initial landscape review of all publicly available, full-course openly licensed materials provided background information to guide the evaluation design as well as a stand-alone document that describes the landscape of current K–12 OER programs in ELA, mathematics, and science (see Appendix A).

To collect data from each of the four programs, we conducted focus groups with developers and users as well as an in-depth review of portions of the openly licensed curriculum and professional learning materials.

- **Developers of openly licensed curricula and professional learning materials:** We conducted focus groups with developers of openly licensed curricula and affiliated professional learning materials from each of the participating programs.
- **OER users:** We also conducted focus groups with district administrators, teachers, and students who had experience using the openly licensed materials.
- **Program lead informational interviews:** We conducted informational interviews with each participating program lead, who answered questions about the program that emerged during data collection.
- **Document review:** We thoroughly reviewed samples of curriculum and professional learning materials from each program for evidence of OEP and CRSP.

## Instrument development

We developed focus group protocols for developers of openly licensed curricula and professional learning materials as well as for administrators, teachers, and students using the materials. We developed the protocols to address the three areas of design, implementation, and impact.

To review the curriculum and professional learning materials, we adapted existing protocols (e.g., Bryan-Gooden et al., 2019; Peoples et al., 2021) and incorporated additional indicators from current literature focusing on different aspects of CRSP (e.g., Bali et al., 2020; Derosa & Jhanghiani, 2017; Hammond, 2015). Initial drafts of the protocol were reviewed by team members who are curriculum experts in each of the three content areas as well as by the

OER program leads and the external equity experts. We then revised the protocol for usability, which resulted in the *Culturally Responsive and Sustaining Practices in Open Educational Resources: A Materials Review Protocol* (see Appendix B). The protocol includes seven constructs, each with from 5 to 18 indicators: classroom culture of care, critical consciousness, free and open access, generating new knowledge, high and equitable standards, inclusive content, and student agency and ownership (Table 1; see also Appendix C).

**Table 1. Constructs associated with open educational practices and culturally relevant and sustaining practices**

Construct	Definition
<b>Classroom culture of care</b>	Class materials and activities provide opportunities and guidance to develop strong relationships (e.g., safe space, ethics of care, respect between students and instructor, inclusive environment).
<b>Critical consciousness</b>	Class materials and activities provide teachers with (a) opportunities for self-reflection about their own biases and (b) guidance to encourage students to think critically about current or social justice issues (e.g., decolonized curriculum, explicit considerations of social justice).
<b>Free and open access</b>	Students and teachers can freely access materials and modify or adapt them to fit their specific needs.
<b>Generating new knowledge</b>	Class materials and activities allow opportunities for students and teachers to apply, evaluate, or create new knowledge, and this knowledge can become part of the open access materials (e.g., renewable or generative assignments).
<b>High and equitable standards</b>	Class materials and activities provide pedagogical and content tools to provide students opportunities to increase their intellectual capacity. <sup>a</sup>
<b>Inclusive content</b>	Class materials and activities contain inclusive content (e.g., bringing in diverse perspectives, providing teachers with tools to tailor content to students' backgrounds, needs, or interests).
<b>Student agency and ownership</b>	Class materials and activities allow for student agency or ownership (e.g., student has voice, choice, or leadership over what they learn, how they learn it, and how they share their learning).

*Note.* Construct definitions and indicators were drawn from Bali et al. (2020), Bryan-Gooden et al. (2019), Derosa & Jhangiani (2017), Ehlers (2011), Gay (2018), Ladson-Billings (1995), Love (2019), Paris & Alim (2017), Peoples et al. (2021), Powell et al. (2016), and Wiley (n.d.).

<sup>a</sup> Intellectual capacity is a term coined by Hammond (2015).

## Data collection

Data collection began with the landscape review of publicly available information on K–12 OER programs and continued with the document review and focus groups.

### Landscape review

Findings from the landscape review are based on publicly available information on websites as well as on reviews of K–12 ELA, mathematics, and science curricula conducted by EdReports. EdReports is an independent nonprofit organization that helps educators identify quality instructional materials based on their usability and alignment to college and career readiness standards. EdReports conducts a sequential review to determine if the instructional materials are aligned to the relevant standards, if all the standards are adequately addressed through the curriculum, and if teachers and students can easily use the materials. Curriculum developers frequently cite EdReports ratings to confirm the overall quality of their programs, and



EdReports estimates that districts representing over 11 million students use EdReports to implement their curricula. For additional information, see Appendix A.

## Document review

We used the *Culturally Responsive and Sustaining Practices in Open Educational Resources: A Materials Review Protocol* to review a sample of materials from each program (student and teacher materials for 1–2 modules as well as professional learning materials and design principles; Table 2). Two researchers reviewed each set of materials and met multiple times to calibrate the review process. The review resulted in a document with identified examples of each construct aligned with one or more of the construct indicators. The full team then met and identified cross-program findings.

**Table 2. Materials reviewed for each K–8 OER program**

Type	Program A	Program B	Program C	Program D
<b>Student- and teacher-facing materials</b>	One grade 7 module, including student materials and teacher guides	Two grade 8 modules, including student materials and teacher guides	One grade 5 unit, including student materials and teacher guides	One grade 5 unit, including student materials and teacher guides
<b>Professional learning materials</b>	One online professional learning module introducing the grade 6–8 curriculum	Online freely available professional learning summaries on both academic content and teaching practices	One professional learning module introducing the program’s learning approach	N/A
<b>Design principles</b>	A blog post describing the program’s approach to addressing race and culture	Webpages describing program approach and design principles	An implementation tool containing details on the program’s instructional vision	N/A

## Focus groups

Two to three researchers participated in each focus group, and meetings were audio-recorded for future reference. Sixteen people participated in the developer focus groups; each group had at least one person who had been involved in the original materials development and one person involved in developing professional learning opportunities. One focus group also included stakeholders who had been involved at the development stage, such as state curriculum leaders. We conducted teacher focus groups for three programs (one program was still at the development stage and did not have teachers experienced with the curriculum) and student focus groups for two programs (we did not interview elementary students from the two programs with elementary school curricula). We also interviewed a district administrator for one program. Each OER program lead provided researchers with an initial list of possible districts or schools to participate in the evaluation, and we followed up to gauge interest and recruit participants. Table 3 provides more information about the participants in each of the focus groups.

**Table 3. Characteristics of focus group participants**

Participant	Program A	Program B	Program C	Program D
Developers	2 curriculum designers	2 materials developers	2 curriculum developers	Program area leader
	1 professional learning designer	2 professional learning developers	3 professional learning designers	2 materials developers
		2 state stakeholders		
Administrators	N/A	One district curriculum director	N/A	N/A
Teachers	3 teachers	4 teachers with 1–3 years of experience using the curriculum	4 teachers	N/A
	1 curriculum lead			
Students	3 students	5 students completing 1 year of using the curriculum	N/A	N/A

## Analysis

We analyzed the results using a combination of grounded theory and existing hypotheses. We used the data to examine how the seven constructs at the design, development, and impact stages were conceptualized in each program; which constructs were essential to each program’s theory of change; and how the connection between the construct and OEP and CRSP was described within each program. We shared preliminary findings with the funder, with program leads, and with the equity experts. At those meetings, the participants identified a number of OER-specific questions that led to follow-up conversations with program leads to better understand how their programs had used the affordances of OER. We provided program case summaries to the funder and to each individual program. Findings were made public through three topical briefs and this final report.

## Limitations

As with all evaluations, this study faced certain limitations. First, the term “evaluation” may be misleading, as we were not evaluating the quality or impact of any of the participating programs. Rather, we evaluated the potential for OER programs to implement CRSP and sought to better understand how CRSP was integrated in the design, implementation, and impact of the programs.

As a small study with four program participants, the results of this evaluation are not generalizable beyond those who participated. Although we selected programs from the universe of K–12 OER programs, we ended up focusing on materials and users in grades 4–8. Within each program, we were not able to review a full year of materials, so the absence of a construct does not mean it was not there, only that we did not observe it.

Finally, we conducted the school-level focus groups in the spring and fall of 2022, and many districts understandably preferred not to burden their teachers with a research request. Even so, we were able to speak with teachers from six districts across the three active programs.

## Findings

### Availability of K–12 Open Educational Resources

As we note in the Evaluation Methods section, the SRI evaluation team used EdReports to examine the universe of full-course K–12 open educational resource (OER) programs (see also Appendix A). Overall, the OER landscape is characterized by a complex ecosystem of OER content developers and providers, whereby certain OER series are available through multiple providers. This complexity appears to be in part an outgrowth of the fluidity of OER programs and possibly their search for sustainable business models. The search for sustainable models may also explain why some OER providers use different Creative Commons (CC) licenses for different series or restrict access to subscribers, even for openly licensed content. There are multiple options available for openly licensed curricula that are aligned with standards in English language arts (ELA) and mathematics, although fewer in high school than earlier grades, especially in ELA. Given that high school mathematics and science courses are typically by subject area (algebra, calculus, biology, chemistry) rather than grade level, it is also possible that high schools are using OER texts such as OpenStax that were originally developed for postsecondary education. We identified nine options for ELA and 11 options for mathematics that at least partially meet usability standards as defined by EdReports, although grade coverage is uneven. For both ELA and mathematics, more programs are available that serve grades 6–8 than any other grade span. Fewer K–2 mathematics programs and 9–12 ELA programs meet usability standards for grades K–2. In addition to the online materials, most providers offer in-person professional learning workshops and virtual professional learning at an additional cost. Very few clearly state that they offer teacher conferences, coaching, or communities of practice. In general, we did not observe many restrictions on use of OER content. The majority of providers use CC BY licenses, and some include non-commercial and share-alike provisions, including those that require subscriptions to access their content.

### Program A: Schoolwide pedagogical shifts

Program A provides a full K-8 freely accessible set of curriculum materials, using a CC BY-NC 4.0 license. The program is designed around principles that include equity and inclusion, standards-based content, and students as active learners, among others.

For the Program A, we collected data via focus groups that included curriculum developers, professional learning developers, grade 6–8 teachers, and grade 8 students. For the document review, we reviewed grade 7 teacher and student materials from one unit, all professional learning materials from the introductory online module, and online materials about addressing topics of race.

### Design

Current editions of Program A curriculum and professional learning materials use the CC BY-NC license. The organization originally used CC BY license but found that, when commercial organizations decided to use the materials, developers felt forced into working with them in order to maintain the integrity of their products. They found that the original licensing had led to “iterations of the curriculum out in the world that we are not 100% behind in terms of how they are built into platforms and asking students and teachers to interact with the content.” The shift to non-commercial licensing has allowed for flexibility in choosing their distribution partners while the program materials are still free and open for education entities.

## Implementation

Program developers described speaking with districts that use Program A materials explicitly because they are free and accessible online. Districts know they will not lose access over time or need to re-license, which is a major benefit for resource-constrained districts. However, designers mentioned that “the number of states and districts who care about [our materials] being open-licensed has waned significantly over the last 3 years.” They noted that districts are pushing against open licensing because they do not want to send the message to teachers that they can customize the curricula. Districts expect “teachers to use the materials consistently.” Program A developers are ambivalent about material adaptations (an element of free and open access) but agree that adaptations are “oversold as a benefit of OER.” Developers are concerned with making sure teachers understand the purpose of the lesson and the standards it addresses before adapting it. They use the phrase “implementation with integrity, not fidelity” to describe their approach to teacher adaptations. Sometimes, districts request modifications that go against the program’s values and mission. Thus, developers often “think[s] of [localization] as a positive thing, but it can be a negative thing too.” The organization has created a new role designed to address districts’ requests for customizations. Developers briefly mentioned the organization is working on expanding its customized solutions capabilities by beginning to build out a new department to address district modifications.

Program A developers define CRSP as “approaches to education that celebrate, sustain, and leverage students’ cultural and social identities as integral parts of teaching and learning.” As an organization, they include equity throughout their work. They noted that “equity can’t be an add on, it can’t be a stand-alone, it has to become immersive in the fabric of our organizational culture.” This includes diversifying the board, diversifying their writers and consultants, and reimagining their human capital strategy and staff retention model. A developer noted “the equity work internally has, I believe, directly led to some changes in principles and policies of what we include in the curriculum.”

Program A teachers described CRSP as “taking into account the culture of each of our students and ensuring that [there are] entry points into the curriculum for each of them.” Students spoke highly of the inclusive context of the texts. One student commented, “It’s nice to see different cultures represented in different books.” Another student shared, “I like how it’s diverse, there’s not just one white character, it’s more complex.” Students enjoyed reading the texts when they reflected their own identities as well as others’ identities.

Teachers noted that students have the highest engagement with content that is socially altruistic and where students are able to think critically about current or social justice issues and be active in discussing historical patterns that repeat in the present. A student shared that the materials “tell you a lot about issues that happened in the world and how they were fixed.” Teachers have added field work and connections to experts to make the curriculum “come alive.” For example, students in one grade are working on a project called “Voices of Equity” in which they are studying food deserts in partnership with a local farm. A teacher further described that through their modifications, they seek to “empower students [to see that] ... things that are happening right now have happened before. What can we do to make some change?”

The materials provided multiple examples of high and equitable standards. The curriculum materials are written with strong pedagogical and content strategies to increase intellectual capacity in students. Assignments are challenging without being evaluative and use nontraditional methods from the arts. Developers envision students from culturally diverse backgrounds “feeling respected and welcomed in learning” and that they “see identity as important to [themselves] but also see ways of connecting [to others] across identities.” Developers want to give students a chance to be seen in the classroom in a way that does not presume that they do not have opinions about how they are represented.

The curriculum materials provide multiple opportunities for students to have agency and ownership over their learning. Often, activities encourage students to make connections to their own lives. Developers highlight their “intentionality behind creating psychological safety.” For example, teacher-facing materials contain discussion around language choices where there is not consensus in the community (e.g., how to discuss a disability). This guidance includes suggestions on navigating conversation in the classroom when students have differing opinions about language choice. This empowers students to make a different choice if they choose to. In alignment with free and open access, developers note this is a function of openly licensed materials; if students “made a different choice of language to use in their classroom, they could change whatever they needed to in the materials with no restrictions.”

Students described experiencing a culture of care in their classroom. One student said, “no one is scared to ask the teachers a question.” A student shared that her class has an environment where “no one is going to judge my opinion ... we have guidelines of what’s expected, if you find out you’re in a group with someone, you’re not allowed to go ‘aw dang it,’ the expectation is that you accept everyone’s opinion and give everyone a chance to speak.”

Originally, developers viewed their written curriculum materials as embedded professional learning, with teacher supports in each lesson. Due to concerns that teachers were not able to take advantage of the materials because of their density, the organization is working to simplify the curriculum materials and instead expand their suite of professional learning offerings, which often are fee-based. The teachers we interviewed for this study received intensive professional learning supports ranging from classroom visits with curriculum developers to in-person professional development sessions. Multiple teachers shared that they are anecdotally aware of how difficult it is to adopt the curriculum without sufficient professional learning supports. They believe implementation at their school was smooth because they “had a strong base in ensuring that kids collaborate, tricks in their back pocket to make sure that was happening, deep understanding of the assessment cycles because of the type of school we’re at.” Teachers expressed that the amount of content can be overwhelming, and often they do not complete all of the designated modules for the year. This can sometimes lead to a preference for breadth over depth, which a teacher described can lead to skipping some of the equity pieces. The teachers interviewed take into account how they can ensure their most marginalized students can still have access to the rigor level while taking into account their home lives.

## Impact

At least two external evaluation studies are looking at the impact of Program A on teacher and student outcomes. Additionally, multiple internally led case studies that describe specific school-level changes have been published.

## Summary

In this evaluation, we found that Program A curriculum materials embody many of the constructs we have identified as being associated with both OEP and CRSP. The data we collected from collaborators at multiple levels and our in-depth review of the curriculum materials show that stakeholders tend to identify the affordances of OEP most clearly during design and development, and highlight their commitment to making the materials free, accessible, and adaptable. During implementation, users described the strength of the program as its high and equitable standards, promotion of a classroom culture of care, and inclusive content.

The users we interviewed described high success in implementing the curriculum because of a schoolwide system of support for culturally relevant and sustaining practices and intensive

professional learning. Schools that do not provide the level of support we saw in our user focus groups may struggle to implement the program’s strategies to change teacher practice.

## Program B: Re-envisioning teaching and learning

Program B provides users with full courses in middle school and is expanding out into elementary and high school. The materials are licensed under CC BY, with free access to some professional learning resources. Additional professional learning can be contracted by districts or schools.

For Program B, we collected data via focus groups that included curriculum developers, professional learning developers, and state stakeholders, as well as teachers, students and administrators from one district in its third year of implementing the program. For the document review, we looked at teacher and student materials from two grade 8 modules. Our review focused on specific guidance to teachers around culturally responsive and sustaining practices (CRSP), and we also reviewed professional learning materials, including freely accessible videos.

### Design

The Program B design process allocated resources to include multiple voices in the design, from curriculum developers to state and local practitioners. The curriculum and professional learning developers described how the OER design elements of free and open access and adaptability of materials were key to the overall program design. In addition to teachers and administrators and content experts, development included multiple organizations as well as an equity panel specifically tasked with examining equity issues. This model had the benefit of incorporating multiple voices throughout the design process, which was possible in part because the materials were OER. That is, the materials were the creation of expert as well as practitioner knowledge, and the process of piloting and revising the materials was one way in which the program “generated new knowledge.”

### *Design features to promote open educational practices*

Program B developers and leaders described how their collaborative design process and ongoing revisions were possible because the materials are OER—specifically that they are online and easily revisable. Developers noted that because it is an OER program (CC BY), meaning that it is free and openly accessible and adaptable, they can make revisions quickly in response to emerging needs. They can prioritize maintaining high and equitable standards and maintain academic rigor without being constrained by the market. The developers noted that this aspect has allowed them to take more risks, to try things based on research that other curricula do not attempt.

One key benefit of materials being open and free is that the many teachers who search materials online independently can find the resources and download them. More than 35,000 teachers have registered on the program’s website to access the resources. The program sees the open licensing process as key to its commitment to offering a free, high-quality, complete curriculum to teachers. For teachers who are not in districts that use the full curriculum, open access is an important mode of distribution.

While adaptability is integral to being OER, the interviews with both developers and users demonstrated a commitment to adaptability in principle that is not always seen in practice. For example, developers expressed concern that teachers may choose to adapt materials toward more traditional pedagogies and thus lose some of the unique and core aspects of the

curriculum. Teachers described feeling constrained to follow a “script” that did not allow them to build on their existing content and pedagogical expertise, although they also noted that with more experience they expect to build their abilities to adapt appropriately.

### ***Design features to promote culturally responsive and sustaining practices***

The program materials include numerous references to specific strategies that promote a classroom culture of care, beginning with an overarching commitment to “developing and supporting classroom norms that provide a safe learning culture” and continuing with specific strategies. The materials are explicitly aligned to national standards and were produced by experts who are committed to high and equitable standards. The teacher guidance materials provide multiple examples of ways for teachers to concretely establish and maintain high and equitable standards for the diversity of students in their classrooms. Our review found examples of inclusive content to support teachers in thinking about the funds of knowledge students bring with them, but we did not find as many specific examples of how to specifically implement this content in the classroom. The curriculum also includes a number of design features that promote student agency, including a tool to generate, keep track of, and revisit student questions related to the content. Teachers are provided with guidance to allow students multiple ways to express their learning.

While curriculum materials are a key aspect of design, the professional learning materials that go with them are just as important. There was consensus that the materials are only one tool, and that shifting teacher understandings of instruction through professional learning is the key to meeting the mission to get students excited about the world around them.

## **Implementation**

During implementation, users described the strength of the program to be the high and equitable standards, student agency, and promotion of a classroom culture of care.

To successfully implement the program, all respondents agreed on the importance of transforming teaching practices. However, there is a potential for a disconnect between the need for transformed teaching practices and the commitment to teacher autonomy. Teachers described that they felt obligated to follow a script and did not feel able to use their existing expertise to teach or to innovate. The curriculum developers, on the other hand, said that they wanted teachers to make the curriculum their own, within the framework of the program’s principles. Teachers we spoke with universally celebrated the changes they made in their teaching practice through the program, while also bemoaning their perceived lack of autonomy.

In one area, progress monitoring and assessment, teachers expressed concern about the instructional shifts away from providing students with content and then testing them on it toward conceiving of students as critical thinkers. Teachers worry that students do not get access to as much content as in other curriculum options and that what they are learning is not measured on traditional state assessments. The program has room to improve on building teachers’ understanding of its assessment philosophy and comfort with the different assessment paradigm.

In this evaluation, we spoke with educators who have the support of their district leaders and who have received support for professional learning as well as for the pedagogical shifts away from emphasizing content toward emphasizing students as critical thinkers. Teachers who adopt the materials independently and may not have school or district support to implement changes, or teachers in districts where there is less than enthusiastic support, may find it difficult to implement the spirit of this program.

## Impact

Program B has been engaged in a multiyear process to develop its materials. Part of that process has involved extended pilot studies. The pilot studies address formative questions about the usability of the materials, and results have been used to make extensive revisions. Ongoing research with partners has focused on two questions:

- To what extent are teachers able to enact units with integrity to its distinctive principles?
- To what extent do program teacher tools and professional learning experiences support teachers to enact the curriculum with integrity?

To date, none of the research has included rigorous impact evaluations on student or teacher outcomes. When asked what impact they have seen or want to see, there was consensus that the largest impact is teacher learning to facilitate student engagement in active learning. While the impact on traditional state test scores remains important, there was consensus that changes in teacher practice and student learning would be deeper and not necessarily effectively measured by state assessments.

## Summary

All the programs evaluated in this study shared an acknowledgement that they have not engaged deeply with the construct of critical consciousness, neither for teachers nor for students. Program B developers described actively debating how to include social justice in the curriculum when teacher expertise in the area cannot be guaranteed. When asked directly about incorporating social justice in their teaching, teachers responded that they were not doing that. A district administrator said she had found that, despite an extensive professional learning on equity and multiple concrete examples throughout the materials, teachers she worked with were overwhelmed with all of the instructional shifts in the program, and for at least 2 years they had not been thinking in terms of equity.

When considering the relationship between OER, OEP, and CRSP in the Program B materials and implementation, we found that respondents most clearly articulated the importance of the materials being freely accessible as the key aspect of OER, followed by the ability to embed high and equitable standards. Respondents less frequently associated the program commitments to student agency, inclusive content, and classroom culture of care with being an OER program. The developers envision a long-term process, understanding that transforming teacher and other educator practices and beliefs takes time. To what degree these transformations require articulating their principles within OEP, or within a frame of CRSP, should continue to be part of the conversation.

## Program C: Openly licensed materials to transform teacher practice

Program C provides users with full courses in K–5. The materials are licensed under CC BY, with free access to some professional learning resources. Additional professional learning can be contracted by districts or schools.

For Program C, we collected data via focus groups that included curriculum developers, professional learning developers, and four grade 4–5 teachers from four school districts across the country. Teachers were recruited to the study through the program’s newsletter and were selected on a first-come, first-served basis. For the document review, we looked at teacher and student materials from one unit, and we also reviewed all professional learning materials from



one of the teaching practices modules. Finally, we reviewed the program’s Implementation Reflection Tool.

## Design

Program C developers described that as an organization, they had worked to develop a common understanding of CRSP—that it all “starts with the idea that all students are capable learners.” Through teacher supports built into the curriculum, developers hope to “build teacher capacity in terms of reflection: helping teachers think about where they are in terms of thinking about who their students are and what they can do.” Developers embed many of their teacher supports designed to promote CRSP into the curriculum materials, grounded in Ladson-Billing’s (1995) theory of “helping teachers use students’ cultures as a vehicle for learning.” Developers described that “the warmup routines that we have ... are also ways that students can think about their home culture—their funds of knowledge—whether it be from home or school.” They embed prompts for teacher facilitation that help students “think about what’s coming next ... making that connection between what they do know and what they’re preparing to learn.” Program C developers noted that “we don’t say that our curriculum itself is culturally responsive, we say that we’re supporting teachers who are implementing culturally responsive pedagogy with the resource of our curriculum ... we don’t intend to dictate what’s going to happen in the classroom itself, but we do want to serve as a resource.”

## Implementation

The Program C lead described that their curriculum is a necessary tool but not a sufficient condition for producing the changes in teacher practice that they envision. In alignment with the classroom culture of care construct, curriculum developers said “building relational trust” with students is a critical component of CRSP, and they believe this can be achieved through increasing teachers’ own content knowledge. Because “students of color ... are more likely to *not* have teachers with strong content knowledge,” developers have embedded teacher learning into their curricular materials. This was consistent with findings from the teacher focus group in which a teacher from a rural district with a high percentage of students of color described the difficulties of implementing these practices when teachers do not have the content expertise. Developers noted that building teacher content knowledge “gets [teachers] out of that habit of having one way to do things and allow[s] teachers to think ‘oh this is a different way that I can see it’” instead of labelling a student’s work as wrong. This in turn helps students “feel more confident in what they’re able to produce.”

Multiple teachers described that the Program C curriculum had allowed them to shift their practice from teacher-led instruction to promoting greater student agency and ownership. One teacher said that in comparison to a traditional textbook, Program C curriculum “has been absolutely exhilarating; students are more engaged and more involved.” Another teacher described that she had changed her practice and let students “take the reins of their own learning instead of dictating what they should and shouldn’t be doing.” The curriculum materials reflect this commitment to student agency and include multiple activities that require student participation and engagement. Materials are designed to allow students to contribute in their own words and teachers respond to student input. The guidance and professional learning materials make regular references to remind teachers to build on students’ previous funds of knowledge.

Program C developers noted the importance of professional learning as a means for teacher buy-in to the problem-based learning (PBL) model that supports high and equitable standards. Developers said they have done work to “empower our [professional learning] facilitators to push back when they hear teachers say things like ‘oh well my kids can’t ...’ and building in ways

to address those things when they come up.” The first unit of each course has supports to help educators develop their “community learning environment” as a way to build positive academic identities in students. Teachers whose districts paid for the formal Program C professional learning described higher success in implementing the PBL model. In contrast, a teacher from a rural district with less resources said that their district only provided one virtual session and it took place before the teachers had the physical materials.

Program C developers firmly believe in the sequence and PBL structure of their curriculum, and the organization is wary of adaptations that could disrupt their design. A curriculum developer stated, “Yes we want you to use [our curriculum], yes we want you to make sense of it in the context of your classroom but also don’t mess with what we did, it’s a good thing.” When districts change the unit order, they run the risk of losing teacher buy-in to the model. Developers said, “If teachers have not embraced student-centered collaborative problem-based learning then they’re not going to be able to use [our curriculum] effectively, they’re going to say ‘oh there’s not enough drill.’” One teacher corroborated the importance of understanding the full curriculum structure and PBL. In its first year of implementation, the teacher’s district decided to reorder the units. Teachers had minimal professional learning support, and the teacher said it was extremely difficult to implement and most teachers in her school had already abandoned the PBL model just months into the school year.

Developers identified an ongoing barrier to implementation being teachers’ beliefs about remediation and their hesitance with changing their practices. Developers noted that in remediating, teachers often “abandon parts of the curriculum to do this review and then the cycle continues, students are still behind because you’re still not teaching grade-level content.” Developers cited literature in stating “there is a way to [assist students behind grade level] in a way that bridges what they know with what they’re learning.” The program lead cited that this is especially challenging with students of color because teachers have biased beliefs about what students of color are capable of learning and approach them with a deficit perspective. One developer stated, “When you have teachers who have found success with direct instruction, and they are unwilling to let go of that perception of them as being the teacher who always gets the best scores, then they are unwilling to dig into what we know to be better learning and deeper conceptual understanding for the students because they’ve been drilling those kids and they have parents who expect that and its working great for them.”

The teacher support materials and professional learning could include more guidance on how to make real-life connections between academic content and students’ local contexts. The classroom culture of care construct could be strengthened through explicit conversations about how and why students from specific racial backgrounds tend to be left out as opposed to keeping the suggestions race-neutral. Hammond’s (2015) work on building awareness and knowledge in teachers about how culture comes into the classroom is a helpful framework in identifying ways to do this.

Developers were aware of how their curricula does not fully address critical consciousness and inclusive content, and they noted that moving forward they would like to explore using their curriculum to promote social justice. Although the program is in an internal process of developing an official position on the historical and institutional factors that lead to differential outcomes, researchers did not find many instances of activities tied to encouraging students to think critically about current or social justice issues in the curriculum materials. While some references to nondominant cultures are made, there is not much discussion about how it applies beyond being used as an example. Program C staff can look to a plethora of research that suggests that engaging in critical thinking around social justice issues is highly beneficial for students. While some educators believe that instruction should rely on content-focused concepts and not extend to sociopolitical concepts, Ladson-Billings (2017), among others, writes about

how “supporting students’ sociopolitical (or critical) consciousness” is “the neglected dimension of culturally responsive practices.”

## Impact

To date, no external studies have explored the impact of Program C, although a number of case studies are in process. Program staff hope to receive funding to conduct a quasi-experimental study in the future. Program developers have created a number of tools for self-reflection at the classroom, school, and district levels as a way to measure impact and implementation. The developers are still figuring out how to use the data collected through these tools, although they already use classroom observation data to improve their materials. The developers noted that these are important sources of feedback in understanding implementation of their program as well as more generally “where we are in education and in life today.”

## Summary

In this evaluation, we found that Program C curriculum materials embody many of the constructs we have identified as being associated with OEP and CRSP. The data we collected show that stakeholders tend to identify the affordances of OEP most clearly during design and development. A curriculum developer shared their enthusiasm with the program’s open features: “One of the keys to equity in education is high-quality curriculum in as many classrooms as possible ... if making [our curriculum] available for free is what it takes to get it in front of kids, then that’s an important part of what we do.” The data we collected through focus groups also emphasize the importance for both developers and teachers of professional learning to implement the design principles behind student agency and ownership, classroom culture of care, and high and equitable standards.

## Program D: Exploring social justice through high-quality materials

Program D provides a full course in grades preK–5 licensed under CC BY-NC, which allows free and accessible non-commercial use. The curriculum is currently in the final stages of development and is being used by teachers in the 2022/23 school year.

For Program D, we convened a focus group that included a preK–5 content specialist, the director of academics, and an external consultant with expertise in culturally responsive curriculum and social justice in education. For the document review, we looked at teacher and student materials from one exemplar grade 5 unit. Professional learning materials were not available at the time of the document review.

## Design

During the developer interview, we learned about the program’s approach and commitment to equity and culturally responsive and sustaining practices. Focus group participants emphasized four of the seven constructs of OEP and CRSP and described how they work together: student agency and ownership, inclusive content, classroom culture of care, and high and equitable standards. The program strives to be student-centered, such that the classroom becomes a learning community where students collaborate with peers in a safe space to learn from one another, have voice, and be present with what they bring from their home life. This approach enables students to see themselves in the academic content. In addition, the participants highlighted that a safe space to learn includes being “okay” to get answers wrong and that everyone learns from one another. Teacher materials will be developed to support student

questioning and will include “anchor charts” to provide students with a bank of terminology they can refer to. The curriculum brings in inclusive content by including a students' home experiences, and all of this contributes to high and equitable standards that encourage all students to learn. The preK–5 curriculum development team has also sought input from other perspectives and expertise, including content experts, curriculum design experts, and experts in universal design for learning and multilingual learners.

Program D demonstrates strong potential for building teacher practices of critical consciousness. First, among the curriculum development team and at the organization level, staff are engaged in their own practices to build and develop their own thinking about social justice issues through book discussions and ongoing trainings. Second, in the materials themselves, aspects of critical consciousness were most present in the types of topics students will explore and the process by which they engage in the topics, which includes five steps: (1) the problem; (2) the investigation/question; (3) the plan; (4) the action; and (5) the presentation.

Similarly, the exemplar unit provided evidence of inclusive content with a variety of instances for students to see diverse, non-stereotyped examples of the content. The teacher lesson plan, however, could benefit from incorporating guidance for how teachers can engage students' experiences and backgrounds, in particular regarding how to respond to varying student experiences with the content. For example, how does a teacher support and acknowledge the range of emotions or questions that may arise when a student shares their own experiences? When developing professional learning support materials, culturally and developmentally appropriate guidance for teachers as it pertains to sensitive topics will be important supports for teachers.

## Implementation

Professional learning materials and supports for teachers are a key component of the current curriculum development process. As one participant stated, “Culturally relevant teaching can't be implemented well if teachers don't have the right practices and mindset.” Some examples of the professional learning modules include (1) setting the stage to shift teacher thinking and (2) “why be an anti-racist educator?” Developers reason that by providing free and open access to the curriculum materials, districts and schools can shift their resources toward teacher professional learning, which they see as key to changing teachers' practices and mindset. While most of the direct professional learning content is fee-based, the hope is that the cost is offset by providing free materials. In addition, teachers can engage in a free online professional learning community, where teachers primarily use the space to share their supplemental materials.

While the program is intentional about making sure their curriculum materials are accessible and free, participants spoke less about other aspects of OEP, such as teachers' ability to adapt the materials for their own contexts. The community of practice spaces seem to be the only mention of or emphasis on modifying materials. Community-centered resources, such as supplemental materials created by teachers, are vetted by program staff to ensure the intent of the lesson is not changed.

## Impact

Because Program D is still in the development stage, no evaluations have been conducted to date.

## Summary

In our evaluation, we see promise and potential in Program D’s curriculum and provide the following recommendations to the program developers as they further refine their curriculum materials.

In our conversations with leaders, developers, and consultants, we heard a deep commitment to culturally responsive and sustaining practices, equity, and social justice for the curriculum they are developing. Our review of the initial materials shows some promising evidence that aligns with the constructs we have identified as being associated with OEP and CRSP. We encourage the design team to operationalize their core values in the materials even more. If they do not already exist, establishing design principles would help ensure that their mission is realized throughout their materials.

Program D should consider embedding more explicit teacher guides and supports within the lesson plan materials. There are a number of proposed topics related to social justice and life skills that will require teacher sensitivity and proper preparation to be able to create a learning environment that feels safe for all students. These supports should give teachers suggestions for working with students that need different levels of supports. For example, how should a teacher prompt and ask questions if a student is a multilingual learner or has special needs? Moreover, if a topic elicits negative feelings or reactions to an activity, what should a teacher look out for and help a student process? Lastly, these supports should also give teachers the tools to cultivate, within a group or whole class activity, an inclusive and positive classroom culture. Suggestions and feedback from teachers that implement these activities in their classrooms will likely yield the most insight. Other types of preparation for these types of lessons should include pre-exercises for the teacher to critically self-reflect as they build their CRSP.

## Discussion

### Synergies between open educational practices and culturally responsive and sustaining practices

The K–8 open educational resource (OER) programs in our study described using the affordances of OER more at the design phase than during implementation, focusing on licensing decisions and ensuring free access. While all programs retain free and open access, some have made licensing decisions that move toward more restrictive open licenses.

While OER generally include the provision of free and adaptable materials, the constructs associated with open educational practices (OEP) require changes in teacher practice that can be promoted through professional learning. The four programs in this study tended to promote user contributions primarily during the initial development and revision of materials by having teachers and administrators join the curriculum development teams. The program developers are less enthusiastic about having teachers and students modify materials once published.

When respondents described program constructs associated with OEP and culturally responsive and sustaining practices (CRSP), such as student agency, they associated the construct with their commitment to CRSP rather than as inherent in the program’s open educational stance. Each program promotes student agency and ownership, inclusive content, and a culture of care, but does not connect those constructs to the materials being OER. All respondents described

encouraging students to think critically about current or social justice issues, or critical consciousness, as the most challenging construct of CRSP to implement.

At the district and school levels, educators use the materials because of their perceived quality, with little awareness of the materials being OER, much less of their being part of an OEP. Differing theories on the role of teacher agency lead to different positions on adaptability of materials. The K–8 context may lead to different decisions about using affordances of OER.

The current landscape of K–8 OER education, as evidenced in the four programs in this evaluation, provides affordable and high-quality curriculum options with explicit commitments to CRSP but does not explicitly embrace OEP and only provides minimal resources for teacher and student exploration of critical consciousness—a necessary construct of CRSP. Developers have a clear vision for how their programs take advantage of the affordances of OER—particularly free and open access and, to a lesser degree, the adaptability of materials. Each program had strengths in multiple constructs associated with CRSP, particularly student agency, building a classroom culture of care, and promoting high and equitable standards. The developers rarely connected those constructs with OEP, however. They all identified similar challenges around embedding critical consciousness in teaching and learning, addressing the disconnect between statewide assessments and curriculum content, and promoting adaptability while maintaining fidelity to curriculum principles. Among their challenges, they did not list deepening an awareness and understanding of OEP.

Curriculum users (teachers and students) also describe the key constructs of OEP and CRSP in the context of culturally responsive practices rather than OEP. Teachers focused more on the quality of the curriculum materials than on their characteristics of being an openly accessible and adaptable resource. Although users may be effectively implementing the changes in teacher practice envisioned by each program, they are not implementing a vision that includes promoting OER principles such as teacher autonomy to adapt materials, nor are they engaging with the broader principles of open education (e.g., contributing to the knowledge commons). Rather, teachers valued the materials for being innovative and high quality and for providing students equitable access to rigorous learning opportunities. K–8 OER developers face the ongoing challenge of determining whether open educational principles are sufficiently embedded in teachers' understandings of their curriculum and CRSP, or whether they need to more explicitly communicate to teachers how open educational principles can improve their practice. If the latter, the synergies and differences between OEP and CRSP need to be more clearly articulated than is currently the case.

## Attitudes toward material adaptations and cooperative learning

The OER program's adaptability of materials and student-led collaborative lesson design are two features with great potential to lead to culturally sustaining OEP. Both developers and users described being apprehensive of the OER feature of material adaptability at the classroom level because of a need to adhere to standards and identified challenges in changing teacher practice toward collaborative learning in an environment of high-stakes assessments.

### Material adaptations

The feature of adaptability in OER offers a promising vehicle for culturally sustaining OEP: what would K–8 curricular materials look like if they were adapted for students of color to drive learning and shape the public knowledge commons? Instead of a static textbook written by a publishing company, a teacher could use their own pedagogy to customize online materials to

incorporate their students' cultures. In alignment with OEP, these adaptations could then be shared between classrooms to strengthen materials based on user experience. For example, if students were working on a unit about poetry using openly licensed materials found online, it may be that all the poetry examples used to teach meter and rhyme came from Shakespeare's work. Teachers could then create an activity where students searched for spoken word poets that discussed themes that impacted their communities. Together, the class could adapt the materials with pieces from their favorite poets to reshare for other classrooms to use.

We identified varying attitudes toward adaptations within and across OER program developers. Because the OER programs take great care in sequencing their materials to be standards-aligned, some materials developers were apprehensive about teachers' ability to change materials while still maintaining standards. For example, one developer noted concern with "making sure that teachers understand where students are supposed to be coming from, understanding the progression of standards, the progression of learning, understanding prerequisite standards." In contrast, developers from a different program were concerned that teachers would abandon the innovative elements of the material design which encourage student curiosity and learning through exploration in favor of the standards portion of the materials. Some programs release materials as editable text documents while others release them as HTML documents or PDFs—making adaptations significantly more cumbersome. Still, multiple developers said they "believe in teacher autonomy and their ability to make the best decisions for the children in their classroom."

## **Collaborative learning**

In alignment with culturally sustaining OEP, the four OER programs are dedicated to moving from traditional lecturing to student-led collaboration. Teachers described how they have shifted from standing at the front of the room and lecturing for a full period to walking around the room to different student groups and asking them questions and engaging in dialogue. In exploring ideas with their peers, students learn in a collaborative manner that resembles communication in many collectivist cultures. Some teachers expressed concern with students' content knowledge in their ability to score highly on exams but universally agreed that this learning style leads to increased critical thinking and the development of practical skills for students. One teacher described, "It's taken a long time for me to realize that just because I'm up there standing doesn't mean the students are going to learn."

Several material developers noted that the pressure of preparing for standardized testing takes up limited class time and leads teachers away from collaborative learning. Because many teachers have become accustomed to a drill style of delivering content, and often see success in this method through higher test scores, changing this culture is difficult. Teachers implementing one of the programs expressed discomfort in abandoning traditional written assessment, even though it does not measure the critical thinking and practical skills that students are acquiring through collaboration. Developers from the program are working on expanding teachers' conception of formative assessment so that they can assess students' thinking by listening to them verbally solve problems. Developers from another program have observed that the practice of constant assessment becomes especially problematic with students who are "below grade level" (often, these are students of color). When students are academically "behind," teachers more easily abandon the collaborative model and rely on a constant cycle of assessment and review of old material through drilling, which means students perpetually miss out on grade-level content.

Focus groups with teachers across six different districts revealed that the emphasis on standardized exams and "teaching to the test" is stratified by school resources and student demographics. A teacher from a different white and wealthy district said, "Standardized tests

don't affect my use of the materials; our students are high performing, so tests are something that we don't emphasize." The teacher further described that "there's really not a standardized test that aligns to the philosophy of student discovery ... but unfortunately that's where money talks, is the tests." In contrast, a teacher from a rural district with lower resources and a relatively high percentage of Black students expressed that "all that's stressed is the state test, you're teaching to the test." This teacher then noted that their school is struggling to change teacher practice from traditional lecturing to student-led learning.

OEP and CRSP offer frameworks for envisioning a transformative education; scholars from both fields have documented how top-down systems of education with restrictive testing requirements disadvantage students of color and restrict the generation of new knowledge. The programs we studied present innovative approaches to address these challenges through OER by offering free materials with open licenses and designing lessons to feature student-centered collaborative learning models, but their full implementation is hindered by high-stakes assessment systems.

## Transforming K–8 teacher practices through open educational resources

We learned some key takeaways from end users regarding openly licensed curriculum adoption and adaptation. Successful implementation, including changes in teacher practice, requires continuous professional learning supports aligned to the curriculum. Unsurprisingly, in districts that could allocate more resources for professional learning throughout the school year, teachers described gaining confidence with the curriculum such that they could make it their own after a few years of teaching with the materials. For example, one school district chose a school to pilot a whole-school approach to openly licensed curriculum adoption. Teachers in the school received a variety of professional learning and other supports such as classroom visits from program developers. One teacher shared that "at [the] beginning [of adoption] we tried to stick tightly to the curriculum, and now we know how to figure out what to cut. We feel more confident in our decisions." When teachers are able to make these student-centered shifts and share the learning with their students by creating a space for discovery and problem-solving, students described feeling agency and ownership of their learning and participating in a classroom culture of care. A student shared that her class has an environment where "no one is going to judge my opinion ... we have guidelines of what's expected, if you find out you're in a group with someone, you're not allowed to go 'aw dang it,' the expectation is that you accept everyone's opinion and give everyone a chance to speak."

While teachers contend with understanding the openly licensed curriculum and integrating their knowledge and prior experience, they are also faced with understanding how the curriculum can meet the diverse needs of their students. Developers take a number of steps to provide supports in the materials for students with disabilities and multilingual learners, but teachers did not always describe using those supports to meet the challenges they face. For example, one OER program highlights suggestions to differentiate for students with disabilities, such as using multiple representations (such as color-coding and numbering different parts of a model), providing physical objects, and providing both audio and written versions of materials. However, in our focus groups we learned from teachers that their curriculum can be challenging in classrooms when there a high number of students with individualized education programs and 504 plans. Additionally, teachers noted challenges with using the materials to support multilingual learners, which may reflect the need for more professional learning about instructional strategies for multilingual learners. Developers often embed language learning supports in content instruction, but teachers may benefit from more guidance to implement them. A number of teachers also shared that their curriculum can be challenging in classrooms



when there a high number of students with individualized education programs and 504 plans. One teacher used a recommended strategy to require fewer, but not less rigorous, items on student exit tickets for their students with disabilities.

In focus groups, teachers rarely brought up teaching in culturally responsive ways, particularly centering students' race or ethnicity or having conversations related to equity, unless the interviewer directly asked such a question. Across OER programs and subject areas, teachers would invite students to make personal meanings and connections to deepen their understanding. However, they would not “deep dive” to unpack students' experiences or incorporate other aspects of culturally responsive and sustaining practices. For example, in addition to inviting and affirming students' social and cultural backgrounds, culturally responsive and sustaining practices should provide a space for students to develop critical thinking that helps them identify interpersonal challenges and recognize systemic contributions to social issues that affect their lives and communities at large. Focus group responses indicate a perception that teaching and understanding openly licensed curriculum materials and utilizing culturally responsive and sustaining practices can and do happen independently of each other. This perception may be due in part to what is emphasized in the early introductions of the curriculum, such as how the curriculum is structured or paced. Given that teachers' ability to implement culturally responsive and sustaining practices, pay attention to social justice issues and facilitate discussions among and with their students depends on their beliefs and knowledge, OER programs may do well to more strongly emphasize to teachers the curriculum as a resource to center equity and implement culturally responsive and sustaining practices.

## Conclusion

The current landscape of K–8 OER education, as evidenced in the four programs in this evaluation, provides affordable and high-quality curriculum options with explicit commitments to culturally responsive and sustaining practices. The programs focus on being open and accessible as part of program design and strive to embed culturally responsive components in materials and professional learning. Being open and accessible means that teachers and schools have free access to materials, but each program deals with sustainability challenges by providing different combinations of fee-based supports and professional learning. The programs articulate a commitment to adaptability of materials but in practice teachers are often not encouraged to adapt; sometimes out of a concern to remain standards-based, and sometimes out of a concern to retain key innovative pedagogical practices that are often the hallmark of each program. Implementation of these programs requires teachers to examine their own practices, make pedagogical shifts toward student agency and active learning, and understand the connections between shifts and culturally responsive and sustainable practices; for all of this, professional learning and systemic support is critical. Each program has different ways of embedding the seven constructs that encompass OEP and CRSP: classroom culture of care, critical consciousness, free & open access, generating new knowledge, high and equitable standards, inclusive content and student agency & ownership. Each program is examining impact differently depending on its stage of development; most prioritize measuring the changes in teacher practice that they argue leads to authentic student learning rather than typical student state assessment scores. Moving forward, as developers of each of these programs work to deepen and improve their materials, they can look to the scholars of open educational practices beyond K-12 into postsecondary, and beyond the borders of the US, to consider sustainability models that do not limit access to the professional learning that is a cornerstone of teacher transformation; to consider how to operate beyond the confines of existing high-stakes assessment systems, and to expand the way that educators think about and implement critical

thinking about current social issues. K-12 OER programs have the potential to build on their commitment to free and open access and culturally responsive and sustaining practices by expanding their understanding and implementation of the broader world of open education that is not limited by the US K-12 educational context.

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# Appendix A. OER Comprehensive Curriculum Landscape in K12 Education

## I. Summary and methods

*Purpose:* This landscape review aims to present the current availability of comprehensive K–12 openly licensed curricula and the extent to which materials meet standards and usability needs in math, ELA, and science. The review seeks to unravel some of the complexity in this landscape by mapping out connections between content developers and providers, which sometimes differ, and providing information about license types. It also provides information about the availability of professional learning and implementation services, which may be necessary to support open educational practices and culturally responsive and sustaining teaching practices (CRSP). However, this review does not qualify whether materials or services were designed to support CRSP or evaluate their effectiveness in doing so.

This iteration of the landscape review is an internal document intended for the Hewlett Foundation, OE program leaders, and a select group of funders. It may also be of interest to EdReports as they consider how best to present their review criteria and findings.

*Sources:* The landscape review’s findings are based on publicly available information on websites, as well as reviews of K–12 ELA, math, and science curricula conducted by EdReports, an independent non-profit organization that helps educators identify quality instructional materials based on their usability and alignment to college and career-ready standards. EdReports conducts a sequential review to determine if the instructional materials are aligned to the relevant standards, if all the standards are adequately addressed through the curriculum, and if teachers and students can easily use the materials. Curriculum developers frequently cite EdReports’ ratings to confirm their program’s overall quality, and EdReports estimates that districts representing over 11 million students use EdReports to implement their curriculum. Additional information is provided in the Methods section below.

*Contents:* Tables A-1–A-7 identify comprehensive OER and non-OER programs; that is, those that are fully scoped and sequenced and are intended to be used as the primary curriculum in a K–12 classroom. Most of these programs offer free digital curriculum materials to instructors, although providers may offer print materials for purchase. Select programs (i.e., Guidebooks ELA) are built around texts that district/school administrators and/or instructors may need to purchase to implement the curriculum in K–12 classrooms, and some require users to purchase a subscription to access digital content that is licensed by Creative Commons (CC). These cost considerations, in addition to other program characteristics, are noted throughout the landscape review.

### *Key Findings:*

Overall, the OER landscape is characterized by a complex ecosystem of OER content developers and providers, whereby certain OER series are available through multiple providers. This complexity appears to be in part an outgrowth of the fluidity of OER projects and possibly their search for sustainable business models. The search for sustainable models may also explain why some OER providers use different CC licenses for different series or restrict access to subscribers, even for openly licensed content.

This review focuses almost exclusively on openly licensed curricula. However, EdReports reviews both OER and non-OER curricula, and we include some comparative information about

EdReports evaluations of OER and non-OER curricula. Almost all OER series that were reviewed by EdReports met expectations for alignment and usability, whereas a substantial number of non-OER series did not. It is not clear whether this is because EdReports applies different criteria for deciding which OER to review, or whether there is some other explanation for this difference.

#### Availability of comprehensive openly licensed curricula that meet standards

- There are multiple options available for openly licensed curriculum that are aligned with standards in math and ELA, though fewer in high school than earlier grades, especially in ELA. Given that high school math and science courses are typically by subject area (Algebra, Calculus, Biology, Chemistry) rather than grade level, it is also possible that high schools are using OER texts such as OpenStax that were originally developed for postsecondary education.
- As of May 2021, OER series accounted for roughly one out of six series reviewed by EdReports in these three subjects (32 OER series compared to 151 non-OER series).
- No options in sciences have been certified by EdReports as meeting alignment standards at this time. EdReports has not reviewed any science curriculum for grades 9–12 (OER or non-OER). These courses, like math, are usually topical rather than grade level, and it is possible that schools are using OER textbooks that were developed for postsecondary education.

#### Availability of openly licensed curricula with features and support services

- We identified 11 options in math and 9 options for ELA that at least partially meet usability standards as defined by EdReports, though grade coverage is uneven. For both math and ELA, there are more programs available that serve grades 6–8 than any other grade span. Fewer K–2 mathematics programs and 9–12 ELA programs meet usability standards for grades K–2.
- In addition to the online materials, most providers offer in-person professional development (PD) workshops and virtual PD at an additional cost. Very few clearly state that they offer teacher conferences, coaching or communities of practice.
- Some programs (principally those included in Table A-2 that were not reviewed by EdReports) offer “complete” OER courses, but their content does not appear to be updated or maintained regularly, and no support services are available. For example, the Minnesota Partnership for Collaborative Curricula maintains a website with links to ELA, math, social studies, and science curriculum materials, but the page identifying partnership member districts was last updated in 2015. We are curious whether practitioners regard these as viable options and, if so, under what circumstances.

#### Licensing

- In general, we did not observe many restrictions on use of OER content. The majority of providers use CC BY licenses, and some include non-commercial and share-alike provisions, including those (like LearnZillion) who require subscriptions to access their content. In other words, providers may restrict access to their content but not use of the content.

## Methods

We identified OER programs to include in the landscape review and collected information about them through the following methods:

- 1. Reviewed EdReports’ assessments of OER series.** EdReports provided us with a comprehensive list of series that they had reviewed as of May 2021. The list indicated each series’ name, publisher, edition, and subject area and grade levels served. We included non-openly licensed curricula to compare the rates of curricula found to be aligned to standards and easy for teachers to use.
- 2. Reviewed New America’s [report on OER resources](#).** We included comprehensive resources, or those that are fully scoped and sequenced and can be used as is, for ELA, science, and math. We also confirmed that the resources were comprehensive by reviewing each OER series’ website.
- 3. Reviewed available OER reports on the EdReports website.** We cross-referenced our existing list of OER series with existing reports on the EdReports website. This review surfaced series that we were not previously aware of, such as Odell Education’s High School Literacy Program (2020).
- 4. Reviewed OER grants funded by the Hewlett Foundation.** We reviewed OER grants funded by the Hewlett Foundation from 2011–2021 using search filters for “curriculum” to identify additional OER series.
- 5. Searched on OER Commons, MERLOT, GoOpen, and OpenStax for full courses and textbooks.** We used search filters for “full courses” to identify additional curriculum and reviewed available OER textbooks in ELA, mathematics, life sciences, and physical sciences. On OER Commons, we also used the filter for Common Core Standards in math and ELA. We then reviewed search results to identify materials that were, in fact, full courses (many were not), that corresponded to our target subject areas, that were developed in the U.S. (excluding several courses developed in Costa Rica on the basis that they would not be likely to meet U.S. standards), and that were not published by unaffiliated individual authors. We also reviewed individual state GoOpen websites, but these searches generally yielded instructional materials and textbooks as opposed to full OER courses.
- 6. Visiting OER provider websites.** We reviewed curriculum and professional development offerings from OER providers like LearnZillion, Open Up Resources, and Great Minds. These findings primarily informed the content of Table A-8.

## II. Grade Levels Served

Table A-1 identifies the number of OER and non-OER programs available by grade level (kindergarten through 12th grade) that have been reviewed by EdReports. Many programs cover multiple grades and/or grade spans, especially in math, where high school courses tend to be focused on topics (e.g. Algebra, Geometry, and Algebra II) rather than grades.

In both math and ELA, the greatest number of OER programs reviewed by EdReports are available in grades 6–8. None of the science OER offerings that we identified serve students in grades 10–12. In contrast, there are more non-OER math offerings available for grades 9–11 than any other grade span, and the greatest number of ELA non-OER programs serve grades K–2. EdReports has not reviewed any non-OER science offerings that serve grades 9–12.

**Table A-1 Number of available OER and non-OER programs by grade levels served (only includes programs reviewed by EdReports)**

Subject	Program Type	K–2	3–5	6–8	9–12
Math	OER	3	4	9	8
	Non-OER	29	29	32	38
ELA	OER	7	7	6	2
	Non-OER	25	14	17	13
Science	OER	0	0	1	0
	Non-OER	3	3	13	0



### III. Availability of Comprehensive OER Curricula for ELA, Math and Science

Table A-2 presents availability of comprehensive openly licensed materials by grade and subject area.

- **Alignment:** According to EdReports, this rating indicates the *“Degree to which materials meet expectations for alignment, including that all standards are present and treated with the appropriate depth to support students in learning the skills and knowledge that they need to be ready for college and career.”*
  - Three asterisks (\*\*\*) indicate products that fully meet EdReports’ standards for alignment.
  - Two asterisks (\*\*) indicate products that partially meet EdReports’ standards for alignment.
  - A single asterisk (\*) indicates products that do not meet EdReports’ standards for alignment.
  - Curricula that do not have an asterisk were not reviewed by EdReports.

Although Table A-2 sorts the available OER programs by grade span and content area, the programs are each unique and don’t necessarily fit easily into the table categories. While the vast majority of series are licensed under Creative Commons, they are not all freely accessible to users. In some cases, curriculum access depends on the provider. For example, users need a subscription to access McGraw-Hill Illustrative Mathematics, but the same curriculum is freely available through Kendall Hunt’s website. A more detailed examination of the curriculum materials may surface key differences between the series’ resources based on the provider.

Most of the available math OER series serve students in grades 3–11 and fully meet EdReports’ standards for alignment. Just over half of the ELA OER offerings available to K–12 students have been reviewed by EdReports, and the vast majority fully meet their standards for alignment. There are far fewer fully developed science OER series, and only one of them has been reviewed by EdReports and did not meet their standards for alignment. We have added notes below the table that provide additional comments on specific resources.

Table A-2 also identifies available OER textbooks by grade span and subject area. These textbooks are meant to serve as core learning resources for high school courses. The vast majority of the 14 textbooks we identified serve high school mathematics students. We identified three textbooks for high school science courses and one textbook for high school ELA students.

Table A-3 summarizes the number of OER reviewed by EdReports across subject areas and grade spans and how many of them meet expectations for alignment. Unlike Table A-2, it also includes non-OER offerings reviewed by EdReports in order to compare the availability of resources in the OER and non-OER universes. For almost every grade span, there are more non-OER offerings in ELA and math that meet expectations for alignment than OER offerings. Notably, there are a larger number of non-OER offerings serving grades K–5 that partially meet expectations than fully meet expectations for alignment. While grades 9–11 have the most non-OER math programs available, over one-third of them do not meet expectations for alignment. As of May 2021, EdReports had not reviewed any non-OER science programs that serve grades 9–12.

**Table A-2. Availability of Comprehensive OER Curriculum Materials by Grade or Grade Span, Subject Area and Alignment to Standards (including ones not reviewed by EdReports)**

	Math	ELA	Science
<b>K–2</b>	<ul style="list-style-type: none"> <li>Eureka Math (Great Minds)***</li> <li>Zearn***</li> <li>Achievement First Mathematics*</li> <li>Illustrative Mathematics K–5 Math (KendallHunt, LearnZillion)</li> </ul>	<ul style="list-style-type: none"> <li>Core Knowledge Language Arts (Amplify)***</li> <li>EL Education K–5 Language Arts (Open Up Resources, LearnZillion)***</li> <li>Fishtank ELA K–2 (Fishtank Learning)***</li> <li>Wit &amp; Wisdom (Great Minds)***</li> <li>Bookworms (Comprehensive Reading Solutions, Open Up Resources)**</li> <li>Focus on Early Learning PreK–2 Curriculum (Boston Public Schools)</li> </ul>	PhD Science
<b>3–5</b>	<ul style="list-style-type: none"> <li>Eureka Math (Great Minds)***</li> <li>Match Fishtank Mathematics (Match Education)***</li> <li>Zearn***</li> <li>Achievement First Mathematics**</li> <li>Minnesota Partnership for Collaborative Curriculum<sup>2</sup></li> <li>Illustrative Mathematics K–5 Math (KendallHunt, LearnZillion)</li> </ul>	<ul style="list-style-type: none"> <li>Core Knowledge Language Arts (Amplify)***</li> <li>EL Education K–5 Language Arts (Open Up Resources, LearnZillion)***</li> <li>Fishtank ELA 3–5 (Match Education)***</li> <li>Wit &amp; Wisdom (Great Minds)***</li> <li>Bookworms (Comprehensive Reading Solutions, Open Up Resources)**</li> <li>Engage NY</li> <li>Guidebooks (LearnZillion)</li> <li>Minnesota Partnership for Collaborative Curriculum</li> </ul>	Minnesota Partnership for Collaborative Curriculum  PhD Science

<sup>2</sup> The Minnesota Partnership for Collaborative Curriculum has assembled “courses” consisting of Google doc links to free resources that are intended to comprise complete curriculum. These resources do not have supporting services and have not been reviewed. It is not clear whether they have been updated since the COVID19 pandemic began.

	Math	ELA	Science
6–8	<ul style="list-style-type: none"> <li>• Eureka Math (Great Mind)<sup>***</sup></li> <li>• Illustrative Mathematics 6–8 Math (Kendall Hunt, LearnZillion, McGraw-Hill)<sup>***</sup></li> <li>• Match Fishtank Mathematics (Match Education)<sup>***</sup></li> <li>• Open Up Resources 6–8 Math<sup>***</sup></li> <li>• The Utah Middle School Math Project<sup>***</sup></li> <li>• Achievement First Mathematics<sup>**</sup></li> <li>• CK–12 Interactive Middle School Math for CCSS<sup>**3</sup></li> <li>• Minnesota Partnership for Collaborative Curriculum Grades 6 and 8</li> <li>• Pearson Math grade <a href="#">6</a> &amp; <a href="#">7</a> (OER Commons)</li> </ul>	<ul style="list-style-type: none"> <li>• Developing Core Literacy Proficiencies (Odell Education)<sup>***</sup></li> <li>• EL Education 6–8 Language Arts (Open Up Resources, LearnZillion)<sup>***</sup></li> <li>• Engage NY<sup>***</sup></li> <li>• Guidebooks (LearnZillion)<sup>***</sup></li> <li>• Wit &amp; Wisdom (Great Minds)<sup>***</sup></li> <li>• CommonLit 360 Curriculum</li> <li>• Lenses (St. Vrain Valley Schools)</li> <li>• Minnesota Partnership for Collaborative Curriculum</li> </ul>	<ul style="list-style-type: none"> <li>• Stanford NGSS Integrated Curriculum - An Exploration of a Multidimensional World<sup>*</sup></li> <li>• Minnesota Partnership for Collaborative Curriculum</li> <li>• OpenSciEd (in development)<sup>4</sup></li> </ul>

<sup>3</sup> CK–12 also has math 1–5 and science, but these do not appear to be comprehensive materials and are not included here.

<sup>4</sup> OpenSciEd’s 6–8 and 9–12 resources are in development. There are several modules available for grades 6–8, but they are not part of a full year-long scoped and sequenced curriculum.

	Math	ELA	Science
9–12	<ul style="list-style-type: none"> <li>• Eureka Math (Great Minds)***</li> <li>• Illustrative Mathematics (Traditional) (LearnZillion, Kendall Hunt)***</li> <li>• McGraw Hill Illustrative Mathematics (AGA)***<sup>5</sup></li> <li>• Mathematics Vision Project (MVP) Integrated (Open Up Resources)***</li> <li>• Mathematics Vision Project (MVP) Traditional (Open Up Resources)***<sup>6</sup></li> <li>• Open Up High School Mathematics Integrated***</li> <li>• Open Up High School Mathematics Traditional***<sup>7</sup></li> <li>• Algebra and Trigonometry (textbook)</li> <li>• Calculus, Volumes 1–3 (textbooks)</li> <li>• Elementary Algebra (textbook)</li> <li>• Fundamentals of Matrix Algebra (textbook)</li> <li>• Intermediate Algebra (textbook)</li> <li>• Minnesota Partnership for Collaborative Curriculum</li> <li>• Prealgebra (textbook)</li> <li>• Precalculus (textbook)</li> <li>• Statistics (textbook)</li> </ul>	<ul style="list-style-type: none"> <li>• Developing Core Literacy Proficiencies (Odell Education)***</li> <li>• Odell Education High School Literacy Program (Open Up Resources)***</li> <li>• CommonLit 360 Curriculum</li> <li>• ELA Guidebooks (LearnZillion)</li> <li>• Lenses (St. Vrain Valley Schools)</li> <li>• Pearson ELA grades 11 &amp; 12<sup>8</sup></li> <li>• Writing and Literature (textbook)</li> </ul>	<ul style="list-style-type: none"> <li>• Biology for AP Courses (textbook)</li> <li>• College Physics for AP Courses (textbook)</li> <li>• InquiryHub<sup>9</sup></li> <li>• Minnesota Partnership for Collaborative Curriculum<sup>10</sup></li> <li>• Physics (textbook)</li> </ul>

<sup>5</sup> License terms for McGraw-Hill Illustrative Mathematics AGA need to be clarified.

<sup>6</sup> The Mathematics Vision Project has partnered with Open Up Resources to provide both integrated and traditional high school mathematics curriculum. It is not clear if and how this curriculum is distinct from the Open Up High School Mathematics series.

<sup>7</sup> Open Up Resources, McGraw-Hill, LearnZillion, Kendall Hunt, and the Mathematics Vision Project offer Algebra, Geometry, and Algebra II. These offerings are reflected in grades 9–12 in Table A-2.

<sup>8</sup> Several courses provided by Pearson are available through OER Commons and designated as complete courses, but it is not clear whether Pearson continues to maintain them or provides any support.

<sup>9</sup> InquiryHub offers biology and chemistry curriculum that are not aligned to a particular grade level. These offerings are listed under grades 10 and 11 here.

<sup>10</sup> The Minnesota Partnership for Collaborative Curriculum has materials for biology, chemistry, and physics, but they are not aligned to a particular grade level. These offerings are noted in grades 9–11 in Table A-1.

**Table A-3. Number of Comprehensive Curriculum Materials by Grade or Grade Span, Subject Area and Alignment to Standards (only includes materials reviewed by EdReports)**

		Math		ELA		Science	
		OER	Non-OER	OER	Non-OER	OER	Non-OER
<b>K–2</b>	Meets expectations:	2	8	5	7	0	0
	Partially meets expectations:	0	10	2	12	0	1
	Does not meet expectations:	1	8	0	6	0	2
<b>3–5</b>	Meets expectations:	3	8	5	5	0	0
	Partially meets expectations:	1	10	2	6	0	1
	Does not meet expectations:	0	8	0	3	0	2
<b>6–8</b>	Meets expectations:	7	11	6	9	0	1
	Partially meets expectations:	2	4	0	6	0	2
	Does not meet expectations:	0	9	0	2	1	10
<b>9–12</b>	Meets expectations:	8 <sup>11</sup>	15	2	8	0	0
	Partially meets expectations:	0	9 <sup>12</sup>	0	4 <sup>13</sup>	0	0
	Does not meet expectations:	0	14	0	1	0	0

<sup>11</sup> There are no available math OER series that serve grade 12, have been reviewed by EdReports, and meet or partially meet expectations for alignment.

<sup>12</sup> There is only one non-OER program that serves grade 12 and has been reviewed by EdReports. It partially meets expectations for alignment.

<sup>13</sup> In grade 11, there are 2 non-OER programs that partially meet expectations. In grade 12, there is one non-OER program that partially meets expectations for alignment.

## IV. Usability

The following tables identify if each program meets EdReports’ usability expectations, or the “*degree to which materials are consistent with effective practices for use and design, teacher planning and learning, assessment, and differentiated instruction.*” Note that EdReports does not review curricula for usability unless they meet or partially meet alignment standards. There are four different possible ratings and two additional designations for programs that have been selected for review:

- Meets expectations
- Partially meets expectations
- Does not meet expectations
- Did not review
- In queue (to be reviewed by EdReports)
- Under review (by EdReports)

If an OER series does not include materials for a particular grade range, the relevant cell is left gray. While most of the math OER programs fully met EdReports’ expectations for alignment, several only partially met their expectations for usability. Match Fishtank noted that they did not expect to meet EdReports’ expectations for usability and have since launched Fishtank Plus to meet their requirements and better support teachers in implementing the curriculum. Most of the ELA OER series reviewed by EdReports fully meet expectations for usability. As previously noted, science OER offerings have been developed more recently, and there are fewer programs available. Only one science OER program is currently under review by EdReports.

**Table A-4. Math OER programs by grade levels served and usability (includes all series reviewed by EdReports for usability; excludes ones that were reviewed by EdReports but did not meet alignment standards, and thus were not reviewed for usability)**

	K–2	3–5	6–8	9–12
CK–12 Interactive (2020)			Partially meets expectations	In queue for review
Eureka Math (2013–2014 and 2015) <sup>14</sup>	Meets expectations	Meets expectations	Partially meets expectations	Did not review
Kendall Hunt’s Illustrative Mathematics (2019 and 2021) <sup>15</sup>	Did not review	Did not review	Meets expectations	Meets expectations

<sup>14</sup> Eureka Math grades K–8 are listed as “In Queue” on the EdReports site even though they have alignment and usability ratings.

<sup>15</sup> Illustrative Mathematics K–5 is available as of fall 2021.

	K–2	3–5	6–8	9–12
LearnZillion Illustrative Mathematics (2019 and 2021)	Did not review	Did not review	Meets expectations	Meets expectations
Match Fishtank Mathematics (2019)		Partially meets expectations	Partially meets expectations	Under review
Mathematics Vision Project (Integrated and Traditional) (2016)				Partially meets expectations
McGraw-Hill Illustrative Mathematics (2020 & 2021) <sup>16</sup>			Meets expectations	Meets expectations
Open Up Resources 6–8 Math (2017)			Meets expectations	Did not review
Open Up High School Math (Integrated and Traditional) (2021)				Meets expectations
Utah Middle School Math Project (2019)			Partially meets expectations	
Zearn (2018)	Meets expectations	Meets expectations		

**Table A-5. Science OER programs by grade levels served and usability**

	K–2	3–5	6–8	9–12
PhD Science	Did not review <sup>17</sup>	Under review		

**Table A-6. ELA OER programs by grade levels served and usability**

	K–2	3–5	6–8	9–12
<b>Core Knowledge (2015)</b>	Meets expectations	Meets expectations		
<b>Developing Core Literacy (2016)</b>			Meets expectations	Meets expectations

<sup>16</sup> McGraw Hill Illustrative Mathematics AGA is listed as “Under Review” on the EdReports site although it has alignment and usability ratings.

<sup>17</sup> The Great Minds website explicitly states that levels K–2 of PhD science are being offered as a “free PDF open educational resource.” These levels have not been reviewed by EdReports, but grades 3–5 are currently under review.

	K–2	3–5	6–8	9–12
<b>Engage NY (2016)</b>			Meets expectations	
<b>Expeditionary Learning (2016)</b>			Meets expectations	
<b>Fishtank ELA (2018) <sup>18</sup></b>	Does not meet expectations		In queue	
<b>LearnZillion EL Education (2019 &amp; 2020)</b>	Meets expectations	Meets expectations	Meets expectations	
<b>LearnZillion Guidebooks (2018)</b>			Meets expectations	
<b>Fishtank ELA (Match Education) (2018)</b>		Does not meet expectations		
<b>Odell Education HS Literacy (2020)</b>				Meets expectations
<b>Open Up Resources Bookworms (2018)</b>	Did not review	Did not review		Under review
<b>Open Up Resources EL Education (2017 and 2019)</b>	Meets expectations	Meets expectations	Meets expectations	
<b>Wit &amp; Wisdom (2016)</b>	Meets expectations	Meets expectations	Meets expectations	

<sup>18</sup> Fishtank ELA grades 3–5 is listed as “Under Review” on the EdReports site but has ratings for alignment and usability.



**Table A-7. Number of Comprehensive Curriculum Materials (OER and Non-OER) by Grade or Grade Span, Subject Area and Usability**

		Math		ELA		Science	
		OER	Non-OER	OER	Non-OER	OER	Non-OER
<b>K–2</b>	Meets expectations:	2	8	4	5	0	0
	Partially meets expectations:	0	0	0	0	0	0
	Does not meet expectations:	0	0	1	0	0	0
	Under review:	0	3	0	6	0	1
	In queue:	0	0	0	1	0	1
<b>3–5</b>	Meets expectations:	2	8	4	5	0	0
	Partially meets expectations:	1	0	0	0	0	0
	Does not meet expectations:	0	0	1	0	0	0
	Under review:	0	3	0	3	1	1
	In queue:	0	0	0	1	0	1
<b>6–8</b>	Meets expectations:	4	10	7	9	0	1
	Partially meets expectations:	4	1	0	0	0	0
	Does not meet expectations:	0	0	0	0	0	0
	Under review:	0	2	0	1	0	1
	In queue:	0	0	1	1 <sup>19</sup>	0	0
<b>9–12</b>	Meets expectations:	5 <sup>20</sup>	13 <sup>21</sup>	2	8	0	0
	Partially meets expectations:	2	2	0	0	0	0
	Does not meet expectations:	0	0	0	0	0	0
	Under review:	1	1	1	0	0	0
	In queue:	1	3	0	0	0	0

<sup>19</sup> Benchmark Advance 2022 serves grades K–6.

<sup>20</sup> No math OER programs meet or partially meet expectations for 12th grade students.

<sup>21</sup> No math non-OER programs meet or partially meet expectations for 12th grade students.

## V. OER Providers

Table A-8 identifies complementary professional development services offered by OER providers that are advertised on their websites. Some publishers, such as OpenSciEd, contract with certified learning providers to provide professional learning services. We are especially concerned with availability of these services because adoption of openly licensed materials alone is unlikely to lead to open pedagogy or culturally responsive and sustaining teaching practices. Moreover, availability of support services is an important factor for districts when selecting materials and may also provide a signal of the sustainability and currency of openly licensed materials. Most provider websites describe in-person or virtual professional development workshops that they offer to K–12 educators. Fewer providers offer coaching or facilitate communities of practice, and only three providers’ websites highlighted conferences related to their openly licensed curricula for educators to attend.

**Table A-8. Provider services**

Provider	In-person PD Workshops	Virtual PD	Conferences	Coaching	Community of Practice
<b>Amplify</b>	No information found on website	✓	No information found on website	No information found on website	No information found on website
<b>BetterLesson</b>	✓	✓	No information found on website	✓	No information found on website
<b>BSCS Science Learning</b>	✓	✓	No information found on website	No information found on website	No information found on website
<b>CommonLit</b>	No information found on website	✓	No information found on website	No information found on website	No information found on website
<b>Dana Center at the University of Texas at Austin</b>	✓	✓	No information found on website	No information found on website	✓
<b>Einstein Project</b>	✓	✓	No information found on website	No information found on website	No information found on website
<b>EL Education (EL Education and Expeditionary Learning)</b>	✓	✓	✓	✓	✓
<b>Fishtank Learning</b>	No information found on website	✓	No information found on website	No information found on website	No information found on website
<b>Great Minds (Wit &amp; Wisdom and Eureka Math)</b>	✓	✓	No information found on website	✓	No information found on website

Provider	In-person PD Workshops	Virtual PD	Conferences	Coaching	Community of Practice
<b>K–12 Alliance at WestEd</b>	No information found on website	No information found on website	No information found on website	No information found on website	✓
<b>Kendall Hunt (Illustrative Mathematics)<sup>22</sup></b>	✓	✓	No information found on website	No information found on website	No information found on website
<b>LearnZillion (EL Education, Illustrative Mathematics, Guidebooks, Odell Education)</b>	✓	✓	No information found on website	✓	No information found on website
<b>Liberty Science Center</b>	✓	✓	No information found on website	No information found on website	No information found on website
<b>Maine Mathematics and Science Alliance</b>	✓	✓	No information found on website	✓	No information found on website
<b>Mathematics Institute of Wisconsin</b>	✓	✓	No information found on website	No information found on website	No information found on website
<b>McGraw Hill (Illustrative Mathematics)</b>	✓	✓	No information found on website	No information found on website	No information found on website
<b>Michigan Math and Science Leadership Network</b>	✓	✓	No information found on website	No information found on website	No information found on website
<b>National Science Teaching Association (NSTA)</b>	✓	✓	No information found on website	✓	✓
<b>Odell Education (Developing Core Literacy Proficiencies)</b>	✓	No information found on website	No information found on website	No information found on website	No information found on website

<sup>22</sup> The IM website notes that professional learning is provided in a variety of formats, including onsite academies and live virtual classrooms, by IM Certified Facilitators. Certified providers in Table 8 include the Michigan Math and Science Leadership Network, Mathematics Institute of Wisconsin, McGraw Hill, LearnZillion, and Kendall Hunt.

Provider	In-person PD Workshops	Virtual PD	Conferences	Coaching	Community of Practice
OpenSciEd <sup>23</sup>	✓	✓	No information found on website	✓	
Open Up Resources (EL Education, Bookworms, Open Up Resources Math)	✓	✓	✓	✓	✓
Pearson <sup>24</sup>	No information found on website	✓	✓	No information found on website	No information found on website

## VI. OER Licenses

- We identified licenses for 28 of the 34 ELA, math, and science OER programs and all 14 textbooks included in this landscape review.
- In some cases, providers like Kendall Hunt identified license types by specific grade spans and these licenses were counted individually. It was not always possible to identify each grade span’s license, as in the case of McGraw Hill’s Illustrative Mathematics for AGA.
- Over half of the licenses we identified fall under Creative Commons Attribution International 4.0 (CC BY 4.0).
- In general, we did not observe many restrictions on use of openly licensed content. The majority of providers use CC BY 4.0 licenses, and some include non-commercial and share-alike provisions, including those (like LearnZillion) who require subscriptions to access their content. In other words, providers may restrict access to the content but not use of the content.
- The “Description” column is taken from the Creative Commons website and highlights the most obvious differences between different types of licenses. These address commercial use of the resources and how to distribute contributions if you remix or build upon the original material.
- The descriptions for 3.0 versus 4.0 licenses are identical. The Creative Commons website [describes](#) how the 4.0 license builds upon the 3.0 license:

<sup>23</sup> OpenSciEd has contracted with 10 other Certified Professional Learning Providers to provide professional development related to its curriculum, including BetterLesson, BSCS, The Dana Center at the University of Texas at Austin, Einstein Project, K–12 Alliance, Liberty Science Center, Maine Mathematics and Science Alliance, The Michigan Mathematics and Science Leadership Network, and The National Science Teaching Association. OpenSciEd also provides its own professional learning services.

<sup>24</sup> Pearson’s virtual PD offerings include webinars and virtual events as opposed to tailored professional development sessions that take place online.

- Unlike 3.0 licenses, 4.0 licenses do not require “porting,” or adaptation to local laws/jurisdictions. They are ready-to-use and internationally enforceable.
- The 4.0 license scope includes sui generis database rights (such rights recognize the investment made in compiling a database).
- 4.0 license more explicitly waives the licensor’s moral rights to better enable reuse of the content as intended.
- 4.0 licenses explicitly permit licensees to link to a separate page with attribution information in order to fulfill the attribution requirements.
- 4.0 licenses allow for licensors to disassociate themselves from reproductions of their work that they object to, regardless of whether or not their original work was adapted/changed.
- 4.0 licenses allow for licensee’s rights to be automatically reinstated if they break their terms but fix the breach within 30 days.
- 4.0 licenses explicitly address how adaptations should be licensed. Users can apply any license to their contributions so long as they do not prevent users of the remix from complying with the original license.

**Table A-9. Types of OER Licenses x Number of Licensees**

Type of License	Description	Number of Programs with License
<b>CC-BY 3.0 (Attribution 3.0 Unported)</b>	<ul style="list-style-type: none"> <li>• <b>Attribution</b> — You must give <a href="#">appropriate credit</a>, provide a link to the license, and <a href="#">indicate if changes were made</a>. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.</li> <li>• <b>No additional restrictions</b> — You may not apply legal terms or <a href="#">technological measures</a> that legally restrict others from doing anything the license permits.</li> </ul>	3
<b>CC-BY 4.0 (Attribution International)</b>	<ul style="list-style-type: none"> <li>• <b>Attribution</b> — You must give <a href="#">appropriate credit</a>, provide a link to the license, and <a href="#">indicate if changes were made</a>. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.</li> <li>• <b>No additional restrictions</b> — You may not apply legal terms or <a href="#">technological measures</a> that legally restrict others from doing anything the license permits.</li> </ul>	23
<b>CC BY-NC 4.0 (Attribution-NonCommercial 4.0 International License)</b>	<ul style="list-style-type: none"> <li>• <b>Attribution</b> — You must give <a href="#">appropriate credit</a>, provide a link to the license, and <a href="#">indicate if changes were made</a>. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.</li> <li>• <b>NonCommercial</b> — You may not use the material for <a href="#">commercial purposes</a>.</li> </ul>	4

Type of License	Description	Number of Programs with License
<b>CC BY-SA 4.0 (Attribution-ShareAlike 4.0 International)</b>	<ul style="list-style-type: none"> <li>• <b>Attribution</b> — You must give <a href="#">appropriate credit</a>, provide a link to the license, and <a href="#">indicate if changes were made</a>. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.</li> <li>• <b>ShareAlike</b> — If you remix, transform, or build upon the material, you must distribute your contributions under the <a href="#">same license</a> as the original.</li> </ul>	2
<b>CC BY-NC-SA</b>	<ul style="list-style-type: none"> <li>• <b>Attribution</b> — You must give <a href="#">appropriate credit</a>, provide a link to the license, and <a href="#">indicate if changes were made</a>. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.</li> <li>• <b>NonCommercial</b> — You may not use the material for <a href="#">commercial purposes</a>.</li> <li>• <b>ShareAlike</b> — If you remix, transform, or build upon the material, you must distribute your contributions under the <a href="#">same license</a> as the original.</li> </ul>	1
<b>CC BY-NC-SA 3.0 (Attribution-NonCommercial-ShareAlike 3.0 Unported License)</b>	<ul style="list-style-type: none"> <li>• <b>Attribution</b> — You must give <a href="#">appropriate credit</a>, provide a link to the license, and <a href="#">indicate if changes were made</a>. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.</li> <li>• <b>NonCommercial</b> — You may not use the material for <a href="#">commercial purposes</a>.</li> <li>• <b>ShareAlike</b> — If you remix, transform, or build upon the material, you must distribute your contributions under the <a href="#">same license</a> as the original.</li> </ul>	3
<b>CC BY-NC-SA 4.0 (Attribution-NonCommercial-ShareAlike 4.0 International)</b>	<ul style="list-style-type: none"> <li>• <b>Attribution</b> — You must give <a href="#">appropriate credit</a>, provide a link to the license, and <a href="#">indicate if changes were made</a>. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.</li> <li>• <b>NonCommercial</b> — You may not use the material for <a href="#">commercial purposes</a>.</li> <li>• <b>ShareAlike</b> — If you remix, transform, or build upon the material, you must distribute your contributions under the <a href="#">same license</a> as the original.</li> </ul>	8
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**Table A-10. License type by OER Series**

OER Series/Textbook	Resource Type	Subject	Grade Levels Served	License
<b>Achievement First</b>	Curriculum	Math	K–8	CC BY 4.0 “Unless otherwise noted, all of the content in this resource is licensed under a Creative Commons Attribution International 4.0 (CC BY) license”
<a href="#"><u>Algebra and Trigonometry</u></a>	Textbook	Math	9–12	CC BY 4.0
<a href="#"><u>Biology for AP Courses</u></a>	Textbook	Science	9–12	CC BY 4.0
<a href="#"><u>Calculus Volume One</u></a>	Textbook	Math	9–12	CC BY-NC-SA 4.0
<a href="#"><u>Calculus Volume Two</u></a>	Textbook	Math	9–12	CC BY-NC-SA 4.0
<a href="#"><u>Calculus Volume Three</u></a>	Textbook	Math	9–12	CC BY-NC-SA 4.0
<b>CK-12</b>	Curriculum	Math	6–8	<a href="#"><u>CK-12 Foundation Curriculum Materials License</u></a>
<a href="#"><u>College Physics for AP Courses</u></a>	Textbook	Science	9–12	CC BY 4.0
<b>Comprehensive Reading Solutions-Bookworms</b>	Curriculum	ELA	K–5	Unknown
<b>Commonlit 360</b>	Curriculum	ELA	6–10	<a href="#"><u>CC BY-NC-SA 4.0 license</u></a>
<b>Core Knowledge</b>	Curriculum	ELA	K–5	CC BY-NC-SA 3.0 “We are pleased that our materials in the CKLA program, available through our website, are available through a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.”
<b>EL Education (Expeditionary Learning)</b>	Curriculum	ELA	6–8	CC BY-NC-SA 3.0 “For users of our Grades 6–8 ELA Curriculum content: Unless otherwise indicated, all work is licensed under the <a href="#"><u>Creative Commons Attribution-NonCommercial-ShareAlike (CC BY-NC-SA). (3.0)</u></a> ”
<a href="#"><u>Elementary Algebra</u></a>	Textbook	Math	9–12	CC BY 4.0
<b>EngageNY</b>	Curriculum	ELA	K–12	CC BY-NC-SA 3.0 Attribution-NonCommercial-ShareAlike 3.0 Unported
<b>Eureka Math</b>	Curriculum	Math	K–12	CC BY-NC-SA 4.0 Creative Commons Attribution - Non Commercial - Share Alike 4.0 International Public License
<b>Fishtank</b>	Curriculum	ELA	K–12	CC BY-NC-SA 4.0 “Notwithstanding the foregoing or anything to the contrary in this Agreement and unless otherwise

OER Series/Textbook	Resource Type	Subject	Grade Levels Served	License
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<b>Focus on Early Learning</b>	Curriculum	ELA	K–2	CC BY-NC-SA 4.0 “Except where otherwise noted, content on this site is by the <a href="#">Boston Public Schools Department of Early Childhood</a> and is licensed under a <a href="#">Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License</a> .”
<b><a href="#">Fundamentals of Matrix Algebra</a></b>	Textbook	Math	9–12	CC BY-NC 4.0
<b>InquiryHub</b>	Curriculum	Science	Chemistry and Biology	CC BY 4.0 Creative Commons Attribution 4.0 International License
<b><a href="#">Intermediate Algebra</a></b>	Textbook	Math	9–12	CC BY 4.0
<b>Kendall Hunt’s Illustrative Mathematics</b>	Curriculum	Math	K–12	K–5 Math—Licensed under the <a href="#">Creative Commons Attribution 4.0</a> license 6–8 Math—CC BY 4.0 AGA—Licensed under the <a href="#">Creative Commons Attribution 4.0</a> license
<b>LearnZillion EL Education</b>	Curriculum	ELA	K–8	CC BY 4.0 Adapted from EL Education under CC BY license.
<b>LearnZillion Guidebooks</b>	Curriculum	ELA	3–12	CC BY 4.0 “English Language Arts Guidebook Units by <a href="#">the Louisiana Department of Education and LearnZillion</a> is licensed under a <a href="#">Creative Commons Attribution 4.0 International License</a> .”
<b>LearnZillion Illustrative Mathematics</b>	Curriculum	Math	K–12	K–5 is licensed under the Creative Commons Attribution 4.0 license.



OER Series/Textbook	Resource Type	Subject	Grade Levels Served	License
				<p>“IM 6–8 Math was originally developed by Open Up Resources and authored by Illustrative Mathematics, and is copyright 2017–2019 by Open Up Resources. It is licensed under the <a href="#">Creative Commons Attribution 4.0 International License (CC BY 4.0)</a>”</p> <p>IM Algebra 1, Geometry, Algebra 2 is copyright 2019 <a href="#">Illustrative Mathematics</a> and licensed under the <a href="#">Creative Commons Attribution 4.0 International License (CC BY 4.0)</a></p>
<b>Lenses</b>	Curriculum	ELA	6–12	<p>CC BY-SA 4.0</p> <p>“St. Vrain Valley Schools licenses this under a <a href="#">Creative Commons Attribution-ShareAlike 4.0 International License</a>.”</p>
<b>Match Fishtank Mathematics</b>	Curriculum	Math		Unknown
<b>Mathematics Vision Project</b>	Curriculum	Math	9–11	<p>CC BY 4.0</p> <p><a href="#">Creative Commons Attribution 4.0 International License</a>.</p>
<b>McGraw Hill Illustrative Mathematics</b>	Curriculum	Math	6–12	<p>CC BY 4.0 for grades 6–8; license terms for AGA are unknown.</p> <p>“IM 6–8 Math was originally developed by Open Up Resources and authored by Illustrative Mathematics, and is copyright 2017–2019 by Open Up Resources. It is licensed under the Creative Commons Attribution 4.0 International License (CC BY 4.0), <a href="https://creativecommons.org/licenses/by/4.0/">creativecommons.org/licenses/by/4.0/</a>.”</p>
<b>MN Partnership</b>	Curriculum	ELA	3–8	Creative Commons 3.0 BY
<b>MN Partnership</b>	Curriculum	Math	3–12	Creative Commons 3.0 BY
<b>MN Partnership</b>	Curriculum	Science	3–9	Creative Commons 3.0 BY
<b>Odell Education Developing Core Literacy Proficiencies</b>	Curriculum	ELA	6–12	CC-BY-NC-SA
<b>Open Up Odell Education HS Literacy</b>	Curriculum	ELA	9–12	Unknown
<b>OpenSciEd</b>	Curriculum	Science	6–8 (in development)	CC BY 4.0

OER Series/Textbook	Resource Type	Subject	Grade Levels Served	License
				“Except as expressly provided to the contrary, the Website content, including the classroom curriculum and professional learning resources created by OpenSciEd and its partners is licensed under a <a href="#">Creative Commons Attribution 4.0 International License</a> (CC BY 4.0).”
<b>Open Up Resources</b>	Curriculum	Math	6–12	CC BY-NC 4.0 “Unless otherwise noted, content produced by Open Up Resources and its partners in this book are published under a <a href="#">Creative Commons Attribution-NonCommercial 4.0 International License</a> (CC BY-NC 4.0) License.”
<b>Open Up Resources-Bookworms</b>	Curriculum	ELA	K–5	Unknown
<b>Open Up Resources-EL Education</b>	Curriculum	ELA	K–8	CC BY 4.0 “Copyright © EL Education Inc. Except where otherwise noted, EL Education’s Language Arts Curriculum is published under a Creative Commons Attribution 4.0 International License (CC BY 4.0).”
<b>Pearson</b>	Curriculum	ELA	11 and 12	<a href="#">Creative Commons Attribution Non-Commercial (CC-BY-NC 4.0)</a>
<b>Pearson</b>	Curriculum	Math	6 and 7	<a href="#">Creative Commons Attribution Non-Commercial (CC-BY-NC 4.0)</a>
<b>PhD Science</b>	Curriculum	Science	K–5	Unknown
<b>Physics</b>	Textbook	Science	9–12	CC BY 4.0
<b>Prealgebra</b>	Textbook	Math	6–8 9–12	CC BY 4.0
<b>Precalculus</b>	Textbook	Math	9–12	CC BY 4.0
<b>Statistics</b>	Textbook	Math	9–12	CC BY 4.0
<b>Utah Middle School Math Project</b>	Curriculum	Math	6–8	CC-BY 4.0.
<b>Wit &amp; Wisdom</b>	Curriculum	ELA	K–8	Unknown
<b>Writing and Literature: Composition as Inquiry, Learning, Thinking, and Communication</b>	Textbook	ELA	11 and 12	CC BY-SA 4.0
<b>Zearn</b>	Curriculum	Math	K–5	CC BY-NC-SA 4.0

OER Series/Textbook	Resource Type	Subject	Grade Levels Served	License
				<p>“Portions of Zearn Math are derivative of Eureka Math and licensed by Great Minds. ©2017 Great Minds, Inc. All rights reserved. Eureka Math was created by Great Minds in partnership with the New York State Education Department and also released as EngageNY. Portions of Zearn Math are also licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License (CC BY-NC-SA 4.0) at <a href="http://www.creativecommons.org/licenses/by-nc-sa/4.0/legalcode">www.creativecommons.org/licenses/by-nc-sa/4.0/legalcode</a>.”</p>

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## Appendix B. Culturally Responsive and Sustaining Practices in Open Educational Resources: A Materials Review Protocol

**Background:** This materials review protocol includes 7 constructs: classroom culture of care, critical consciousness, free and open access, generating new knowledge, high and equitable standards, inclusive content, student agency & ownership. Each construct includes a one-sentence description of the construct and examples of how the construct can appear in the design of the curriculum materials and of professional learning supports. Each construct includes three columns to record evidence from the materials: the first to copy the evidence, the second to align the evidence with one or more of the examples, and the third to synthesize the evidence.

- 1. Identify materials.** Identify materials to be reviewed (curriculum materials, professional learning materials, curriculum descriptions). Use the table below to provide details about the materials selected.
- 2. Familiarize yourself with the constructs.** Read through the examples for each construct; note that these are only *samples* of implementation and are not exhaustive. The construct may appear differently in examples from your program's materials.
- 3. Compile evidence.** Review all materials against each of the 7 constructs and complete each section with evidence from the materials. Include the source document name & page number if applicable.
- 4. Calibrate.** All reviews should be done in collaboration with at least one other reviewer. After each has reviewed separately, schedule time to calibrate your results.

### Items were adapted from:

- Bali, M., Cronin, C., & Jhangiani, R. S. (2020). Framing open educational practices from a social justice perspective. *Journal of Interactive Media in Education*, 1, 10. <https://doi.org/10.5334/jime.565>
- Bryan-Gooden, J., Hester, M., & Peoples, L. Q. (2019). Culturally responsive curriculum scorecard. Metropolitan Center for Research on Equity and the Transformation of Schools, New York University.
- Peoples, L. Q., Islam, T., & Davis, T. (2021). *The culturally responsive-sustaining STEAM curriculum scorecard*. Metropolitan Center for Research on Equity and the Transformation of Schools, New York University.

### Additional terms and definitions were pulled from:

- Gay, G. (2018). *Culturally responsive teaching: Theory, research and practice* (third edition). Teachers College Press.
- Hammond, Z. L. (2015). *Culturally responsive teaching and the brain*. Corvin Press.
- Ladson-Billings G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal*, 32(3), 465–491.
- Love, B. L. (2019). *We want to do more that survive: Abolitionist teaching and the pursuit of educational freedom*. Beacon Press.
- Paris, D., & Alim, H. S. (2017). *Culturally sustaining pedagogies: Teaching and learning for justice in a changing world*. Teachers College Press.

**OER program name:**

**Reviewer:**

**Materials reviewed:**

File Name	Description

**Classroom culture of care:** *Class materials and activities provide opportunities and guidance to develop strong relationships (e.g., safe space, ethics of care, respect between students and instructor, inclusive environment)*

Classroom culture of care		Evidence: specific examples from materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<b>Design of Curriculum Materials</b>	<p><b>Samples of what classroom culture can look like in curriculum materials:</b></p> <ol style="list-style-type: none"> <li><b>1.</b> The curriculum affirms multiple forms of communication or language systems (e.g., native languages, AAVE or AAL, "slang", "Spanglish" etc.) during academic, mathematical and scientific argumentation. The curriculum does not constrain students to "monocultural or monolingual society based on White, middle-class norms of language and cultural being." (For example, a lens of Dominant American English (DAE) would focus on issues with word choice, misspellings, and points of departure from the topic that could indicate a narrative of academic failure (Kinloch, 2017, in Paris &amp; Alim, 2017)).</li> <li><b>2.</b> Guidance is provided on learning activities that promote sense of belonging, caring, openness, and respect. This could involve intentional use of collaboration, group projects, or exercises in which students learn about each other, among others.</li> </ol>			
<b>Design of Professional Learning Supports</b>	<p><b>Samples of what classroom culture can look like in professional learning supports:</b></p> <ol style="list-style-type: none"> <li><b>3.</b> Guidance is provided on how to demonstrate to students that their diverse identities are seen as assets and strengths that can advance individual and group learning, rather than as challenges or difficulties to be overcome.</li> <li><b>4.</b> Guidance is provided on ways to facilitate classroom activities that share power among students, that elevate different voices, that encourage a space where everyone feels recognized, valued and respected.</li> <li><b>5.</b> Guidance is provided on how to approach issues of power dynamics between teachers and students.</li> </ol>			
<b>Other</b>				

**Critical consciousness:** *Class materials and activities provide teachers with (a) opportunities for self-reflection about their own biases and positionality and (b) guidance to develop students’ critical consciousness and/or emancipation (e.g., decolonized curriculum, explicit considerations of social justice)*

	Evidence: specific examples from materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<p style="text-align: center;"><b>Critical consciousness</b></p> <p><b>Design of Curriculum Materials</b></p>	<p><b>Samples of what critical consciousness can look like in curriculum materials:</b></p> <ol style="list-style-type: none"> <li><b>1.</b> Social situations and problems are not seen as individual problems but are situated within a societal and/or systemic context (e.g., legacies of genocide, land theft, enslavement, and colonialism (Paris &amp; Alim, 2017), redlining, housing discrimination, White flight, gentrification, police brutality, racial health disparities, unemployment; societal context that is not due to education levels but to racism (Love, 2019)).</li> <li><b>2.</b> The curriculum provides opportunities for students to connect learning to social, cultural, political, or environmental concerns that affect them and their lives and contribute to change.</li> <li><b>3.</b> The curriculum encourages students to take actions that combat inequity or promote equity within the school or local community.</li> <li><b>4.</b> The curriculum provides opportunities for students to see knowledge (including STEM) as a way to understand and improve their world, take actions that address inequity or promote equity, and connect learning to social, political, and/or environmental concerns.</li> <li><b>5.</b> The curriculum encourages students to critically reflect on dominant knowledge systems (White, western assumptions of "fact") (e.g., critically questioning assimilation to the White imperialist/colonialist project where students are asked to lose or deny their languages, literacies, cultures, and histories in order to achieve in schools (Paris &amp; Alim, 2017)).</li> <li><b>6.</b> Homework/classroom assignments and assessments reflect issues of social justice, equity, and Black, Indigenous, and people of color’s experiences and contributions.</li> </ol>		

	Evidence: specific examples from materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<p style="text-align: center;"><b>Critical consciousness</b></p> <p><b>Samples of what critical consciousness can look like in professional learning supports:</b></p> <p><b>7.</b> Guidance is provided on how to design lessons or engage in conversations that use academic content to disrupt power inequities or create opportunities for students to practice disruption. (Power stemming from White middle-class, patriarchal, cisheteronormative, English-monolingual, ableist, classist, xenophobic, Judeo-Christian norms (Paris &amp; Alim 2017)).</p> <p><b>8.</b> The teachers’ materials ask teachers to reflect on their own practices and experiences learning academic subjects and critique them through a lens of cultural responsiveness. This process involves being aware of one’s biases and the gaps between one’s own culture and students’ cultures.</p> <p><b>9.</b> Guidance is provided on how to reflect on and discuss the legacy of education related trauma amongst historically marginalized communities and on designing healing and joyful learning experiences (especially STEM).</p>			
<p><b>Design of Professional Learning Supports</b></p>			
<p><b>Other</b></p>			



**Free and open access:** *Students and teachers can freely access materials and modify or adapt them to fit their specific needs*

Free and open access	Evidence: specific examples from materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<p><b>Design of Curriculum Materials</b></p> <p><b>Samples of what free &amp; open access can look like in curriculum materials:</b></p> <ol style="list-style-type: none"> <li>1. The curriculum provides opportunities for students to use accessible technology and manipulatives to explore curriculum concepts in ways that reflect a variety of ways of “doing” (e.g., through different modalities, multiple ways of representation).</li> <li>2. Curriculum materials are fully accessible; e.g., curriculum rigor is not dependent on access to resources, materials and technology that students and schools may not have.</li> <li>3. All resources, materials and technology options are rigorous and interesting. (i.e., if students can engage curriculum materials with a computer or paper, the paper materials should be just as rigorous, interesting, and engaging as using the computer).</li> <li>4. Materials that can be accessed on multiple devices; materials can be saved or printed, as well as used in digital formats.</li> <li>5. Materials include explicit accessibility options for students with diverse disabilities.</li> </ol>			
<p><b>Design of Professional Learning Supports</b></p> <p><b>Samples of what free &amp; open access can look like in professional learning supports:</b></p> <ol style="list-style-type: none"> <li>6. Guidance is provided on helping students access materials on multiple devices.</li> </ol>			
<p><b>Other</b></p>			

**Generating new knowledge:** *Class materials and activities allow opportunities for students and teachers to apply, evaluate, or create new knowledge, and this knowledge can become part of the open access materials (e.g., renewable or generative assignments)*

	Evidence: specific examples from materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<p style="text-align: center;"><b>Generating new knowledge</b></p> <p><b>Design of Curriculum Materials</b></p> <p><b>Samples of what generating new knowledge can look like in curriculum materials:</b></p> <ol style="list-style-type: none"> <li>1. The materials provide opportunities for students to develop renewable or non-disposable assignments (that is, assignments that have value or use beyond the classroom, often shared as OER (e.g., student-created quiz questions, open pieces, instructional videos)).</li> <li>2. The materials promote collaborative knowledge creation (including students and their families/communities).</li> <li>3. The materials promote student-created content, including opportunities for students to create and teach lessons to their peers.</li> </ol>			
<p><b>Design of Professional Learning Supports</b></p> <p><b>Samples of what generating new knowledge can look like in professional learning supports:</b></p> <ol style="list-style-type: none"> <li>4. Guidance is provided for producing renewable or non-disposable assignments (that is, assignments that have value or use beyond the classroom, often shared as OER (e.g., student-created quiz questions, open pieces, instructional videos)).</li> <li>5. Guidance is provided for collaborative knowledge creation (including students and their families/communities).</li> <li>6. Guidance is provided for student-created assignments or assessments.</li> <li>7. Guidance is provided to encourage student-created content, including opportunities for students to create and teach lessons to their peers.</li> <li>8. Guidance is provided to help teachers foster environments of collaboration that go beyond group work by incorporating individual's assets, resources, and strengths (such as various ways of knowing, doing and being) to advance group and individual learning.</li> </ol>			
<p><b>Other</b></p>			

**High and equitable standards:** *Class materials and activities provide pedagogical and content tools to provide students opportunities to increase their intellectual capacity\*\**

	Evidence: specific examples from materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<p style="text-align: center;"><b>High and equitable standards</b></p> <p><b>Samples of academic rigor and high standards in curriculum materials</b></p> <ol style="list-style-type: none"> <li>1. The curriculum provides appropriate challenges in order to stimulate brain growth, such as thinking about one's thinking and facilitating higher order thinking with applied and open-ended questions. This can also be "productive struggle" (<a href="https://www.ascd.org/el/articles/productive-struggle-is-a-learners-sweet-spot">https://www.ascd.org/el/articles/productive-struggle-is-a-learners-sweet-spot</a>), allowing students to work through struggles.</li> <li>2. The curriculum helps students process new content using multiple methods including methods that are not academically traditional (e.g., songs, poems, rapping, dance, etc.)</li> <li>3. The curriculum provides a balance between giving students both care and push</li> <li>4. The curriculum provides instructional scaffolding</li> <li>5. The curriculum helps students cultivate a positive mindset and sense of self-efficacy</li> <li>6. The curriculum gives students language to talk about their learning moves (e.g., think and process their learning)</li> <li>7. The curriculum provides students with tools for tracking their own progress toward learning targets.</li> <li>8. The curriculum uses pedagogical strategies that provide students multiple ways to access the content.</li> </ol>			

High and equitable standards	Evidence: specific examples from materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<p><b>Design of Professional Learning Supports</b></p> <p>Samples of academic rigor and high standards in professional development</p> <p><b>9.</b> Guidance is provided to teach students cognitive routines using the brain’s natural learning system of input, elaboration and application (<a href="https://schoolsup.org/txts-4-teachers/2221">https://schoolsup.org/txts-4-teachers/2221</a>). Examples are 'ignite' with an attention getting activity, 'chunk' information into manageable portions, 'chew on'/process that information, review with authentic strategies like playing a game.</p> <p><b>10.</b> Guidance is provided to develop and use formative assessment tasks that are instructive rather than evaluative, and that are specific, timely, supportive, that validate student’s ability to master learning target, and that provide specific actions to take</p> <p><b>11.</b> Guidance is provided to help students create a positive narrative about their identity as learners</p> <p><b>12.</b> Guidance is provided on how to notice and acknowledge students when they are engaging in academic mindsets.</p> <p><b>13.</b> Guidance is provided to help students connect with their current expertise and competencies.</p> <p><b>14.</b> Guidance is provided to reimagine the student and teacher relationship as a partnership</p> <p><b>15.</b> Guidance is provided to help teachers balance giving students both care and push</p> <p><b>16.</b> Guidance is provided on maintaining high standards, offering emotional support as well as instructional scaffolding</p> <p><b>17.</b> Guidance is provided about engaging students in thinking about their thinking in conversations about their learning and cognitive strategies</p>			

**Other**

\*\*Intellective capacity is a term coined by Hammond (2015).

**Inclusive content:** *Class materials and activities contain inclusive content (e.g., bring in diverse perspectives, provide teachers with tools to tailor content to students’ backgrounds, needs or interests)*

	Evidence: specific examples from materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<p style="text-align: center;"><b>Inclusive content</b></p> <p><b>Samples of what inclusive content can look like in curriculum materials:</b></p> <ol style="list-style-type: none"> <li>1. There are references to different ethnic and cultural traditions, languages, religions, names and clothing, and when described, diverse ethnicities and nationalities are portrayed – not all Asian families are Chinese, not all Latinx families are Mexican, etc. Characters from diverse backgrounds are not ambiguous.</li> <li>2. Diverse family structures (e.g., single parents, adopted or foster children, same-sex parents, other relatives living with the family) are represented.</li> <li>3. Characters of color are main characters and not just sidekicks, or advice-givers, or saviors. (ELA)</li> <li>4. If there is conflict in the storyline, the characters of color are not mostly considered the problem. (ELA)</li> <li>5. Characters of color are not assumed to have low family wealth, low educational attainment and/or low income. (ELA)</li> <li>6. The curriculum acknowledges and/or incorporates the expertise and resources of diverse communities, their cultures, and their historical and/or contemporary experiences.</li> <li>7. The curriculum communicates an asset-based perspective by representing people of diverse races, classes, genders, abilities and sexual orientations through their strengths, talents and knowledge (for example, characters of diverse cultural backgrounds are not represented stereotypically or presented as foreign or exotic).</li> <li>8. The curriculum highlights and affirms the diversity of knowledge systems, including those of Indigenous, Black/African, Brown, and non-Western conceptions of knowledge such as interdependence, sustainability, and continual change across content areas, including STEM.</li> <li>9. The curriculum presents non-dominant or different points of view on the same event or experience, especially points of view from marginalized</li> </ol>			

**Design of Curriculum Materials**

	Evidence: specific examples from materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<b>Inclusive content</b>			
<b>Design of Professional Learning Supports</b>			
<b>Other</b>			

people/communities.

**10.** Gender is addressed from an assets-based perspective; its impact is explored and gender-limiting assumptions are challenged.

**11.** The curriculum acknowledges the origins of science, technology, engineering, arts and/or math in various forms in different cultures throughout the world, and that the Western narrative of STEM obscures or makes invisible the diversity of contributions to STEM and what STEM is, including elevating mathematicians and/or scientists with historically marginalized identities (e.g., non-binary or trans people, women, people of color, people with disabilities, working class people, multilingual people) and their discoveries.

**12.** The curriculum elevates not just “scientists and mathematicians,” but the everyday users of math, science, technology, and engineering.

**13.** The curriculum presents multiple understandings of a scientific or mathematical concept or theory, especially highlighting points of view from marginalized people/communities. (STEM)

**Samples of what inclusive content can look like in professional learning supports:**

**14.** Guidance is provided on how to engage students in experiential learning activities whereby they learn about their own (and other) cultures and communities.

**15.** Guidance is provided on how to engage students’ families to enhance lessons.

**16.** Guidance is provided on how to customize and supplement the curriculum to reflect the cultures, traditions, backgrounds and interests of the student population.

**17.** Guidance is provided on how to access Indigenous and non-Western resources to understand academic content, including math and science, including oral histories, legends, and community knowledge.

**Other samples:**

**18.** Assessments (formative and/or summative) measure outcomes associated with culturally responsive and sustaining practices.

**Student agency and ownership:** *Class materials and activities allow for student agency or ownership (e.g., student has voice, choice, or leadership over what they learn, how they learn it, and how they share their learning)*

	Evidence: copy-pasted examples from the materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<p style="text-align: center;"><b>Student agency and ownership</b></p> <p><b>Samples of what student agency &amp; ownership can look like in curriculum materials:</b></p> <ol style="list-style-type: none"> <li><b>1.</b> The curriculum provides opportunities for learners to see themselves in the content and projects (identities).</li> <li><b>2.</b> The curriculum provides guidance for learning activities (e.g., project work) that recognize value in all participants' contributions (voices).</li> <li><b>3.</b> The curriculum promotes activation of prior knowledge (e.g., pre-assessment questions); use of learners' experiences and culture as content; reflection questions; elicitation and concrete incorporation of learners' thoughts and attitudes (funds of knowledge).</li> <li><b>4.</b> The curriculum provides opportunities for learner choice (e.g., students have say over choice of topic for essay or project) (interests).</li> <li><b>5.</b> The curriculum encourages the development of student-created study guides; products that can be used repeatedly that are relevant to learners' future career goals (value).</li> <li><b>6.</b> The materials respond to specific user input, allowing students to reflect and construct their own methods to problem-solving, inviting learners' personal interpretations (personalization).</li> <li><b>7.</b> The curriculum promotes action-oriented activities (examples of learner-centered assessment strategies include reflections, portfolios, personal action plans) (agency).</li> </ol>			

**Design of Curriculum Materials**

	Evidence: copy- pasted examples from the materials	Notes on the example (e.g., how does it exemplify the construct)	General reflections on presence or absence of this construct
<p style="text-align: center;"><b>Student agency and ownership</b></p> <p><b>Samples of what student agency &amp; ownership can look like in professional learning supports:</b></p> <p><b>8.</b> Guidance is provided on using students’ everyday lives and prior knowledge as the starting point for lessons and learning activities.</p> <p><b>9.</b> Guidance is provided on how to make real-life connections between academic content and the local neighborhoods, culture, environment, community issues, and current events.</p> <p><b>10.</b> Guidance is provided on creating opportunities for students to exercise agency over their learning, e.g., by offering choices over topics, ways of demonstrating learning, which books/materials they read.</p> <p><b>11.</b> Guidance includes, for specific lessons, describing a range of possible student responses that could all be valid, given the range of student experiences and perspectives.</p>			
<p><b>Design of Professional Learning Supports</b></p>			
<p><b>Other</b></p>			



## Appendix C. Definitions of seven constructs in the Culturally Responsive and Sustaining Practices in Open Educational Resources: A Materials Review Protocol

In promoting a **classroom culture of care**, teachers are able to address power dynamics in the classroom and develop learning activities that promote belonging, caring, openness and respect. Teachers understand the role of culture in education and interrogate their own identity, privilege and bias to strengthen their practice (Ladson-Billings, 1995). Teaching is “validating, comprehensive and inclusive, multidimensional, empowering, transformative, emancipatory, humanistic, and normative and ethical” (Gay, 2018). Teachers are able to implement the features of CRSP in learning settings (Paris & Alim, 2017). In the context of open educational practices, there is a shift from primarily teacher-centric practices to learner-centric practices (Bali, 2020).

A core construct of openly licensed materials is that they provide learners with **high quality educational experiences**. Similarly, CRSP provides students with access to academically rigorous curriculum (Ladson-Billings, 1995), and involves pedagogies that allow students to learn at high levels (Hammond, 2015). The curriculum provides a balance between giving students both care and push, provides multiple ways to access content, and includes accessibility options for students with diverse abilities.

**Inclusive content** is fundamental to CRSP. Inclusive content brings in diverse perspectives and is aligned to student context. Materials use an assets-based perspective that includes the diversity of different ethnic and cultural backgrounds and family structures and present perspectives from marginalized peoples and communities. Inclusive content affirms student identities and experiences (Ladson-Billings, 1995). Content and instruction are historicized (Paris & Alim, 2018). Open educational practices provide an opportunity to move from a focus on content to a focus on process (Bali, 2020).

Culturally responsive and sustaining practices include the promotion of **student agency and ownership**. Students have voice, choice and leadership in their learning. Students see themselves in the curriculum and see that they are valued; students see their culture and its value; the curriculum encourages learner choice and agency. There is an affirmation of student identities and experience (Ladson-Billings, 1995); students develop their own agency and provide input to their learning (Paris & Alim, 2017). Open educational practices also encourage student agency and the possibility of student creation of materials and knowledge.

Open Educational Resources (OER) are teaching, learning and research materials that reside in the public domain or have been released under an intellectual property license that permits their **free use**, adaptation, redistribution, and re-purposing by others. This allows students to have access to high-quality rigorous materials and instruction unrestrained by the resources or experiences they bring to the classroom.

A core construct of open educational practices is the opportunity for learners and educators to **generate new knowledge**. Students and teachers generate new knowledge collaboratively, and revise and adapt materials. OEP facilitates retaining, remixing, revising, reusing and redistributing of openly licensed materials (Wiley, n.d.). In contrast, CRSP places less emphasis

on the generation of knowledge and more on fostering environments that value different individuals' strengths and that advance group and individual learning.

In this evaluation we have defined two components of **critical consciousness**; the process of teacher self-reflection as the first step in developing culturally relevant and sustaining practices, and the process by which students are encouraged to develop their own ability to think critically about current or social justice issues and/or emancipation. Students connect learning to social, cultural, political and environmental concerns; they are encouraged to use knowledge to improve their world and address inequities. Students develop knowledge and skills needed to develop critical perspectives of others and the world (Ladson-Billings, 1995). They develop a capacity to contend with internalized oppressions (Paris & Alim, 2017). In the context of open educational practices, there is an expansion from primarily pedagogical-focused instruction to including a focus on social justice (Bali, 2020).

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