

TEACHER PREP REVIEW

Building Content Knowledge

February 2023



National Council
on Teacher Quality

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OVERVIEW

Building broad content knowledge is essential to developing students' literacy and knowledge of the world, and eliminating educational disparities.

Building students' content knowledge—knowledge about the natural and human world—is a critical linchpin to helping them become strong readers and creative problem solvers. Years of cognitive research has shown background knowledge in key subject areas, like science and social studies, is essential to reading comprehension, helping students not only understand the meaning of a text, but also interpret new words and ideas.¹ For example, strong content knowledge allows a student completing their science reading assignment to properly interpret the word “pupil” as the center of the human eye, rather than a student at school.

Elementary grades are an essential time for building this knowledge as it is cumulative.

The more a student knows, the faster they can learn more. As learning happens so quickly, if a student doesn't receive a strong foundation in core content knowledge, they may never catch up to their peers.²

Failing to provide the opportunity to learn to read has devastating effects on children—recent national data shows only 33% of 4th graders are reading proficiently. Alarming, the current reality fails some students disproportionately—the number of students reading proficiently drops precipitously for Black students (17%), Hispanic students (21%), English language learners (10%), and students with disabilities (11%).³

Critical to righting this inequity are well-prepared teachers who can deliver engaging opportunities for students to learn core content foundational for reading comprehension. However, for teachers to provide students with background knowledge to support them in becoming successful readers, they must first gain the knowledge themselves. Surveys of new elementary teachers find they often do not feel confident in their knowledge of science nor social studies.⁴

Teacher preparation programs, therefore, play a critical role in providing aspiring teachers with the content knowledge they need to teach their future students. Are preparation programs achieving this goal? To find out, the National Council on Teacher Quality (NCTQ)

engaged experts from the field, teacher preparation program faculty, and measurement experts to design the Building Content Knowledge standard,⁵ one of the seven standards of the [Teacher Prep Review](#), to ascertain the extent to which undergraduate elementary teacher preparation programs (and the institutions in which they are housed) build candidates' content knowledge in two core subject areas: science and social studies.

Two guiding principles inform this analysis:

1. To develop successful readers, all elementary teachers should enter the profession with a base of knowledge in the core subjects taught in elementary grades.
2. To support students to learn the content in science and social studies, teacher preparation programs have the responsibility to ensure teacher candidates possess and/or acquire an established base of knowledge and demonstrate this knowledge through success in their coursework.⁶

See the research behind the Building Content Knowledge standard.

[Read our research rationale.](#)

Explore the Building Content Knowledge Tool

To make this analysis actionable, NCTQ developed the **Building Content Knowledge: Content Coverage Tool**, which provides individual teacher preparation programs a personalized analysis of (1) whether the program's requirements or institution's general education requirements adequately cover key content essential for students, and (2) guidance on which courses the program could require or recommend to best prepare future teachers to pass content licensure exams, teach the breadth of elementary curricula, and, ultimately, boost students' reading comprehension.

Access the Building Content Knowledge: Content Coverage Tool

[Explore your program's personalized recommendations.](#)

FINDINGS

Course requirements are an underutilized tool for ensuring teacher candidates receive the science and social studies content knowledge necessary to promote students' literacy and learning.

Lack of adequate content coverage in teacher preparation has often been attributed to competing demands between teacher prep programs' priorities and those of the broader institution. After examining 437 undergraduate elementary programs,⁷ NCTQ found many institutions already offer coursework covering essential science and social studies content and allot considerable time to general education requirements.⁸

Teacher preparation programs have an opportunity to refine course requirements to ensure teacher candidates receive the science and social studies content knowledge necessary to fuel students' literacy and learning.

On average, institutions and teacher prep programs require four science courses and six social studies courses⁹ across general education and program requirements, indicating they already devote significant time to cover key content topics. However, only 3% require aspiring teachers to complete courses in most of the topics in science or social studies an elementary teacher needs to know.

While relevant courses are offered by institutions, they are presented as *options*, rather than *requirements*.

SCENARIO 1

Candidates have many choices to make when selecting courses to fulfill multiple requirements; and without clear guidance, it is unlikely candidates will choose the suite of courses ensuring they are well-prepared in all key content topics.

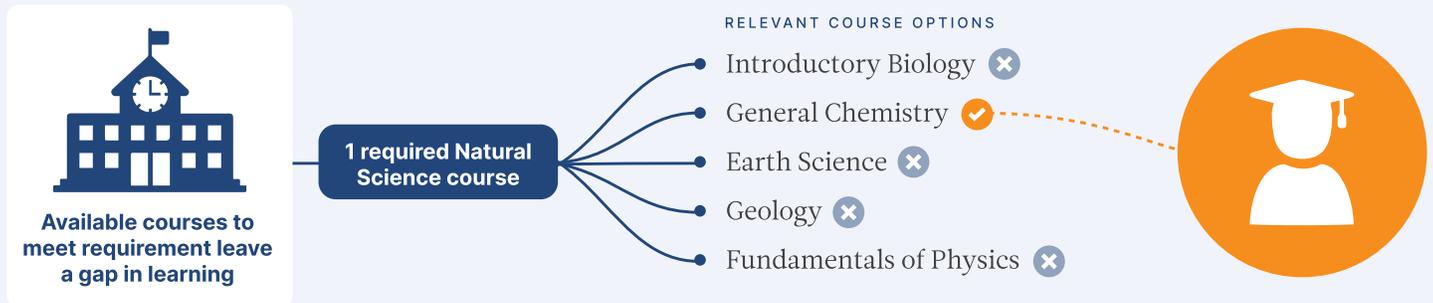
In many general education requirements, a candidate can choose from a wide selection of course options. The requirement may state a student has to take one course in history, and allow them to choose from a list of 20 different history courses covering a range of topics. Some of these options are directly relevant to the knowledge an elementary teacher needs; others are irrelevant. For example, to fulfill a general education requirement, a candidate may opt to take “American Government” (represented in *every* state’s social studies standards) or “Sports History and American Character” (represented in no state standards). The abundance of choices makes it unlikely a candidate will select courses relevant to teaching elementary students.



Candidates are forced to choose between topics, even though they need to learn about all of them.

Some institutions require aspiring teachers to complete several science or social studies courses, but the way requirements are structured forces aspiring teachers to pick and choose what essential content to take—and what to skip. This leaves gaps in the core science and social studies content the aspiring teacher gains before graduation.

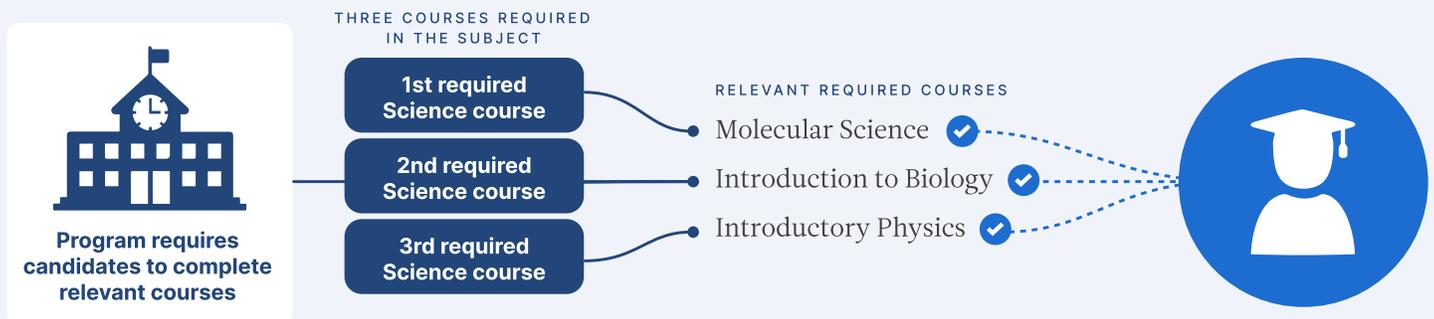
For example, an institution requiring only one “Natural Science” course, including options like “Introductory Biology,” “General Chemistry,” and “Fundamentals of Physics,” leads candidates to select one essential science topic but does not ensure they are exposed to any others.



IDEAL

Ideally, programs should provide candidates with multiple, specific recommendations of which courses to take, allowing them to meet graduation requirements *and* gain the social studies and science content they need to teach their future students.

While general education requirements are designed for all students at an institution, programs can provide specific guidance on the best options for aspiring teachers. By analyzing the courses available within currently existing requirements using the **Content Coverage Tool**, programs can give candidates concrete, relevant options leading them to deep content knowledge exposure by the time they graduate. For example, a vague institutional requirement such as, “Take one Natural Science course” by a university can be bolstered by teacher preparation program recommendations of relevant options that align to standards for students, such as “Survey of Chemistry,” “Introduction to Biology,” or “Introduction to Physical Geography.” Where candidates are asked to choose between topics, programs should ensure they are both recommending relevant courses *and* ensuring their program requires courses to fill in any remaining gaps.



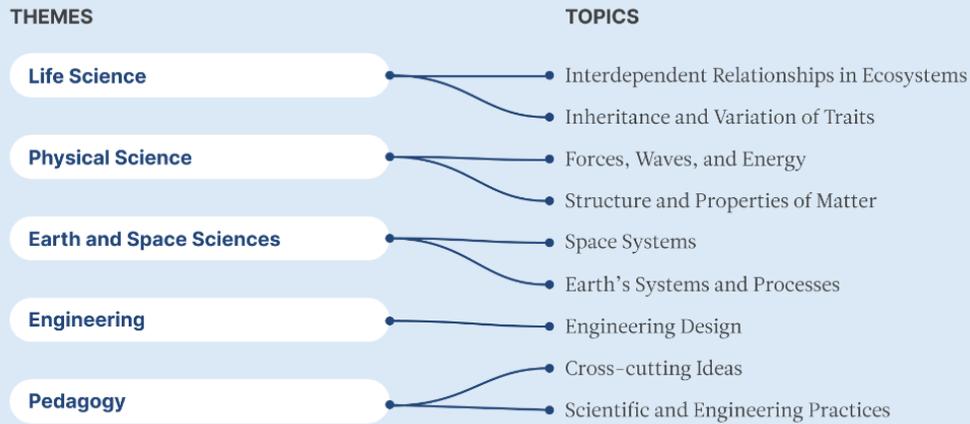
84% of institutions in our sample address most¹⁰ science and social studies content elementary teachers need within current course options, but only 3% of these institutions require candidates to take the *right* courses in most topics.

To determine essential science and social studies topics for aspiring elementary teachers to learn, NCTQ reviewed student standards, elementary content licensure tests,¹¹ elementary content exams,¹² and engaged with an expert advisory panel. (Read more about this process in the [Technical Manual](#).) While these content topics are often covered in courses offered by the institution and included as options to meet general education requirements, specific topics are rarely explicitly required by the teacher preparation program or broader institution.

What are the thirteen topics of Social Studies content?



What are the nine topics of Science content?



There is widespread opportunity for programs to provide more specific recommendations and guidance without adding new courses or increasing the time candidates need to complete graduation requirements.

For example, 95% of institutions or programs currently have a course within existing requirements covering forces, waves, and energy, but only 41% of institutions or programs **explicitly require** candidates take a course covering the topic, despite all 50 states and D.C. requiring elementary teachers to teach this topic. Programs could help close this gap by finding relevant courses offered at their institution and recommending candidates use it to fulfill graduation requirements.

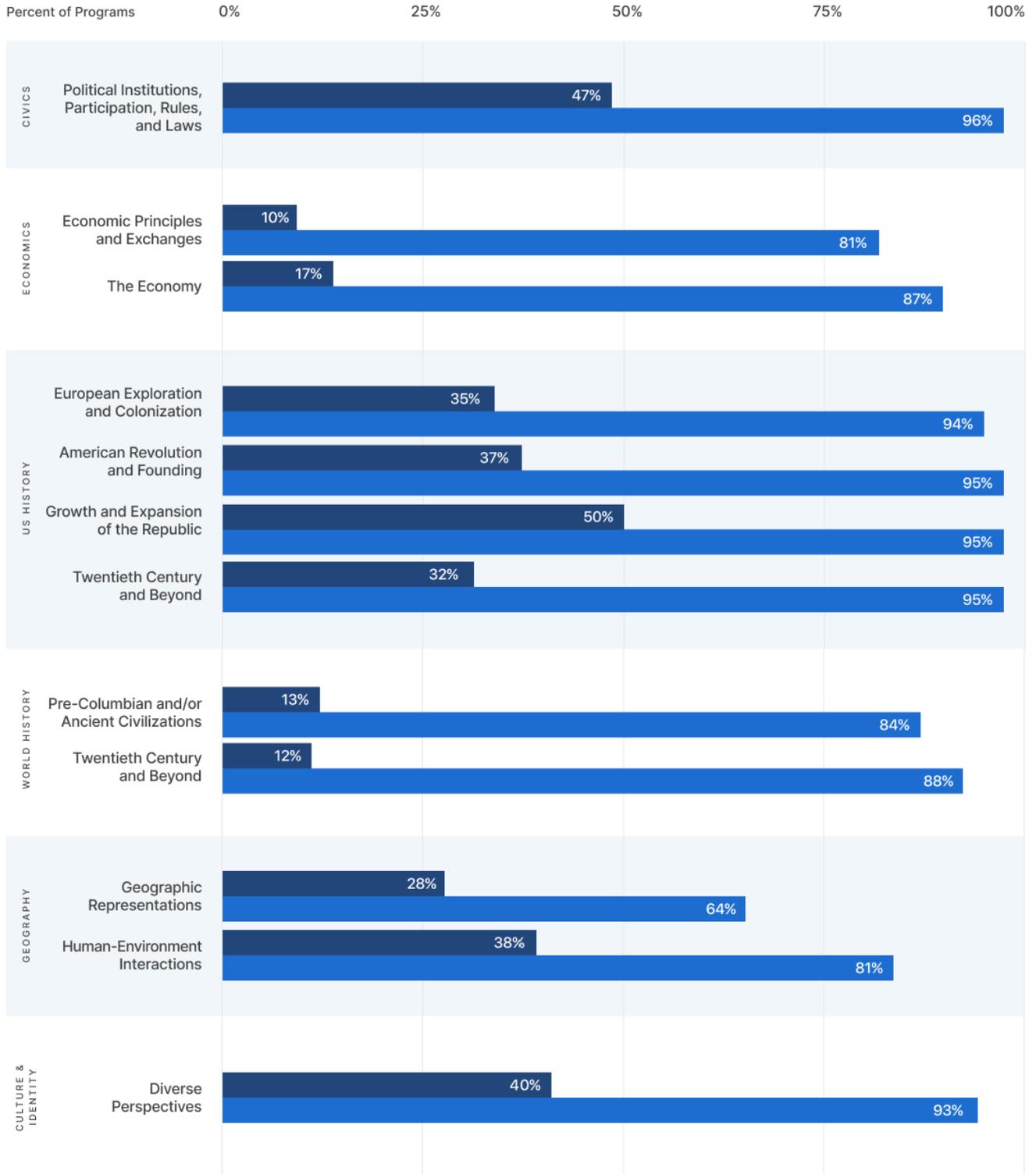
The chart below illustrates the percentage of institutions offering coverage of key topic areas as options in current requirements (light blue bars) versus the percent *requiring* aspiring teachers to take courses covering the topics (dark blue bars).

Course requirements compared to course options (by key topic area)

Institutions/programs that **require** a course covering a topic compared to institutions/programs that offer **optional** courses covering a topic

Social Studies

■ Topic is covered in **required** course ■ Topic is covered in **optional** course

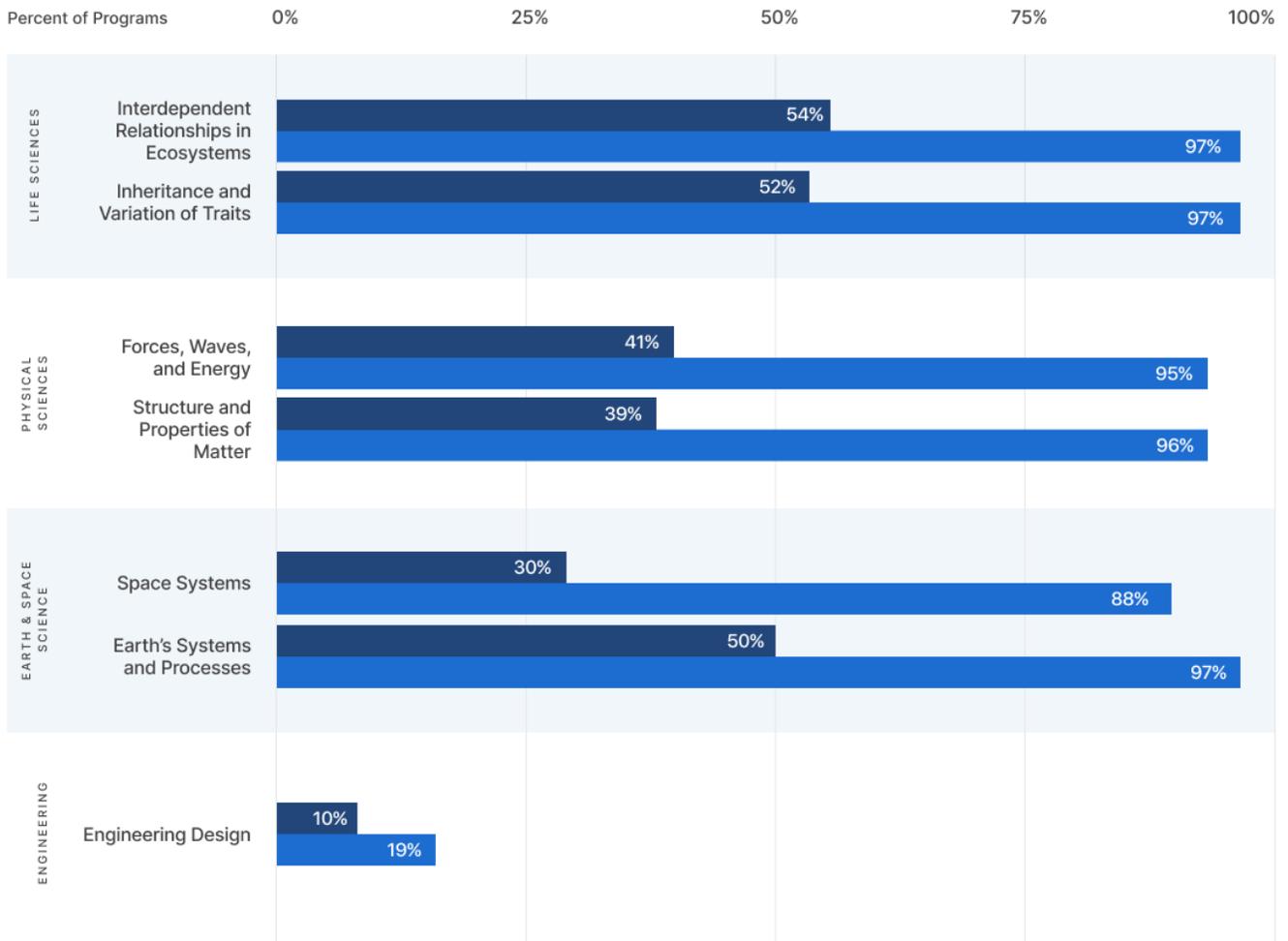


Course requirements compared to course options (by key topic area)

Institutions/programs that **require** a course covering a topic compared to institutions/programs that offer **optional** courses covering a topic

Science

■ Topic is covered in **required** course ■ Topic is covered in **optional** course



Gaps in teacher preparation program requirements will leave students unprepared for the future of work and engaged citizenry.

Some of the topics least likely to be required in teacher preparation programs leave teachers unprepared to provide their students with the fundamental knowledge and skills to participate in a modern world. For example, in order for students to become informed citizens, it is important to understand the basic tenets of economics and world history; however, fewer than 20% of institutions require coverage of either of these topics. In an increasingly complex financial system, knowledge of basic economic principles is important for both managing one's own household finances and understanding how the economy functions.¹³ Lacking knowledge of world history leaves society vulnerable to repeating atrocities of the past¹⁴ and ill-equipped to address complex international problems of the present.¹⁵

When aspiring teachers do not have content knowledge in economics and world history, they are unable to fully prepare their students to meet the national and global challenges of today. The same can be said about topics that help ensure students understand our nation's past. Without a strong understanding of U.S. history, Americans cannot learn from the past to better shape the future. While course requirements covering U.S. history are somewhat more common, with approximately one-third to one-half of institutions requiring coverage of related topics, this still means that the remaining institutions, up to two thirds of our sample, are not requiring aspiring elementary teachers to learn about basic social studies topics like the American Revolution. While most institutions have courses available related to key social studies topics, there is a missed opportunity to guide aspiring teachers toward courses that would best prepare them for the classroom.

As with social studies topics, there is not a single science topic that all aspiring teachers are required to take. This is despite the fact that we know early exposure¹⁶ to science, technology, engineering, and math concepts is a critical strategy for encouraging underrepresented groups to pursue careers in these high-demand, high-paying fields.¹⁷

Most states adopted a science standard for students on Engineering Design—but teacher preparation programs have been slow to adapt.

This gap in content is particularly glaring in engineering: while engineering is part of the science standards in 40 states, only 19% of institutions even offer related coursework for aspiring teachers, much less explicitly require it. Given that so few institutions offer these types of courses, the path forward will require institutions and programs to work together

to ensure there is opportunity for aspiring teachers to gain this knowledge. As engineering is one of the STEM fields where women and people who identify as Black or Latino are most underrepresented,¹⁸ access in the elementary years is particularly important for spurring interest in engineering careers. And since those who obtain bachelor's degrees in engineering have some of the highest starting salaries of all majors,¹⁹ broader exposure to engineering concepts in the elementary years can be the starting point for setting students on a pathway to a high-paying, high-demand job.

While engineering requirements at teacher preparation programs are rare, some programs are ahead of the curve and have designed engineering courses specifically for aspiring teachers that emphasize how to integrate engineering design concepts into elementary instruction.

Some institutions have created Engineering Design courses for aspiring teachers.

VERMONT

Castleton University

PHY 1170: Engineering Design in the Classroom

The Next Generation Science Standards (NGSS) place an emphasis on incorporating engineering activities in the science classroom. This course will focus on the distinctions between science and engineering and give students the opportunity to design and practice teaching these lessons. This is a project-based course that will utilize Lego kits produced for the purpose of teaching engineering and computer coding.

PENNSYLVANIA

Drexel University

ESTM 342: Teaching Engineering Concepts to Children

This course is designed to provide elementary educators with the background knowledge and experiences that will enhance their ability to teach engaging, effective, and meaningful engineering lessons. These include: trends and issues in 21st century engineering education; best practices pedagogies in engineering education; connections and integration between engineering curriculum and other content areas; engineering design practices; planning, managing, implementing, and assessing engineering lessons; safety in engineering classrooms; the use of technology to enhance engineering instruction; and how to engage all learners in positive classroom engineering experiences.

MISSOURI

University of Central Missouri

ECEL 2620: Physical Science and Engineering Design for Teachers

An inquiry driven course in physical science and applied engineering design consistent with national, state and local standards designed for teacher candidates and content standards for elementary grades.

Actions for teacher preparation programs

1. Conduct a gap analysis using the Content Coverage Tool.

Programs must first understand if there are any content gaps that exist across their current offerings in the program or institution’s general requirements. In NCTQ’s [Content Coverage Tool](#), the “*How to Improve Coverage*” section of the Recommendations tab provides a list of topics missing from current institution and program course offerings even after selecting the “Most Aligned” set of courses (defined as the set of courses meeting current institution and program requirements *and* addressing the greatest number of topics). While there are typically numerous requirements for elementary teachers, starting with the “*How to Improve Coverage*” section helps programs to identify topics *not covered*, but also provides course options *already existing at your institution* which can help fill those gaps without adding any new coursework.

2. Recommend specific courses.

Programs should, at minimum, recommend which courses aspiring elementary teachers should take to learn the content necessary to teach elementary students. Programs can create guidance materials, such as recommended course lists, to post on their website or within program requirement catalogs, and work with advisors to provide both candidates *and* potential candidates with specific recommendations on which courses both align to what elementary teachers need *and* fulfill general education requirements. In the [Content Coverage Tool](#), programs or advisors can use the “Most Aligned” set of courses section of the Recommendations tab to identify existing courses that are available to recommend to aspiring teachers.

3. Use other sources of data on candidates’ outcomes to identify the top areas of need.

In order to understand strengths and areas of growth, programs can compare gaps in coverage, course-taking patterns, and performance on elementary content licensure exams for at least the most recent three years to identify top areas of need. Both major licensure test companies (Pearson and ETS) offer preparation programs access to data management systems, which can provide detailed reports on candidates’ performance on exams and identify areas of weakness. Comparing gaps in coverage in current

requirements to course-taking patterns may reveal why candidates are weak (or strong) in licensure test content areas. If candidates struggle in a specific content area, provide guidance to candidates on relevant courses available for each topic area.

4. Advocate for the program's needs with institutional leaders.

Preparation program leaders should alert institutional leaders to gaps in coverage and explain how a lack of content knowledge can impact future teachers. Program leaders can advocate for key changes such as collaborating with liberal arts or science faculty to create alignment between current course content and the needs of teacher candidates, opening up additional seats in relevant courses, giving priority enrollment to teacher candidates, increasing the availability of courses covering specific topics relevant to elementary teachers, or hiring faculty who can teach varied content. For topics without applicable courses in current requirements, such as Engineering Design, consider collaborating with faculty at your university to develop new courses or modify existing ones to include missing content.

Actions for state policymakers

5. Require a content licensure test measuring all four core content areas separately.

In order to verify that aspiring teachers possess the content knowledge to both teach elementary students and build the background knowledge needed to create strong readers, states should consider requiring a content licensure test measuring all core content areas separately. Licensure tests combining major content areas can mask potential knowledge gaps, and ultimately leave teachers unprepared for the job. By requiring content licensure tests with separate content subtests, the state and programs can use this data to strengthen teacher preparation programs in specific, targeted ways.

6. Leverage the program approval process to support continuous improvement.

States can use the [Content Coverage Tool](#) and licensure test pass rates during the program approval process to monitor the extent to which programs support teacher candidates in building the breadth of their content knowledge. In particular, first-time pass rates are indicative of the preparation aspiring teachers received across their entire preparation experience. States could require programs to unpack this data by conducting a gap analysis using the **Content Coverage Tool** and licensure test pass rates to identify areas for growth in specific topic areas. This type of process will align standards, instruction, and assessment across the breadth of required content topics in science and social studies.

HOW WE ANALYZED

Methodology

Analysis relied on multiple sources of data to populate the Building Content Knowledge Tool for each program to review before finalization:

- University requirement catalogs;
- Course descriptions;
- Program requirement descriptions or degree plans; and
- Concentration requirements.

Methodology in Brief

A team of analysts use course catalogs to determine the required coursework for each elementary program in the sample. Analysts use the information provided both within the general education requirements and those requirements specified by the teacher preparation program to identify courses likely providing science or social studies coverage. Using the institution’s catalog or program information, analysts log each requirement as a separate “Requirement Category.”

Type of Requirement Category	Action	Example
Singular course	Treat as singular no other course options can fulfill it.	All candidates must take CHEM 101.
Menu of course options (10 or fewer) to meet one Requirement Category	Treat as “group,” each course listed as a possible option for topic identification.	Candidates may take one course from the following options: BIO 102, BIO 103, ASTRO 102, CHEM 101.
Menu of course options (more than 10) to meet one Requirement Category	Treat as “group,” label as “extensive list”, and select some courses likely to provide coverage in the topic coverage identification process.	Candidates must take one course with the prefix “BIO,” “ASTRO” or “CHEM.”

After identifying the courses meeting each Requirement Category for both the institution and program, analysts determine which topics each course covers. To identify coverage, analysts use the course title and description to determine whether the course likely covers the topics aligning with what elementary teachers need to know, based on an analysis of standards, licensure tests, and expert input. In the *Course Analysis* section of the tool, users will be able to see which topics are addressed by which courses for each requirement category.

Using course topic coverage findings, analysts select courses to determine the most-aligned set of courses. Taken together, these courses accomplish two goals: 1) cover the broadest range of topics, while 2) meeting institution and program requirements. These are the set of courses NCTQ recommends teacher prep programs guide their aspiring candidates to complete, as they cover the largest number of topics of what elementary teachers need to know.

Learn more about the development of the Building Content Knowledge standard.

See the full [Technical Manual for Building Content Knowledge \(2022\)](#) for details on the development of the standard, the sample of programs, analysis protocols, coding reliability between data sources, and supporting research.

Research Rationale

Why is content knowledge important?

Content knowledge across an array of subjects and topics supports reading comprehension.

The full breadth of what teachers need to know and be able to do is expansive, and content knowledge is one of many critical requirements to be a successful elementary teacher, especially when teaching students to read. Much as learning phonics helps students decipher the sound of words, gaining background knowledge about a breadth of subject areas helps students draw meaning from what they read. A review of decades of research confirms:

“higher levels of background knowledge enable children to better comprehend a text. Readers who have a strong knowledge of a particular topic, both in terms of quantity and quality of knowledge, are more able to comprehend a text than a similarly cohesive text for which they lack background knowledge.”²⁰

Tests of students' reading comprehension reveal that their knowledge of the topic predicts their comprehension more accurately than their reading ability does.²¹ Moreover, spending more class time on social studies is associated with improved reading ability, especially for students who are learning English and for those who are living in poverty.²² Several studies of specific curricula or interventions have found building students' science and/or social studies content knowledge also supported their vocabulary and comprehension.²³

A summary of research by Knowledge Matters highlights four ways in which background knowledge underpins reading comprehension:

“First, vocabulary tends to grow along with knowledge, but when just 2% of the words in a passage are not known, comprehension begins to drop.²⁴ Second, the ability to process multiple details in a reading passage is severely restricted when readers aren't familiar with the topic(s) in the passage; cognitive scientist Daniel Willingham says that without adequate background knowledge, “chains of logic more than two or three steps long” can't be well comprehended.²⁵ Third, when we know a little about a topic (e.g., that Alaska is freezing cold), we use that bit to generate a picture in our mind that helps us make sense of a related passage (e.g., that animals without heavy coats or other means of staying warm will struggle to survive in Alaska). Fourth, when we already know much of what's in a passage, we don't have to focus on its basics, and we can think critically: Does this passage make sense? Do I agree with its argument? How do the different items and ideas in this or several passages relate to each other?”²⁶

Disparities in access to a broad curriculum reinforces inequities for students of color and students living in poverty.

Learning core content builds the foundation for later grades and supports students' ability to enter postsecondary education. In a recent report on educational equity, the National Academies of Sciences identified “disparities in curricular breadth,” and in particular “availability and enrollment in coursework in the arts, social sciences, sciences, and technology,” as a key indicator of educational inequities.²⁷ Data from the National Assessment of Educational Progress and other sources confirms a sizable opportunity gap in core content areas for students of color and students living in poverty.²⁸

Moreover, teachers with gaps in their content knowledge are more likely to work in more disadvantaged (and often lower-achieving) schools—those with higher rates of poverty and more students of color.²⁹ Similarly, classes of students with higher prior achievement in math or in science are more likely to be taught by teachers who report higher levels of preparedness in those subjects, compared with classes of students with lower prior achievement.³⁰

Inequities in early access to core content knowledge are cited as a key reason for later inequities in access to jobs,³¹ as disparities in access to jobs in the STEM field illustrate.³² Not only do students deserve to attain an education preparing them to pursue a variety of fields, but those fields benefit from the perspectives and participation of people from a broad range of backgrounds and experiences.³³

Content knowledge is important for its own sake.

Learning about a new topic is an important and powerful experience in its own right. The National Academies of Sciences states,

“Every child deserves to experience the wonder of science and the satisfaction of engineering. Children, even at very young ages, are deeply curious about the world around them and eager to investigate the many questions they have about their environment. Decades of research suggest that children are capable of learning sophisticated disciplinary concepts and can engage in scientific and engineering practices (National Research Council [NRC], 2007, 2012). Engaging them in learning science and engineering takes advantage of this interest and helps them to answer their own authentic questions and solve real-world problems that are important to them.”³⁴

Early exposure to science, technology, engineering, and mathematics (STEM) may have lifelong implications for students. Children form attitudes about STEM subjects in the early grades.³⁵ Further, teaching children science concepts in the early grades establishes “the knowledge and skills they need to approach the more challenging science and engineering topics introduced in later grades.”³⁶ Experts also anticipate early exposure to STEM subjects increases students’ interest in pursuing those careers.³⁷

Regarding social studies, there have been several perspectives over the years on why elementary students should learn history and social studies. These include that students should learn social studies to promote “civic competence and a disposition toward participatory citizenship,” and students should learn a more rigorous history curriculum because “study rooted in the disciplines not only teaches content more effectively but makes for more thoughtful and cognitively sophisticated students.”³⁸

Additionally, knowledge begets more knowledge. New research finds having prior knowledge of a subject makes it easier to acquire new knowledge on that subject.³⁹ Learning about topics early on enables students to learn more content related to those topics faster, whereas students who miss an early introduction to a broad base of content will struggle to catch up.⁴⁰ If the education system provides fewer opportunities to learn social studies and science to children from low-income backgrounds or children of color than their wealthier or whiter peers (which disparities in NAEP scores would suggest is the case⁴¹), this inequity not only leaves them on weaker footing in the elementary grades, but makes it harder for them to ever catch up.

Why do aspiring elementary teachers need dedicated content coursework as part of their preparation?

There is widespread agreement among the education field—teachers cannot teach what they do not know. A 2020 NCTQ survey found 83% of teacher preparation program leaders and 95% of state education agency (SEA) leaders agreed with this sentiment.⁴² The reasons these groups cited for the importance of content knowledge includes:

- Elementary teachers who have knowledge of a core content area can more efficiently plan lessons in that area (92% of teacher preparation program leaders and 93% of SEA leaders agree or strongly agree).
- Teachers cannot know how to deliver instruction in a content area (pedagogical content knowledge) without first having a clear understanding of that content area (84% of teacher preparation program leaders and 90% of SEA leaders agree or strongly agree).
- Elementary teachers need to have more advanced knowledge of content than what they teach their students (84% of teacher preparation program leaders and 95% of SEA leaders agree or strongly agree).
- Elementary teachers who have knowledge of a core content area are more likely to effectively teach that content (87% of teacher preparation program leaders and 98% of SEA leaders agree or strongly agree).

Even though they have earned bachelor’s degrees and sometimes master’s degrees, many teachers enter the classroom without a clear foundation in the content they will be expected to teach. In a survey on behalf of the National Science Foundation, elementary teachers report they do not feel well prepared to teach science or social studies, and their reported rates of preparedness have declined in all subjects between 2012 and 2018.⁴³ Federal surveys of new teachers (not specific to elementary grades) find only 37% report feeling very well prepared to teach their subject matter in their first year, and 31% feel they were very well prepared to meet state content standards in their first year of teaching.⁴⁴ While teachers may not know everything they will be expected to teach before they set foot in the classroom, they will be far more effective if they enter with a foundation in most of the content knowledge.⁴⁵

Further, this survey data is supported by a committee report from the National Academies, which concluded,

“The available evidence suggests that many science teachers have not had sufficiently rich experiences with the content relevant to the science courses they currently teach, let alone a substantially redesigned science curriculum. Very few teachers have experience with the science and engineering practices described in the [Next Generation

Science Standards]. This situation is especially pronounced both for elementary school teachers and in schools that serve high percentages of low-income students, where teachers are often newer and less qualified.”⁴⁶

While research on teachers’ elementary content preparation and knowledge is limited, most available research confirms a common sense conclusion—students learn more when their teachers know more. This relationship between the courses teachers take during their pre-service preparation or in-service professional development and their students’ achievement has been found in English language arts and in science.⁴⁷ Another study finds that when teachers learn more about an elementary mathematics topic during preparation, they address that topic more completely when teaching.⁴⁸

Research generally finds the more a person knows about many different subject areas, the stronger his or her levels of literacy are, as measured by vocabulary and scores on tests of reading comprehension.⁴⁹ A body of robust research spanning many decades connects a teacher’s level of literacy or verbal ability and the achievement of that teacher’s students.⁵⁰

Elementary teachers’ insufficient content knowledge may also impede their ability to give their students appropriate assignments. A 2018 TNTP study found “few...assignments gave [students] the chance to demonstrate grade-level mastery.” In data TNTP shared with NCTQ for assignments from kindergarten through grade 5, only a quarter of English language arts assignments (28%) and half of math assignments (48%) were based on grade-level content.⁵¹ These results were particularly egregious for students of color: classrooms with mostly white students received 3.6 times more grade-appropriate lessons than classrooms with mostly students of color, and classrooms with mostly higher-income students received 5.4 times more grade-level lessons than classrooms with mostly low-income students.⁵²

An insufficient background in core subjects may also hinder teachers’ efforts to identify additional resources to use in their classrooms, or to assess the quality of those resources.⁵³

When teachers have strong content knowledge in science and social studies, they are better prepared to help their students succeed in meeting the standards in those subjects and simultaneously better prepared to boost students’ reading levels and literacy skills.

ENDNOTES

1. Smith, R., Snow, P., Serry, T., & Hammond, L. (2021). The role of background knowledge in reading comprehension: A critical review. *Reading Psychology*, 42(2), 1-27; Connor, C. M., Dombek, J., Crowe, E. C., Spencer, M., Tighe, E. L., Coffinger, S., ... & Petscher, Y. (2017). Acquiring science and social studies knowledge in kindergarten through fourth grade: Conceptualization, design, implementation, and efficacy testing of content-area literacy instruction (CALI). *Journal of educational psychology*, 109(3), 301; Kim, J. S., Burkhauser, M. A., Mesite, L. M., Asher, C. A., Relyea, J. E., Fitzgerald, J., & Elmore, J. (2021). Improving reading comprehension, science domain knowledge, and reading engagement through a first-grade content literacy intervention. *Journal of Educational Psychology*, 113(1), 3.
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4. Horizon Research, Inc. (2019). *Highlights from the 2018 NSSME+*. Retrieved from <http://horizon-research.com/NSSME/wp-content/uploads/2019/01/Highlights-from-2018-NSSME.pdf>
5. A previous iteration of this standard was called the Elementary Content standard.
6. Aligned to a [crosswalk](#) between Praxis Elementary Education: Multiple Subjects (5001), Pearson products from five states, common standard frameworks, and the NEAP assessment by subject area: Literature/Writing: Common Core State Standards, Science: Next Generation Science Standards, Social Studies: The College, Career, and Civic Life Framework for Social Studies.
7. See the [Technical Manual](#) for a more in-depth explanation of the sample.
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