MARYLAND STATE DEPARTMENT OF EDUCATION
EQUITY AND EXCELLENCE

Mohammed Choudhury
State Superintendent of Schools

**TO:** Members of the State Board of Education

**FROM:** Mohammed Choudhury, State Superintendent of Schools

**DATE:** July 25, 2023

**SUBJECT:** Bluepring Deep Dive: College and Career Readiness Study Interim Report - Content and Standards Alignment Analysis

## Purpose

The purpose of this item is to provide an overview and update of the Blueprint College and Career Readiness Study currently being conducted by the American Institutes for Research (AIR). The results of the interim report on the content and standards alignment analysis will be presented.

## Background

The Blueprint for Maryland's Future requires MSDE to commission an empirical study of the interim College and Career Readiness (CCR) standard adopted by the Maryland State Board of Education in February 2022. To meet the interim CCR standard, students must achieve a qualifying score on both the state grade 10 English Language Arts test and a high school math test.

In spring 2022, MSDE partnered with the Maryland Assessment Research Center (MARC) at the University of Maryland to complete a short-term quantitative study to explore the relationship between students' outcomes in high school measures and success in postsecondary coursework. In November 2022, MSDE contracted with the American Institutes of Research (AIR) to conduct a multi-part study of the CCR standard that included 1) a predictive validity analysis of the interim standard to confirm and expand on MARC's study; and 2) a content and standards alignment analysis to determine the skills and knowledge necessary to succeed in the first year at a community college or 4-year college or university.

In May 2023, AIR presented their interim findings on the predictive validity of the interim CCR standard. The report focused on students who attended a Maryland public high school in grade 10 from 2015 to 2019 and attended a Maryland college or university after high school graduation. Two main findings of the report were:

1. Compared to the interim standard, an alternative CCR standard that includes high school grade point average (GPA) as another way to meet the standard would increase the percentage of students who meet the CCR standard at the end of grade 10 from 40% to 64%.
2. An alternative CCR standard that includes high school GPA as another way to meet the standard would also increase the percentage of students who were correctly classified as college ready or not college ready from 65% to 75%.

## Executive Summary

The presentation will include:

1. Background on the overall CCR study, including a review of the interim report on the predictive validity analysis and an update on stakeholder engagement for the study

2. Preliminary results from an assessment of the extent to which Maryland's College and Career Ready Academic Content Standards align with postsecondary expectations in (1) entry-level credit-bearing English language arts (ELA), math, and science courses; (2) developmental ELA and math courses; and (3) certificate-granting workforce training programs

3. Analysis of top-performing educational systems and how they define students as college and career ready, and the extent to which those expectations align to Maryland's expectations

4. Results from a study of potential areas of bias within K-12 assessments used to determine CCR

5. Research on the impact of grade inflation

## Action

No action is required; this information is for discussion only.

## Attachments

AIR_CCR_Interim_Report2.pdf

AIR_CCR_Interim_Report2.ppt

# College and Career Readiness Study Background

MARYLAND STATE BOARD OF EDUCATION | July 25, 2023

MARYLAND STATE DEPARTMENT OF EDUCATION
EQUITY AND EXCELLENCE

Presented By | Matthew Duque, Office of Research, Planning, and Program Evaluation

# Blueprint for Maryland's Future: Requirements

The Blueprint calls for a clear definition of a college and career readiness standard (CCR) and a system of assessments that ensure students are reaching their goals and receiving the support needed. The MSDE has commissioned two separate research studies to define and verify the CCR standard:

- **Exploratory Study**
  - MSDE partnered with the Maryland Assessment Research Center (MARC) at the University of Maryland to complete a short-term quantitative study to explore the relationship between students' outcomes in high school measures and success in postsecondary coursework and/or workforce outcomes.
- **Long-Term Study**
  - MSDE contracted with the American Institutes for Research (AIR) to 1) confirm and expand upon MARC's **predictive validity study** of the current interim CCR standard and 2) perform a deep **content and standards alignment analysis** to determine the skills and knowledge necessary to succeed in the first year at a community college or 4-year college or university in Maryland.

# Current CCR Interim Standard

The Blueprint requires a new **college and career readiness standard** that allows graduates to succeed in entry-level credit-bearing college courses. The goal is for all students to meet the standard by the end of their 10th grade year.

**Current Blueprint Interim Standard Effective Now**

A student meets the CCR Standard if they meet or exceed the standards in both English **and** Math:

## English

English 10

- **Score 3 or 4** on Fall or Spring MCAP
- Score 4 or 5 on the PARCC
- Score 2 or 3 on early Fall 2021 MCAP

**AND**

## Math

Algebra I, Algebra II, or Geometry

- **Score 3 or 4** on Fall or Spring MCAP
- Score 4 or 5 on the PARCC
- Score 2 or 3 on early Fall 2021 MCAP

Or a score of **520 on the Math SAT**

The Maryland State Board of Education adopted the interim standard on February 22, 2022

# CCR Standards: Statutory Context

Before the State Board can set an updated **long-term CCR Standard**, the long-term **research study must first be completed.**

- While the long-term study is being conducted, the **interim CCR standard** is used for **funding calculations.**
- The **current agreements between LEAs and community colleges may still be used for community college course placement** during this period.

**After the long-term research study is complete**, the State Board will adopt a CCR standard that "enables the **student to be successful in entry level credit bearing courses** or postsecondary education training at a State community college."

- **At that point**, "Each **community college** and other open–enrollment public institution of higher education shall **accept for enrollment in credit–bearing courses** any individual who has **achieved college and career readiness** according to the standard adopted by the State Board."

MD Code, Education, §15-126; §7-205.1

# Blueprint Requirements and Scope of Research Study

Fulfilling Blueprint requirements, MSDE contracted with AIR to conduct an **empirical study of the skills, knowledge, and abilities needed to succeed in the first year** of Maryland community college coursework. The research is comprised of **two parts:**

- **A quantitative study** that:
  - Measures the **relationship between the interim CCR standard and student readiness to succeed** in entry-level credit-bearing coursework or postsecondary education training.
  - **Explores additional possible measures of student readiness** beyond the interim CCR standard (e.g., **GPA**, course credit attainment, career and technical education (CTE) course credit).
- A **content and standards alignment study** that:
  - Completes a **deep content analysis to determine the levels and types of literacy in reading, writing, and mathematics** that are needed to succeed in entry–level courses and postsecondary training offered at colleges in the state.
  - Explores the **alignment of Maryland College and Career Ready Standards** to the content of entry-level credit-bearing **postsecondary courses and postsecondary training** and to **the content of remedial postsecondary courses**.
  - **Examines top–performing educational systems throughout the world** and consider **potential sources of bias** in assessments used to determine college and career readiness.
  - Gathers perspectives through **focus groups** from a wide range of stakeholders in higher education, K-12, and workforce

Source: Annotated Code of Maryland, Education Article § 7–205.1

# Timeline and Process (1 of 2)

To complete the critical research that will **inform the adoption of the CCR standard**, MSDE sought out the most qualified researchers in the industry, through a **Competitive Sealed Proposals process.** MSDE released a **Request for Proposals (RFP) on May 16, 2022.**

Firms had until July 14, 2022 to submit their proposals.

- **5 proposals were received from researchers across the country.**

An **evaluation committee of MSDE and LEA** staff members evaluated each proposal on its **technical merits**. The committee met with each offeror to discuss their proposal.

- The **technical evaluations were then combined** with the evaluation of the financial offers.

**On November 16, 2022, the Board of Public Works approved** the recommended contract with **the American Institutes for Research (AIR)**, a nonpartisan, not-for-profit research organization.

# Timeline and Process (2 of 2)

**MSDE facilitated the official study kickoff meeting with AIR on December 1, 2022** and will **serve as a partner** during the research study.

The **interim report on the predictive validity study** was released on **May 23, 2023** and presented to the State Board of Education.[1]

The **interim report on the content and standards alignment study** will be released on **July 25, 2023** and presented to the State Board of Education.

As specified in the Blueprint, **AIR will submit their final research report** to the Governor, the Maryland General Assembly, the AIB, and MSDE **on or before September 1, 2023.**

1 https://marylandpublicschools.org/stateboard/Documents/2023/0523/BlueprintDeepDive-CollegeCareerReadinessStandard.pdf

# Predictive Validity Study: Interim Report

The interim report of the predictive validity study, released in May 2023, focused on **students who attended a Maryland public high school in grade 10 from 2015 to 2019 and attended a Maryland college or university after high school graduation.**[1]

The interim report found that, **compared to the interim CCR standard**,

1. An alternative **CCR standard that includes high school grade point average (HSGPA**) as another way to meet the standard would **increase the percentage of students who met the CCR standard** at the end of grade 10 from **40% to 64%**.
2. An alternative **CCR standard that includes HSGPA** as another way to meet the standard would **increase the percentage of students who were correctly classified** as college ready or not college ready from **65% to 75%.**[2]

1 https://marylandpublicschools.org/stateboard/Documents/2023/0523/BlueprintDeepDive-CollegeCareerReadinessStandard.pdf

2 Using a postsecondary progress benchmark of at least 12 college credits earned in the first semester.

# Stakeholder Engagement

Stakeholder engagement for the CCR study consists of three phases:

1. Prior to the start of the study, **MSDE and AIR engaged various stakeholders in the design of the study**, including the Maryland Higher Education Commission, the Maryland Association of Community Colleges, and the University System of Maryland. MSDE and AIR provided office hour sessions for stakeholders to provide input for and ask questions about the study.

2. As part of the study, AIR conducted **focus groups of stakeholders in Maryland from K-12, higher education, and workforce** on their perceptions of college and career readiness and surveyed stakeholders who were unable to attend the focus groups.

3. Following the release of each report, MSDE and AIR will hold listening sessions with stakeholders to gather stakeholder feedback on the findings of each study. Thus far, multiple sessions have been held with LEA leadership and higher education stakeholders for the first interim report on the predictive validity study.

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**RFP# R00B2600072**

# Career and College Readiness Empirical Study

## Interim Report on the Content and Standards Alignment Analysis

Presented to the Maryland State Board of Education

Jessica Mason, Lauren Ramsay, Tori Cirks, Jordan Rickles

July 25, 2023

# Agenda

1. Content and Standards Alignment Analysis Overview
2. Postsecondary Stakeholder Engagement
3. Landscape Scan
4. Sources of Bias in Assessments
5. Alignment and Preliminary Findings
6. Limitations, Key Takeaways, What's Next
7. Questions and Discussion

# High-Level Approach

**Maryland College and Career Ready Standards (MCCRS) Predictive Validity Analysis**
Determine how well the interim and alternative MCCRS predict whether a student will be successful in entry-level credit-bearing courses or postsecondary training.

**Content and Standards Alignment Analysis**
Determine the levels and types of literacy in English language arts (ELA), mathematics, science, and career and technical training programs needed to succeed in entry-level credit-bearing courses and postsecondary training.

**Interim Report**
April 2023

**Interim Report**
June 2023

**Final Report and Recommendations**
**August–September 2023**

Ongoing communication and coordination with the Maryland State Department of Education (MSDE)

# Content and Standards Alignment Analysis Overview

# Approach for Content and Standards Alignment

We designed the analysis with three objectives in mind.

**Objective 1.** Assess the extent to which MCCRS for academic content align with postsecondary expectations in (1) entry-level credit-bearing ELA, math, and science courses; (2) developmental ELA and math courses; and (3) certificate-granting workforce training programs.

**Objective 2.** Identify top-performing education systems and how they define students as being college and career ready and explore the extent to which those expectations align to Maryland's expectations.

**Objective 3.** Identify potential areas of bias within Grades K–12 assessments used to determine college and career readiness.

# Components of Content and Standards Alignment

**Administer inventory course requirements and programmatic survey** to identify requirements for first-year credit-bearing English, math, and science courses and developmental courses at each Maryland community college.

- **Collaborator**: Maryland Higher Education Commission (MHEC)

**Collect stakeholder engagement information via focus groups and follow-up surveys** with Maryland postsecondary faculty, workforce representatives, and K–12 leaders to provide important context for the information collected through the programmatic survey and collect information about potential sources of bias in assessments.

- **Collaborators**: University System of Maryland Provosts, MHEC, MSDE's Office of College and Career Pathways, K–12 Content Collaboratives

# Content and Standards Alignment Analysis

**Conduct an alignment and gap analysis** to identify areas of alignment and misalignment between MCCRS and postsecondary content and expectations.

**Conduct a landscape analysis and literature review** to explore how top-performing education systems approach college and career readiness and to identify potential sources of bias in college and career readiness assessments.

# High-Level Insights

**Overall, the Maryland K–12 content standards, which students should meet by the end of Grade 10, align to the content expectations of postsecondary course content in ELA and math**. However, postsecondary stakeholders report that incoming students are not fully prepared for college-level work and point to several areas that may contribute.

- Findings from our engagement with postsecondary stakeholders suggest that **nonacademic skills, such as self-direction, time management, critical thinking, and other social-emotional factors**, are areas where students could benefit from additional support to be fully college ready.
- Postsecondary stakeholders also note **potential bias in placement tests**, which is consistent with existing research on bias in assessments.
- Other high-performing education systems, especially from other U.S. states, provide useful insights. **Top-performing systems use consistent, rigorous college preparatory curriculum and counseling early in students' educational journeys**; they also tend to have very clear vocational pathways beginning in high school or earlier and supports for students in those pathways.

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# Postsecondary Stakeholder Engagement

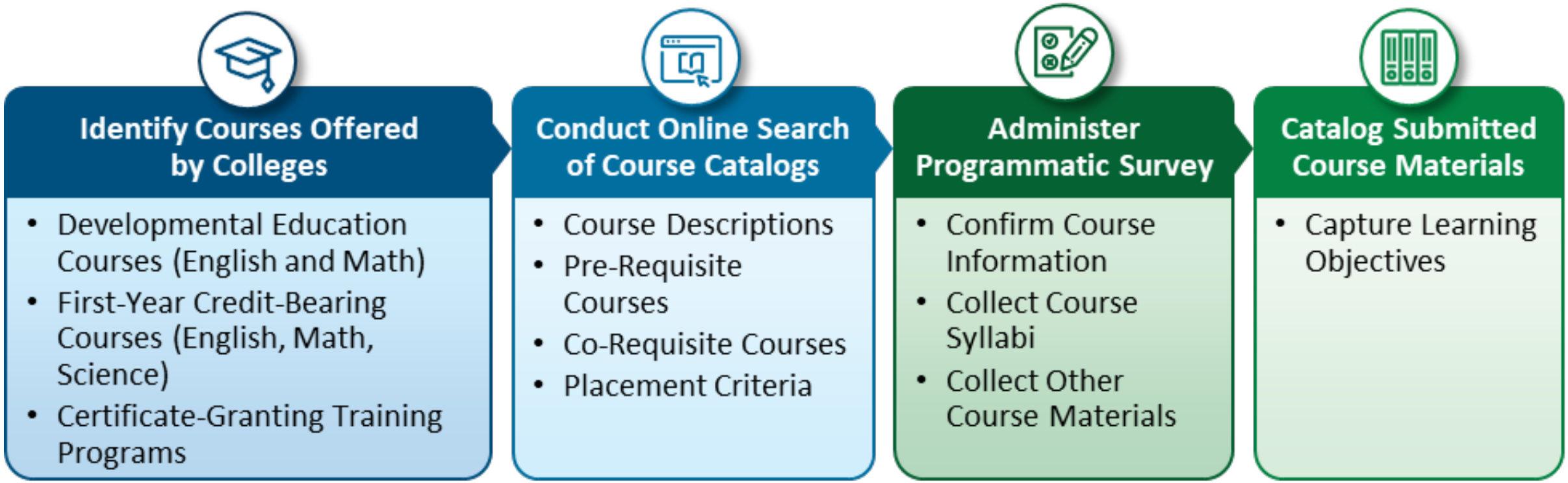
# Overview of Postsecondary Stakeholder Engagement

**To develop a deeper understanding of postsecondary stakeholders' expectations for incoming student readiness, we took two approaches**.

- Course inventory and programmatic survey (community colleges)
- Focus groups (community colleges, 4-year institutions, workforce and K–12 stakeholders)

# Course Inventory and Programmatic Survey

# Course Inventory and Programmatic Survey Approach



# Course Inventory and Programmatic Survey Findings

**Course inventory**

- Covered **publicly available information from all 16 Maryland community colleges.**

**Programmatic survey participation**

- We worked with MHEC to distribute the survey invitation to the presidents of all 16 community colleges.
- Community college responses were provided most often by **faculty (43%)**, followed by **administrators (32%)**, and then **department chairs (24%)**.

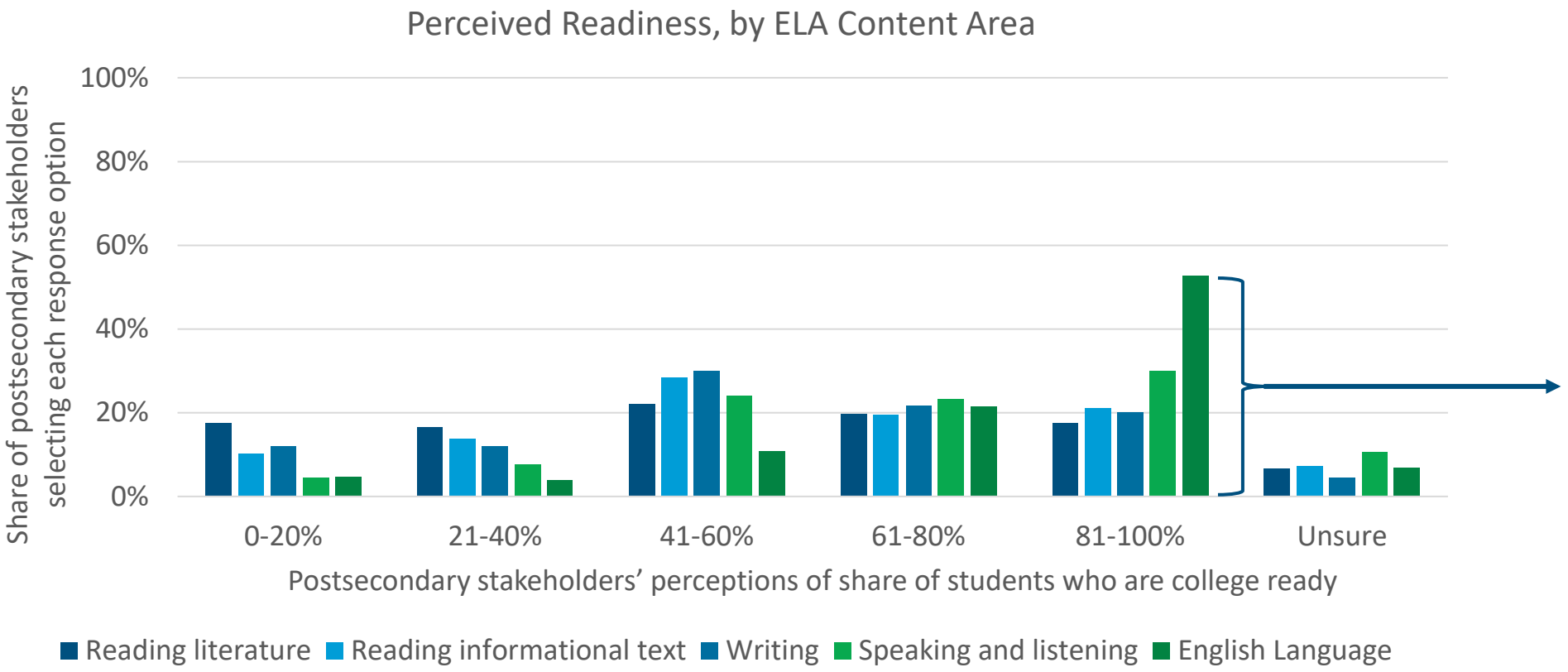
# Course Inventory and Programmatic Survey Findings

## Content Emphasis From Preliminary Community College Syllabi Review

| Course type | Content emphasis | Number of syllabi received |
|---|---|---|
| **Developmental ELA** | Producing clear, coherent, organized writing | 25 |
| **First-year credit-bearing ELA** | Producing clear, coherent, organized writing; gathering source information and integrating that information appropriately | 18 |
| **Developmental math** | Algebra, followed by functions | 41 |
| **First-year credit-bearing math** | Algebra, functions, number and quantity, geometry, and statistics | 42 |
| **First-year credit-bearing science** | Obtaining, evaluating, and communicating information; planning and carrying out investigations | 18 |

# Programmatic Survey Findings

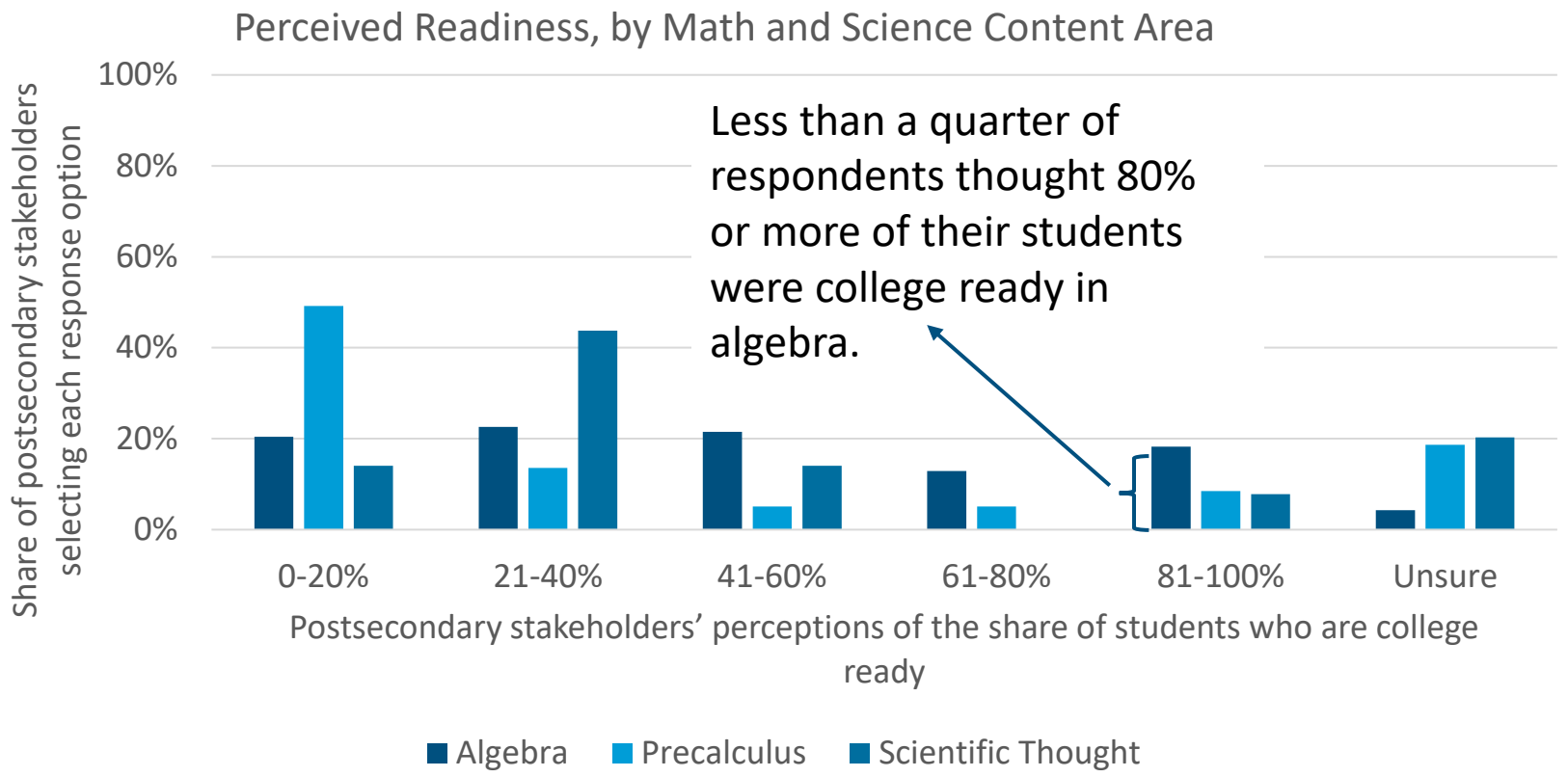
## ELA Readiness Perceptions at Community Colleges, by MCCRS for ELA (Strands)




More than half of respondents thought more than 80% of their students were college ready in English language.

# Programmatic Survey Findings

## Math Readiness Perceptions at Community Colleges by MCCRS for Math and Science



# Focus Groups

# Focus Group Participation and Collaborators

| Focus groups (8) | Number of participants | Outreach collaborators |
|---|---|---|
| Postsecondary (5 focus groups): ELA, math, developmental education, science, career and technical education (CTE) | 30 | MHEC<br>University System of Maryland Provosts |
| Workforce (2 focus groups): Trade, nontrade | 4 | MSDE's Office of College and Career Pathways |
| K–12 education (1 focus group): ELA, math, science, CTE | 7 | Maryland's K–12 Content Collaboratives |
| **Total** | **41** | |

# Postsecondary Focus Group Participation, by Institution Type

| Institution type | Number of participants |
|---|---|
| Public 2-year | 16 |
| Public 4-year | 12 |
| Private 4-year | 2 |
| **Total** | **30** |

# Focus Group Protocol

- **The postsecondary focus group protocol included questions about the following**:
  - **Course readiness**
    - » Skills and knowledge postsecondary stakeholders expect of students who are college and career ready
    - » Extent to which incoming students meet those expectations
    - » Prerequisites and placement tests used
    - » Potential barriers to success in current prerequisites and placement tests
  - **Course design**
    - » Learning objectives of courses
    - » Strategies used to center diversity, equity, and inclusion

# Postsecondary Focus Group Findings

- **Postsecondary stakeholders identified that many incoming students struggle with reading, writing, precalculus, and scientific thought**.
  - Across focus groups, postsecondary stakeholders noted that many students are not performing at the college level.
  - Consistent with the survey findings, ELA stakeholders reported that critical reading and writing are areas where students are not performing at college level, as one stakeholder's comment exemplifies:

    *"Some of our students are being held back by their ability to read and write."*
  - Math and science stakeholders also expressed concern about students' readiness for entry-level courses, especially with regard to scientific thinking and algebra.

# Postsecondary Focus Group Findings

- **Postsecondary stakeholders view nonacademic skills as an important component of determining college and career readiness.**
  - Nonacademic skills, such as self-direction, time management, critical thinking, and other social-emotional factors, should be considered alongside academic skills in determining college and career readiness.
  - Faculty noted that the extent to which students have developed these skills can be a source of inequity for students despite placement in courses based on academic measures. For example, one faculty member described how nonacademic skills can be a barrier for students:

    *"I feel like the biggest barrier when students are successful or not has to do with their noncognitive skills, their ability to manage time to meet deadlines, to be able to transition from a really more structured environment of high school to having the free time."*

# Postsecondary Focus Group Findings

- **Student supports play an important role in ensuring incoming students are college ready**.
  - Faculty in focus groups noted the importance of having resources for additional student support and the need to provide scaffolding to ensure student success.
  - Focus group participants cited the effects of the COVID-19 pandemic, the increasing number of dually enrolled students, and a lack of academic skills as reasons why postsecondary stakeholders have observed an increase in students who need scaffolded support.
  - Comments from focus group participants, along with the syllabi collected through the programmatic survey, point to a range of supports, including tutoring and writing centers, zero-cost textbook models, and disability support services.

# Postsecondary Focus Group Findings

- **Postsecondary stakeholders point to the need for multiple measures for determining college and career readiness**.
  - According to focus group participants, grade point average, ACCUPLACER, ALEKS, and student self-assessments are common placement mechanisms. However, stakeholders cautioned against using only these measures, especially given their perspectives on the importance of nonacademic skills.
  - For example, several focus group participants agreed that standardized testing is not always a complete assessment of college readiness. One stakeholder described,

    *"We've been doing a lot of research with our ALEKS and placement scores. . . . What we see is that there is very little correlation between placement score and success in a class."*

# Landscape Scan

# Landscape Scan Approach

- Analysis of top-performing states: Colorado, Connecticut, and Massachusetts
  - Initial selection informed by the following:
    - » ACT and SAT college and career readiness benchmarks
    - » National Assessment of Educational Progress performance in reading and math
    - » Postsecondary degree attainment
  - Final selections determined in consultation with MSDE
- Analysis of top-performing countries: Estonia, Germany, Japan, and Singapore
  - Initial selection informed by the following:
    - » Trends in International Mathematics and Science Study and Programme for International Student Assessment performance
    - » Ethnic diversity
    - » Equity in educational outcomes
  - Final selections determined in consultation with MSDE

# Landscape Scan Takeaways—U.S. States

- **Definitions of college and career readiness vary across top-performing states (Colorado, Connecticut, and Massachusetts) and Maryland**.
  - Both Maryland and Massachusetts specify that students who are college and career ready will be able to enroll in credit-bearing classes, and the two states also focus on skills required to be successful in college or a career.
  - Massachusetts breaks down these skills by subject: English and math.
  - Connecticut quantifies requirements with specific testing parameters.
  - Colorado's definition refers to state standards and requirements and includes that a student should not need remediation.

# Landscape Scan Takeaways—U.S. States

- **Top-performing states provide formal college and career readiness counseling to students before Grade 10 and an easily accessible college and career readiness plan. Examples include the following**:
  - **Colorado**
    - **Individual Career and Academic Plan**: Multiyear process that guides students and families in the exploration of career, academic, and postsecondary opportunities (https://www.cde.state.co.us/postsecondary/icap)
    - **MyColoradoJourney**: Online tool that helps job seekers and students get connected to jobs, education planning, and support resources (https://www.mycoloradojourney.com/)
  - **Massachusetts**
    - **MyCAP**: Multiyear process through which students, school staff/teachers, and parents design an "authentic post-secondary plan" and that documents students' learning and can serve as an electronic portfolio (https://www.doe.mass.edu/ccte/ccr/mycap/)

# Landscape Scan Takeaways—Countries

- Drawing comparisons with international education systems is challenging due to **fundamental differences between these countries and the United States**.
  - Laws and policies
  - Structure of education systems
  - Cultural and social norms
  - College and career readiness as a concept
- For future studies, additional in-depth analyses of college and career readiness expectations and education systems within the United States beyond the analyses conducted in this study may provide more useful comparisons with Maryland and yield more feasible recommendations.

# Landscape Scan Takeaways—Countries

- **Top-performing countries offer multiple rigorous tracks**.
  - Vocational or technical tracks are among several options for upper secondary school leading to a postsecondary career, with specific sets of requirements for completing each secondary track so that it feeds directly into the corresponding career pathway.
- **Technical secondary programs are high quality and regulated centrally**.
  - Technical or vocational programs in the focal countries are rigorous and effective for preparing students for the workforce. Graduates from such programs are generally able to find success in their fields and earn high incomes.
- **Postsecondary readiness consists of academic and nonacademic skills**.
  - Although the term *college and career readiness* is not explicitly used in the four focal countries, their educational systems effectively prepare most students for academic or technical career pathways.
  - To successfully complete secondary school, students in these countries must master academic and life skills.

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# Sources of Bias in Assessments

# Sources of Bias in Assessments

- **To identify sources of bias in college and career readiness assessments, we took the following approaches**:
  - Literature review of existing research related to bias in assessments
  - Focus groups with postsecondary stakeholders

# Sources of Bias in Assessments

- **Standardized assessments are frequently subject to cultural bias.**
  - Cultural bias in standardized tests is well documented and mostly attributed to language used in the tests, which is normed to background knowledge often held by White, middle-class students.
  - Some studies raise equity concerns about the reliance on college admissions tests to determine college and career readiness.
- **Inequities exist in opportunities to prepare for assessments.**
  - Postsecondary stakeholders also noted the opportunity gap for students in less resourced districts, recognizing that those students may not receive advice about college preparation and pathways that is consistent with advice students in more resourced districts receive.
  - These stakeholder reflections are consistent with existing research that points to inequities in preparation for such assessments.

# Alignment and Preliminary Findings

# Alignment Approach

**Objective:** Assess the extent to which MCCRS for academic content aligns with postsecondary expectations in (1) entry-level credit-bearing ELA, math, and science courses; (2) developmental ELA and math courses; and (3) certificate-granting workforce training programs.

- **Step 1. Compile review materials.**
- **Step 2. Develop qualitative alignment index.**
- **Step 3. Code alignment of standards.**
- **Step 4. Analyze alignment ratings and justifications.**

# MCCRS Included in the Analysis

| ELA |
| --- |
| Grades 9–10 ELA/Literacy Standards<br>Grades 9–10 Disciplinary Literacy Standards |

| Mathematics | |
| --- | --- |
| Algebra I<br>Algebra II<br>Geometry<br>Statistics | Mathematical Practices |

| Science |
| --- |
| Disciplinary Core Ideas for Life Science: High School Grade Band Progressions<br>Disciplinary Core Ideas for Physical Science: High School Grade Band Progressions |

# Postsecondary Courses Included in the Analysis

## English

- *Developmental English*: Developmental courses focused on both reading and writing
- *First-Year Credit-Bearing English*: 100-level English composition courses without prerequisites

## Mathematics

- *Developmental Math*: Courses focused on foundations and fundamentals and pre-algebra
- *First-Year Credit-Bearing Math*: 100-level math courses focused on foundations, algebra, statistics and precalculus without prerequisites

## Science

- *First-Year Credit-Bearing Science*: 100-level science courses focused on biological and physical science without prerequisites

## Certificate-Granting Training Programs

- Top certificate-granting programs based on Maryland Association of Community Colleges Workforce Training Dashboard

# Materials Informing the Analysis

## Conceptual Framework

Table 1. Common Content Across English Composition Courses

| Academic and technical content | | Employability skills | |
|---|---|---|---|
|  | • Writing conventions include content related to grammar, punctuation, spelling, sentence structure, paragraphing, and other mechanics of writing. |  | • Technology use includes content related to applying information technology appropriately and effectively. |
|  | • Idea/thesis generation includes content related to developing an argument or organizing principle in which to ground writing products. |  | • Information use includes content related to understanding, evaluating, and using a variety of information. |
|  | • Research includes content related to conducting and documenting research used to inform writing. |  | • Critical thinking includes content related to analyzing, reasoning, solving problems, planning, organizing, and making sound decisions. |
|  | • Text analysis includes content related to reading and analyzing texts that are used to inform writing. |  | • Communication includes content related to communicating effectively with others in multiple formats. |
|  | • The writing process includes content related to the key steps in writing, as well as collecting and incorporating feedback. | | |
|  | • Rhetorical knowledge includes content related to audience and purpose, and applying that knowledge to produce the appropriate type of writing. | | |
|  | • Text comprehension includes content related to annotating and summarizing college-level texts. | | |

## Materials

- MCCRS
- Postsecondary Course Descriptions
- Postsecondary Course Learning Objectives
- Postsecondary Course Syllabi

## Initial Analysis

Coding Outputs: Course syllabi and course descriptions were coded using Maryland K–12 content standards, and standard-specific files were created that included all content coded to that standard.

# General Process Used to Determine Alignment

## Content Reviewers

Read available materials related to the MCCRS and postsecondary course content.

Determined an alignment rating for both content and rigor.

Wrote brief rationale for the rating.

## AIR Research Team

Reviewed and aggregated ratings.

Wrote analysis of findings.

# Dimensions of Alignment

| Content | Rigor |
| --- | --- |
| The extent to which the postsecondary course content includes clear and sufficient language to suggest that the college courses cover the same content described in the high school standard | The extent to which the postsecondary course content describes a lower, similar, or higher level of cognitive expectation than the high school standard |

# Preliminary Alignment Findings

ELA and Mathematics

# Interpreting Alignment Findings

High School Standards Not Covered in Postsecondary Course Content

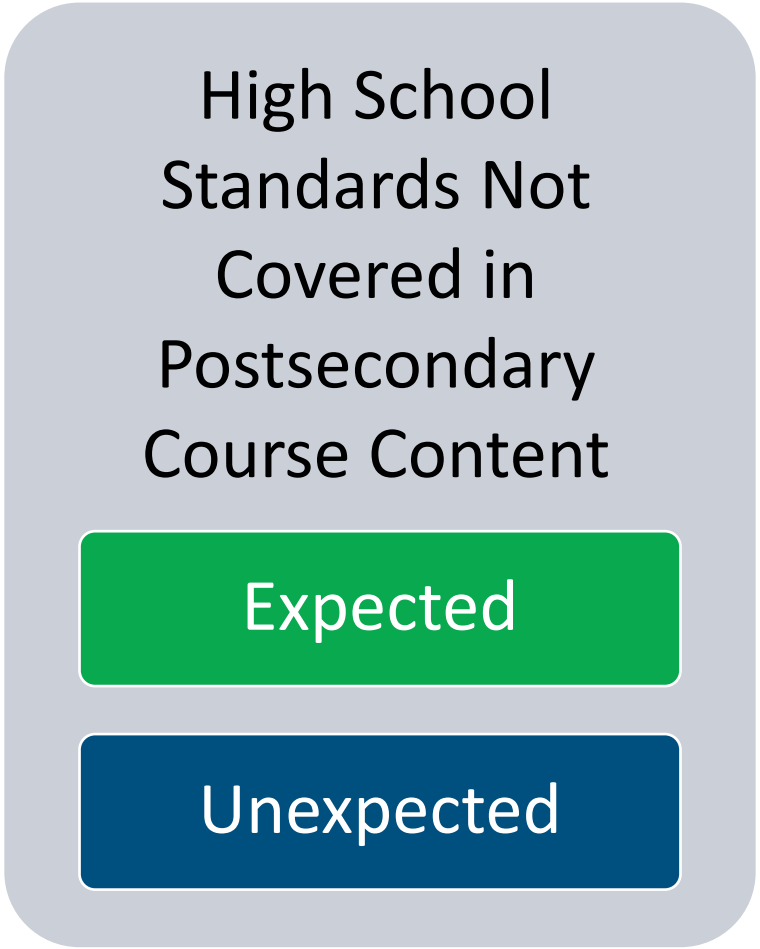
- Expected
- Unexpected

High School Standards That Align or Partially Align to Postsecondary Course Content

Postsecondary Course Content Not Covered in High School Standards

- Expected
- Unexpected

# Example of Expected Nonalignment




Maryland's General Education Requirements for Public Institutions specifies English composition as meeting the postsecondary English requirement. Given the focus on writing, it might be expected that high school standards focused on literature would not be covered in course content.

**Nonalignment should not be automatically interpreted as a negative finding.**

# High-Level Takeaways of ELA Analysis

**Alignment by the Numbers**

- 42 college and career readiness ELA standards across 5 strands
- 25 developmental-level syllabi submitted
- 18 first-year credit-bearing syllabi submitted
- 7 content experts

In general, the **standards identified for students to meet at the end of Grade 10 align to the content expectations of postsecondary course content** in developmental ELA and first-year credit-bearing ELA courses.

- For both developmental and first-year credit-bearing ELA courses, the **Writing and Language** strands of the MCCRS for ELA had the highest level of alignment to postsecondary course content, followed by **Reading Informational Text**.
- The rigor of developmental courses is most often at similar or lower expectations than those found within the Grades 9–10 ELA standards; rigor within first-year credit-bearing ELA was most often at similar or higher expectations.

# High-Level Takeaways of Math Analysis

**Alignment by the Numbers**

- 41 developmental-level syllabi submitted
- 42 first-year credit-bearing syllabi submitted
- 122 college and career readiness high school mathematics standards across Algebra I, Algebra II, Geometry, and Statistics
- 7 content experts

Standards were reviewed by domain (algebra, functions, number and quantity, geometry, and statistics) and cluster (e.g., Arithmetic With Polynomials and Rational Expressions). In general, **high school math standards align with postsecondary expectations**.

- Generally, high school standards classified within **algebra** and **functions** demonstrated the most alignment with college-level expectations.
- Few introductory or developmental college courses include expectations for geometry. However, given that geometry at the collegiate level is more appropriate for students majoring in mathematics than algebra, this makes sense.

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# Limitations, Key Takeaways, What's Next

# Postsecondary Stakeholder Engagement Limitations

- The course inventory and programmatic survey, which provided the bulk of the data that informed the alignment review, are limited to community colleges. This is an appropriate starting point for understanding entry-level and developmental course requirements; future studies may consider other institution types.
- The alignment study was intended to focus on expectations for college and career readiness, primarily gathering perspectives from postsecondary stakeholders. Future studies regarding career readiness should consider deeper engagement with workforce and K–12 stakeholders.

# Landscape Scan Limitations

- Drawing comparisons with international education systems is challenging due to fundamental differences between these countries and the United States and Maryland. For future studies, additional in-depth analyses of college and career readiness expectations and education systems within the United States beyond the analyses conducted in this study may provide more useful comparisons with Maryland and yield more actionable takeaways.
- Empirical research on bias in assessment is limited, especially for specific, individual exams.

# Alignment Limitations

- Reviewers relied on document review (e.g., syllabi), and the specificity and depth of information in documents varied. The lack of consistency resulted at times with reviewers determining alignment based on implicit expectations.
- The contents, structure, and level of detail in syllabi varied across institutions.
- The standards and content alignment analysis does not include an analysis of the quality of instruction (at the high school or postsecondary levels) or the availability and quality of student supports and resources, all of which impact the degree to which students are able to meet content expectations.

# Takeaways

- **Multiple measures may help assess college and career readiness more equitably**.
  - Data from focus groups and from the literature review on bias in assessments point to the importance of using multiple measures to assess college and career readiness.
  - Postsecondary stakeholders reflected on the varied levels of preparation and educational opportunity their students have, noting that, even though students may meet content standards, they are not always ready for postsecondary coursework.

# Takeaways

- **Nonacademic indicators of college and career readiness, along with supports that develop these nonacademic skills, are important**.
  - High school academic content is aligned with college and career needs, but many students are not ready at college or workforce entry.
  - Postsecondary stakeholders highlighted the importance of critical thinking, self-direction, and social-emotional skills, as well as work-based learning and internships to support workforce readiness.
  - Providing supports to students to develop these skills is important, particularly with regard to mental health, disability, and social-emotional issues.

# Takeaways

- **Providing consistent, rigorous college preparatory curriculum and counseling early in students' educational journeys may increase college and career readiness.**
  - Although the exact definitions of *college and career readiness* vary somewhat across the states we examined (Colorado, Connecticut, and Massachusetts), all these states provide rigorous college preparatory curriculum counseling and easily accessible college and career readiness planning to students and their families, beginning prior to 10th grade.
  - High-performing education systems in other countries offer high-quality secondary or upper-secondary pathways with academic and technical training that link to postsecondary opportunities and career pathways, leading to high-earning jobs.

# Takeaways

- **Overall, the standards identified for students to meet at the end of Grade 10 align to postsecondary course content**.
  - The high school standards align with postsecondary expectations in developmental math and first-year credit-bearing math courses and developmental ELA and first-year credit-bearing ELA courses.
  - Lack of alignment should not automatically be interpreted as a negative finding; in some cases, lack of alignment is expected based on standard entry-level postsecondary courses.

# What's Next?

- The final report will be released in August–September 2023:
  - We will expand on the preliminary analysis to provide a more comprehensive picture of alignment between Maryland Grades K–12 content standards and postsecondary expectations.
  - We will provide an in-depth analysis resulting from the content and standards alignment review, drawing connections between the alignment review and the preliminary insights in this report.
  - We will include updated and synthesized findings from the predictive validity analysis.

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# Questions and Discussion

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22096_07/23

# Grade Inflation in K-12 Schools

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# Zachary Bleemer

- Assistant professor of economics at Princeton University
- Labor economist focused on education
- Recent writing on college admissions and educational access

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# Grade Inflation

- Grades are persistently rising in schools across the US[1]
  - Rising for students and schools of all types

- **Key question**: Do higher grades help or hinder the learning and longer-run outcomes of grade-inflated students?

[1] Gershenson 2018; Bleemer 2020



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# Main Take-Aways

1. Grades serve competing priorities

2. Grade inflation can encourage students to persist in their education

3. Inflation's effects differ for top, middle, and bottom student GPAs, with the greatest potential benefits at the bottom

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# Grades serve competing priorities

- At least four key audiences:
  - Motivate work effort (key teacher goal)
  - Inform students of how school is going
  - Inform colleges and employers of students' academic performance

- Loss of motivation is grade inflation's key cost[1]; college selection is unimpacted[2]

[1] Ahn, Arcidaicono, Hopson, and Thomas 2023
[2] University of California 2020



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# Grade Inflation and Encouragement

- Students who earn higher grades are more likely to persist in education[1]
- Disadvantaged students tend to be more responsive to grading policies[2]
- Low-GPA students generally benefit from access to difficult coursework[3]

[1] Denning *et al* 2022
[2] Goldin 2020; Butcher *et al* 2014
[3] Bleemer and Mehta 2022, 2023



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# Grade Inflation at the Top and at the Bottom

- Grade inflation for low-GPA students likely has the greatest positive impacts[1]
  - Extra motivation and encouragement is generating additional learning[2]
  - Remember: C students are learning![3]

- <u>This may require additional support for teachers</u>

[1] Bleemer 2020
[2] Cotton, Hickman, and Prince 2022
[3] Kirkeboen, Leuven, and Mogstad 2016; Bleemer and Mehta 2022



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# Main Take-Aways

1. Grades serve competing priorities

2. Grade inflation can encourage students to persist in their education

3. Inflation's effects differ for top, middle, and bottom student GPAs, with the greatest potential benefits at the bottom

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# Maryland College and Career Readiness Empirical Study

## Interim Report on the Content and Standards Alignment Analysis

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**JUNE 2023**

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# Contents

# Exhibits

# Executive Summary

The *Blueprint for Maryland's Future*, passed by the 2021 Maryland General Assembly, requires that a college and career readiness (CCR) standard be set for Maryland public school students that "certifies that by the end of 10th grade, and not later than the end of 12th grade, a student has the requisite literacy in English and math to be successful in first-year, credit-bearing coursework at a Maryland community college or open enrollment postsecondary institution" (Blueprint for Maryland's Future Act, 2021, p. 9). The Maryland State Department of Education contracted with the American Institutes for Research® (AIR®) to conduct a study of the interim CCR standard and to explore additional potential measures of student readiness for college and career success. The study includes two components: (1) a predictive validity analysis, and (2) a content and alignment analysis.

This report presents the methodological approach and preliminary takeaways from the content and standards alignment analysis. This report complements the report from the predictive validity analysis, which was released in April 2023. A final report that synthesizes findings from both components of the study will be completed by September 2023.

## Approach to the Content and Standards Alignment Analysis

We designed the analysis to address three objectives:

- **Objective 1**. Assess the extent to which Maryland's College and Career Ready Academic Content Standards align with postsecondary expectations in (1) entry-level credit-bearing English language arts (ELA), math, and science courses; (2) developmental ELA and math courses; and (3) certificate-granting workforce training programs.
- **Objective 2**. Identify top-performing educational systems and how they define students as college and career ready, and explore the extent to which those expectations align to Maryland's expectations.
- **Objective 3**. Identify potential areas of bias within Grades K–12 assessments used to determine CCR.

To address these objectives, we undertook the following activities:

- **Inventory course requirements** to identify requirements for first-year credit-bearing ELA, math, and science courses and developmental courses at each Maryland community college, followed by a programmatic survey administered to college faculty

and administrators to collect syllabi for all courses and additional details about perceptions of college readiness.

- **Collect stakeholder engagement via focus groups** with Maryland postsecondary faculty, workforce representatives, and K–12 leaders to provide important context to the information collected through the programmatic survey, and to collect information on perceptions about potential sources of bias in assessments.
- **Conduct a landscape analysis and literature review** to explore how top-performing education systems approach CCR and to identify potential sources of bias in CCR assessments.
- Conduct an **alignment and gap analysis** to identify areas of alignment and misalignment between Maryland CCR standards and postsecondary content and expectations.

## Preliminary Takeaways

In this interim report, we examined the extent to which postsecondary content and expectations align with Maryland's K-12 content standards by engaging stakeholders, reviewing literature, and conducting the alignment and gap analysis. We also sought to understand how top-performing education systems approach CCR and what sources of bias may be present in CCR assessments. The alignment and gap analysis is ongoing. Early results show that overall, the Maryland K-12 content standards, which students should meet by the end of Grade 10, align to the content expectations of postsecondary course content in ELA and math. The preliminary findings support the following key takeaways:

- **Consider nonacademic indicators of college and career readiness alongside the provision of supports that develop these nonacademic skills.** Preliminary analyses suggest that high school academic content is aligned with college and career needs, but that many students are not ready at college or workforce entry. Postsecondary stakeholders consistently emphasized the importance of critical thinking, self-direction, and social-emotional skills, as well as work-based learning and internships to support workforce readiness. Providing supports to students to develop these skills is important, particularly with regard to mental health, disability, and social-emotional issues.
- **Utilize multiple measures to assess college and career readiness more equitably.** Data from focus groups and from the literature review on bias in assessments point to the importance of using multiple measures to assess college and career readiness. Postsecondary stakeholders reflected on the varied levels of preparation and educational opportunity their students have, in addition to noting that even though students may meet content standards, they are not always ready for postsecondary coursework.

- **Provide consistent, rigorous college preparatory curriculum and counseling early in students' educational journeys**. While the exact definitions of CCR vary somewhat across the states we examined (Colorado, Connecticut, and Massachusetts), all provide rigorous college preparatory curriculum—and, notably, counseling and easily accessible CCR planning to students and their families beginning prior to tenth grade. High-performing education systems in other countries offer strong, high-quality secondary or upper-secondary pathways that offer academic and technical training. These programs are closely linked to postsecondary opportunities and career pathways, leading to high-earning jobs. The programs also are overseen, regulated, and evaluated by a high-level central (national) body to ensure quality. Furthermore, postsecondary readiness in top-performing countries is defined not only by academic content but also mastery of important life skills.

## Limitations to the Preliminary Analysis

When interpreting the findings and takeaways presented in this report, several limitations should be considered. First, the alignment review which will produce a substantive portion of the findings for this analysis is still ongoing. Second, the alignment review also relies on what was explicitly included in college course materials, and the level of detail varied across colleges. Third, the course inventory and programmatic survey focused only on community colleges. Although this is an appropriate starting point for this research, given the focus on entry-level and developmental course expectations, future studies should consider including all postsecondary institutions in Maryland as well as other areas of study beyond ELA, math, and science. Future studies also should consider including a deeper analysis of other stakeholder perspectives (e.g., workforce, K-12). Finally, comparisons with international education systems are challenging due to fundamental differences between these countries and the United States.

## Next Steps

For the interim report, we focused primarily on preliminary analyses of data collected via the course inventory, programmatic survey, focus groups, and literature reviews. The early alignment findings indicate that standards identified for students to meet at the end of Grade 10 in ELA and math generally align to the content expectations of postsecondary course content. For the final report, we will expand on the preliminary analysis to provide a more comprehensive picture of alignment between Maryland Grades K–12 content standards and postsecondary expectations. In particular, we will provide an in-depth analysis resulting from the content and standards alignment review, drawing connections between the alignment review and the preliminary insights in this report. The final report also will include updated and synthesized findings from the predictive validity analysis.

# A. Introduction

A central goal of the *Blueprint for Maryland's Future*, passed in 2021 by the Maryland General Assembly, is to ensure that all Maryland public school students are college and career ready before graduating from high school, signifying an ability to transition successfully to postsecondary coursework at a community college or 4-year postsecondary institution or to the workforce. To reach this goal, the act requires that a College and Career Readiness (CCR) Standard be set for Maryland public school students that "certifies that by the end of 10th grade, and not later than the end of 12th grade, a student has the requisite literacy in English and math to be successful in first-year credit-bearing coursework at a Maryland community college or open enrollment postsecondary institution" (Maryland State Department of Education, 2022, p. 9). Further, the *Blueprint* requires that the Maryland State Department of Education (MSDE) contract with a public or private entity to conduct an empirical study of the interim CCR standard set by MSDE to determine whether that standard reflects or predicts whether a student will be successful in entry-level credit-bearing courses or postsecondary education at a state community college.

### Maryland's Interim CCR Standard

In February 2022, the Maryland State Board of Education set an interim CCR standard. The standard states that students are considered college and career ready when they meet or exceed a metric in both English and math, as defined by the following criteria:

- **English**: Score at or above the *proficient* (or met expectations) performance level on the English 10 state assessment
- **Math**: Score at or above the *proficient* (or met expectations) performance level on the Algebra 1, Algebra 2, or Geometry state assessment or score at least 520 on the SAT math test

In August 2022, MSDE released an implementation roadmap for the CCR policy established in the *Blueprint* (MSDE, 2022). In the roadmap, MSDE highlighted the importance of establishing a CCR standard that reflects the skills and knowledge necessary to succeed in the first year at a community college, as well as what it means to be equipped to thrive in any postsecondary or career environment. The roadmap also outlined the call for an empirical study that (a) not only meets the requirements of the *Blueprint* but also examines alternative indicators of readiness; (b) further studies the alignment between the Maryland interim CCR standard and current content standards required by postsecondary institutions and industry; and (c) considers potential sources of bias in any proposed CCR standard. In its conclusion, the roadmap stipulated that the empirical study should inform adoption of a CCR standard that best predicts whether a student is ready for college and career, without a disproportionate impact on any student group.

MSDE contracted with the American Institutes for Research® (AIR®) to conduct the empirical study required by the *Blueprint* and to explore additional possible measures of student readiness for college and career success. The empirical study includes two components:

1. A **predictive validity analysis** to determine whether the interim CCR standard predicts whether a student is ready to progress toward postsecondary success (see sidebar).

2. A **content and standards alignment analysis** to determine the levels and types of literacy in English language arts (ELA), math, and science needed for postsecondary success.

This report presents preliminary insights from the content and standards alignment analysis based on the tasks that have been completed by June 2023. We start with an overview of our approach to the content and standards alignment analysis and then present the preliminary results from that analysis. We conclude the report with a summary of our key takeaways based on our preliminary analysis to date, a discussion of the limitations of the analysis, and an overview of next steps.

For the final report (due in September 2023), we will present synthesized findings from both the finalized content and standards alignment analysis and the predictive validity analysis. The final report will include findings from the full content and standards alignment analysis as well as the predictive validity analysis. In addition, the final report will be informed by continued discussions with MSDE and other key stakeholder groups.

### Predictive Validity Analysis

In addition to the content and standards alignment analysis, the Maryland CCR Empirical Study includes a predictive validity analysis that addresses two study objectives:

- Examine whether Maryland's interim CCR standard predicts student success in entry-level credit-bearing courses or postsecondary education training at a state community college.
- Examine how the interim CCR standard and alternative specifications of the standard predict postsecondary progress across a range of common postsecondary pathways taken by Maryland public high school students.

Across both objectives, we examined the extent to which the high school measures of CCR, or a particular CCR standard, operate equitably across different student groups.

An interim report released in May 2023 presented preliminary findings from the predictive validity analysis, The interim report findings indicated that including a way to meet the CCR standard with the interim CCR standard criteria or a high school grade point average of at least 3.0 could increase the percentage of students who meet the CCR standard and improve the accuracy of the standard.

## B. Frameworks for College and Career Readiness

This section summarizes prior research on frameworks for CCR, which informs our approach to the content and standards alignment analysis and situates the analysis within a larger CCR knowledge base.

### B.1. Frameworks for College and Career Readiness

A commonly cited definition of college readiness describes it as "the level of participation a student needs in order to enroll and succeed—without remediation—in a credit-bearing course at a postsecondary institution" (Conley, 2010, p. 21). Conley (2012) furthered his definition of college readiness by establishing a four-dimension framework for readiness that includes career-ready skills needed for students to be prepared for both higher education and the workforce. This four-dimension framework includes:

- **Dimension 1—Content knowledge** demonstrated through understandings of the key ideas, concepts, and vocabulary in core academic subjects such as ELA, math, science, and social studies (e.g., performance on state content assessments).
- **Dimension 2—Cognitive strategies** such as problem solving, reasoning, analysis, and interpretation skills necessary for success on the job and in college-level coursework.
- **Dimension 3—Academic behaviors** that promote student ownership of learning (e.g., self-awareness, self-monitoring, study skills) and transcend content-area knowledge.
- **Dimension 4—Contextual skills and awareness** about the informal and formal systems and culture of the institution that enable the transition to life beyond high school (e.g., knowledge of postsecondary admissions requirements, understanding workforce norms).

A framework developed by the College and Career Readiness and Success Center at AIR (Balestreri et al., 2019) advances Conley's framework for readiness by situating CCR within a comprehensive system for success that organizes CCR components into four strands:

- **Strand 1.** Learners have clear **goals and expectations** about what they should know and be able to do to achieve CCR.
- **Strand 2.** Learners know the **outcomes and measures** used to identify whether they are meeting expectations for CCR and success.
- **Strand 3.** Institutions provide **pathways and supports** that enable learners to achieve college and career success.

- **Strand 4.** Institutions have the robust **resources and structures** needed to enable learner readiness for college and careers**.**

An important feature of the framework offered by Balestreri et al. (2019) is that defining and measuring a CCR standard happens within the context of institutional supports, resources, and structures. A CCR standard can set clear goals and expectations (Strand 1) and establish CCR outcomes and measures (Strand 2), but the quality of the standard may depend on how well existing institutional systems develop CCR (Strands 3 and 4). Thus, a CCR standard should be seen as not only a tool to gauge individual student readiness but also as a way to inform institutional- and system-level changes.

## B.2. Overview of CCR in the United States

Since the enactment of the Every Student Succeeds Act of 2015, and its policy mandate for states to establish more explicit CCR requirements in their Grades K–12 academic standards, states have responded with varied approaches to measure, monitor, and report on their students' CCR. In most cases, states use standardized tests, such as their own state assessments, the SAT, or the ACT, to measure readiness among high school students. Many states also use high school coursework and grades to determine readiness.

Although some states determine their students' college readiness based on a single standardized test (e.g., ACT, SAT/PSAT), others use multiple measures to determine readiness. California, for example, established multiple criteria to determine whether a high school graduate is "prepared" or "approaching prepared" for college based on whether a student meets at least one of the criteria based on state assessment scores, scores on Advanced Placement (AP) or International Baccalaureate examinations, passing college-level courses, or completing certain course requirements with a grade of C or better.

In parallel to changes among Grades K–12 education systems, there has been a growing movement in the past decade for broad and open access postsecondary institutions (e.g., community colleges, 4-year colleges with high acceptance rates) to adopt a multiple measures assessment approach when determining incoming students' appropriate placement in either developmental education or credit-bearing college-level courses. Under this approach, institutions do not rely on only one traditional placement examination (e.g., ACCUPLACER) to determine placement but rather consider a range of academic measures that allow students greater opportunity to demonstrate their readiness for college-level coursework. For example, in Maryland, all community colleges and a majority of the 4-year public institutions and state-aided independent institutions use more than one assessment tool to determine students' course placement (Maryland Higher Education Commission, 2021). The most common academic measures include SAT/ACT, AP, and high school grade point average.

Although theoretically distinct from college readiness, career readiness often is defined by the same metrics as college readiness. The number of states with career-focused measures in their CCR indicators has more than doubled since 2014 (Advance CTE, 2019), but these indicators often do not isolate career readiness as a separate metric with its own distinct requirements. A career readiness metric often included in measures of CCR is participation in career and technical education (CTE) programs designed to prepare students with technical skills and knowledge for specific occupations (Hirschy et al., 2011). As of 2019, 23 states included participation or completion in a CTE pathway or course as a component of CCR (Advance CTE, 2019). Moreover, 10 states incorporated experiential, work-based learning into a measure of career readiness, yet challenges exist in how to measure and standardize what counts as acceptable work-based learning (Advance CTE, 2019).

## C. Approach to the Content and Standards Alignment Analysis

This section describes our approach to the content and standards alignment analysis. We designed the analysis with three objectives in mind:

- **Objective 1.** Assess the extent to which Maryland's College and Career Ready Academic Content Standards align with postsecondary expectations in (1) entry-level credit-bearing ELA, math, and science courses; (2) developmental ELA and math courses; and (3) certificate-granting workforce training programs.
- **Objective 2.** Identify top-performing educational systems and how they define students as college and career ready, and explore the extent to which those expectations align to Maryland's expectations.
- **Objective 3.** Identify potential areas of bias within Grades K–12 assessments used to determine CCR.

This interim report includes a description of the methodology used for each task conducted for the analysis, preliminary insights about the alignment between Maryland's Grades K–12 content standards and postsecondary expectations; insights from the examination of top-performing education systems; and tools, templates, and protocols used for the analysis. The final report will include findings from the content and standards alignment analysis, which was ongoing at the time of this report's writing.

In the remainder of this section, we describe our current approach to the content and standards alignment analysis, including (1) the guiding research questions; (2) how we identified and articulated the readiness expectations of Maryland's postsecondary institutions and the methodology used to conduct the content alignment review; (3) how we identified and examined top-performing education systems; and (4) how we identified potential areas of bias within the CCR assessments. Additional details about our approach are in the Appendices.

### C.1. Guiding Research Questions

Nine research questions guided our approach to the content and standards alignment analysis, with the questions clustered to address the study objectives. The research questions are displayed in Exhibit 1.

### Exhibit 1. Study Objectives and Guiding Research Questions

| Objective | Guiding Research Questions |
|---|---|
| **Objective 1.** Assess the extent to which Maryland's College and Career Ready Academic Content Standards align with postsecondary expectations in (1) entry-level credit-bearing ELA, math, and science courses; (2) developmental ELA and math courses; and (3) certificate-granting workforce training programs. | • **Research Question 1:** To what degree are the Maryland College and Career Ready Standards aligned to the content of entry-level credit-bearing postsecondary courses and certificate-granting postsecondary training programs at state postsecondary institutions?<br>• **Research Question 2:** To what degree are the Maryland College and Career Ready Standards aligned to the content of remedial postsecondary courses?<br>• **Research Question 3:** To what degree are the Maryland College and Career Ready Standards aligned to the tests/measures named in the standard set by the Maryland State Department of Education to indicate readiness for success in entry-level credit-bearing postsecondary courses and postsecondary training programs?<br>• **Research Question 4:** To what degree are the Maryland College and Career Ready Standards aligned to the tests/measures used by postsecondary institutions to place students in entry-level credit-bearing postsecondary courses and certificate-granting postsecondary training programs? |
| **Objective 2.** Identify how top-performing educational systems define students as college and career ready and explore the extent to which those expectations align to Maryland's expectations. | • **Research Question 5:** How do top-performing educational systems throughout the world identify students as college and career ready?<br>• **Research Question 6:** What are the knowledge/skills students in those systems should have if they are identified as "college and career ready"?<br>• **Research Question 7:** How is "college and career ready" defined in those systems?<br>• **Research Question 8:** How do identification strategies, knowledge/skills, and definitions compare to those used in Maryland? |
| **Objective 3.** Identify potential areas of bias within assessments used to determine CCR. | • **Research Question 9:** In any assessments used to determine CCR, what sources of bias are present? |

To address these guiding research questions, we undertook four data collection and analysis activities:

- **Inventory course requirements** to identify requirements for first-year credit-bearing ELA, math, and science courses and developmental courses at each Maryland community college, followed by a programmatic survey administered to college faculty and administrators to collect syllabi for all courses and additional details about perceptions of college readiness.
- **Collect stakeholder engagement via focus groups** with Maryland postsecondary faculty, workforce representatives, and K–12 leaders to provide important context to the

information collected through the programmatic survey, and to collect information on perceptions about potential sources of bias in assessments.

- **Conduct a landscape analysis and literature review** to explore how top-performing education systems approach CCR and to identify potential sources of bias in CCR assessments.
- **Conduct an alignment and gap analysis** to identify areas of alignment and misalignment between Maryland CCR standards and postsecondary content and expectations.

Exhibit 2 shows the analysis activities that inform each research question.

### Exhibit 2. Research Questions and Analysis Activities

| Research question | Course inventory | Focus groups | Landscape analysis and literature review | Alignment and gap analysis |
|---|---|---|---|---|
| **RQ1.** To what degree are the Maryland College and Career Ready Standards aligned to the content of entry-level credit-bearing postsecondary courses and certificate-granting postsecondary training programs at state postsecondary institutions? | ● | ● | | ● |
| **RQ2.** To what degree are the Maryland College and Career Ready Standards aligned to the content of remedial postsecondary courses? | ● | ● | | ● |
| **RQ3**. To what degree are the Maryland College and Career Ready Standards aligned to the tests/measures named in the standard set by the Maryland State Department of Education to indicate readiness for success in entry-level credit-bearing postsecondary courses and postsecondary training programs? | ● | ● | | ● |
| **RQ4.** To what degree are the Maryland College and Career Ready Standards aligned to the tests/measures used by postsecondary institutions to place students in entry-level credit-bearing postsecondary courses and certificate-granting postsecondary training programs? | ● | ● | | ● |
| **RQ5.** How do top-performing educational systems throughout the world identify students as “career and college ready”? | | | ● | |

| Research question | Course inventory | Focus groups | Landscape analysis and literature review | Alignment and gap analysis |
|---|---|---|---|---|
| **RQ6.** What are the knowledge/skills students in those systems should have if they are identified as "career and college ready"? | | | ● | |
| **RQ7.** How is "career and college ready" defined in those systems? | | | ● | |
| **RQ8.** How do identification strategies, knowledge/skills, and definitions compare to those used in Maryland? | | | ● | ● |
| **RQ9.** In any assessments used to determine CCR, what sources of bias are present? | | ● | ● | |

## C.2. Postsecondary Readiness Expectations

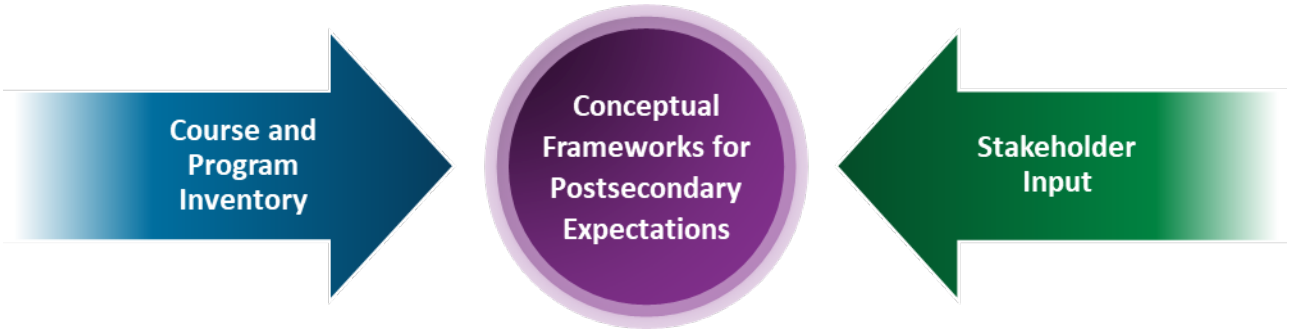
In this section, we describe our approach to studying postsecondary expectations for college and career readiness (guiding Research Questions 1–4). Activities described in this section include the course inventory, programmatic survey, and stakeholder engagement through focus groups.

Maryland's postsecondary education system consists of 16 public community colleges, 14 public 4-year institutions, and 19 state-aided independent 4-year institutions (IPEDS, 2023). All public institutions in the state are required to provide developmental education for students whose performance on assessments indicates that they are not prepared for college-level coursework. Maryland's 16 community colleges provide more than 100 credit-bearing programs (MACC, 2023), more than 150 noncredit programs, and almost 300 certificate-training programs (MCCACET, 2020). Additionally, a larger share of students who enter community colleges need developmental education: 69% of community college students need developmental education, compared with 15% of students entering 4-year institutions (Van Orden, 2020).

Given that the community colleges provide such a large share of the entry-level and developmental courses to Maryland students, we focused on community colleges to capture a representative picture of entry-level and developmental courses in the state. To identify expectations for college and career readiness in entry-level and developmental courses across Maryland's community colleges, we collected information from an in-depth course inventory and an accompanying programmatic survey that we conducted with the community colleges. In addition, we gathered input from postsecondary, workforce development, and K–12 stakeholders via virtual focus groups. Based on this information, we are synthesizing course and program content and expectations across community colleges and provide an overview of what students need to be prepared to succeed in first-year credit-bearing ELA, math, and science

courses; developmental ELA and math courses; and certificate-granting workforce training programs. This synthesis will be shown in conceptual frameworks (the final versions of which will be presented in the final report) for postsecondary expectations, with a postsecondary expectations framework being presented for each of the subject areas under study. Exhibit 3 reflects our process of building conceptual frameworks for postsecondary expectations based on our learnings from the course and program inventory and stakeholder input. Our analysis follows an iterative process in which evidence from multiple sources of data continually inform each other to present a coherent picture of what students need to be prepared for postsecondary education (Miles & Huberman, 1984). The conceptual frameworks for postsecondary expectations will be provided in the final report.

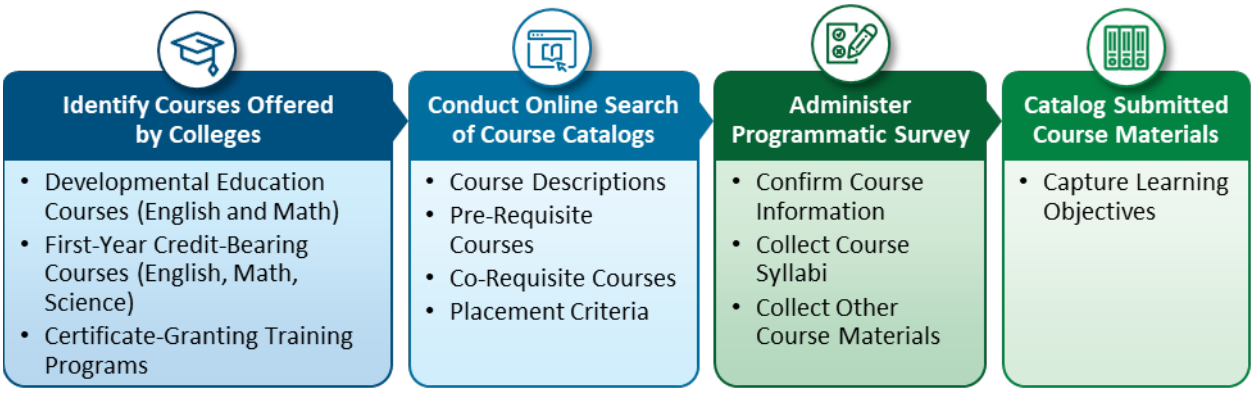
**Exhibit 3. Approach to Identifying Postsecondary Readiness Expectations**




### *Course Inventory and Programmatic Survey*

To inventory course requirements for entry-level and developmental courses, we collected and analyzed extant data on entry-level and developmental courses (Exhibit 4) and administered a programmatic survey to faculty and administrators at each community college.

**Exhibit 4. Course Inventory Process**




First, we identified first-year credit-bearing ELA, math, and science courses and developmental courses at each community college using information publicly available on college websites.

This search provided initial insights into key themes in course descriptions. Common information collected includes course descriptions, ACCUPLACER score requirements, and prerequisites/corequisites. In total, the course inventory contains 241 courses across the 16 community colleges. Criteria for inclusion in the course inventory were:

- **Developmental ELA:** Noncredit-bearing ELA courses that served as prerequisites for 100-level ELA courses.
- **ELA**: 100-level ELA courses that had no other 100-level ELA courses as prerequisites.
- **Developmental Math:** Noncredit-bearing math courses that served as prerequisites for 100-level math courses.
- **Math**: 100-level math courses that had no other 100-level math courses as prerequisites.
- **Science**: 100-level biology and physical science courses, grounded in the definition of the required science courses for general education; classes designed for general education students (non-biology majors); and/or classes with no other science prerequisites.

Exhibit 5 details the number of courses per subject area.

**Exhibit 5. Number of Courses Identified Through Online Search by Subject Area**

| Subject area | Number of courses |
|---|---|
| **Developmental Math** | 73 |
| **First-Year Credit-Bearing Math** | 60 |
| **Developmental ELA** | 43 |
| **First-Year Credit-Bearing ELA** | 34 |
| **Science** | 31 |
| **Total** | **241** |

Based on the information collected and analyzed for the initial course inventory, we developed a programmatic survey to request faculty and administrators at community colleges to: (1) review the course information to confirm or correct what was collected; and (2) submit course syllabi, learning objectives, assessments, and grading rubrics. The programmatic survey also included several questions related to college and career readiness that asked respondents to offer their perception of the share of their students who are college ready in a range of content areas (e.g., reading literature, algebra, scientific thought). Additional open-ended questions provided opportunities for respondents to share their perspectives on how learning objectives

are set and revised and offer any other reflections on their expectations for and experiences with students' college and career readiness. Appendix A includes the programmatic survey, and Appendix B provides a list of ELA, math, and science courses included in the course inventory.

Given the variation in organizational structure across community colleges, we worked with the Maryland Higher Education Commission (MHEC) to distribute the survey invitation to the presidents of all 16 community colleges, who then shared the survey with the appropriate stakeholders at their institutions. Responses were provided most often by faculty (43%), followed by administrators (32%), and then department chairs (24%). Division directors accounted for 6% and course coordinators accounted for 3% of the respondents. Deans accounted for 2%, and other roles accounted for 2%.[1] In total, we received responses from 11 colleges and syllabi for 144 unique courses of the 241 courses, or 60% of the courses identified in the course inventory. In addition, we received supplemental information other than syllabi for six courses. Exhibit 6 shows the number of unique syllabi received via the programmatic survey by content area.

**Exhibit 6. Number of Unique Syllabi Received by Subject Area**

| Subject area | Number of syllabi |
|---|---|
| **Developmental Math** | 41 |
| **First-Year Credit-Bearing Math** | 42 |
| **Developmental ELA** | 25 |
| **First-Year Credit-Bearing ELA** | 18 |
| **Science** | 18 |
| **Total** | **144** |

### *Stakeholder Input*

To supplement and provide nuance to the information collected through the course inventory, we engaged key stakeholders from postsecondary education; additionally, we included stakeholders from the workforce and K–12 education to gather additional input to inform a common understanding of postsecondary readiness expectations from multiple perspectives. AIR conducted eight focus groups with a total of 41 participants. Exhibit 7 lists the focus groups, the number of participants, and who we collaborated with for outreach.

[1] The sum or percentages is higher than 100 since some respondents indicated multiple roles.

### Exhibit 7. Focus Group Participation and Collaborators

| Focus groups (8) | Number of participants | Outreach collaborators |
|---|---|---|
| **Postsecondary (5 Focus Groups):** ELA, math, developmental education, Science, CTE | 30 | MHEC<br>University System of Maryland Provosts |
| **Workforce (2 Focus Groups)**: Trade, nontrade | 4 | MSDE's Office of Career and College Pathways |
| **K–12 Education (1 Focus Group):** ELA, math, science, CTE | 7 | Maryland's K–12 Content Collaboratives |
| **Total** | **41** | |

**Postsecondary education engagement.**

To better understand the expectations that Maryland's postsecondary institutions have for students entering postsecondary education, we conducted five virtual focus groups with a total of 30 faculty and staff from postsecondary institutions in the state. To provide additional perspectives to the data collected through the course inventory and programmatic survey (focused solely on community colleges), the focus groups and associated stakeholder engagement efforts allowed us to deepen our understanding of expectations for college and career readiness across all institution types. To recruit participants for the postsecondary focus groups, we worked with MHEC to share information about the focus groups, solicit feedback on the approach, and distribute invitations for participation. A key consideration was ensuring that all institution types were included in the recruitment, including community colleges and 4-year public and 4-year state-aided independent institutions.[2] See Appendix C for more detail about the participant distribution by subject area and institution type in the focus groups.

We aligned the focus group protocol with the guiding research questions related to the postsecondary perspective on college and career readiness. The protocol focuses on questions about course readiness (e.g., the knowledge, skills, and abilities postsecondary stakeholders expect students to have entering college) and course design (e.g., approaches to teaching and learning). It also includes questions about potential bias in college and career readiness expectations. Appendix C provides the protocol used for the postsecondary education focus group.

[2] Following the focus groups' completion, we sent an optional feedback form to the postsecondary stakeholders who were not selected for the focus groups to allow those who were interested to share their perspectives. The form included several key questions from the focus group protocol, with open-text responses for individuals to provide feedback and additional data to complement the focus group data.

In addition to the focus groups, the AIR team also sought input from the University System of Maryland (USM) Provosts. We presented an overview of the Content and Standards Alignment Study to the USM Provosts on February 28, 2023, and facilitated a short discussion about their perspectives on college and career readiness. Following the meeting, we distributed a short feedback form with open-ended questions for the provosts to provide additional feedback. We received six responses, providing additional context to the data collected through the five postsecondary focus groups and optional feedback form.

**Additional stakeholder engagement.**

Although this study's primary focus was on understanding postsecondary content and expectations, AIR also invited workforce and K-12 stakeholders to participate in virtual focus groups to complement the insights gathered from the postsecondary stakeholders and provide additional context. To recruit workforce stakeholders, we worked in partnership with the leadership of MSDE's Office of Career and College Pathways to recruit participants. Our outreach targeted those in roles that were most connected with hiring and interfacing with incoming employees (e.g., hiring managers) in both the trade[3] and nontrade fields. In total, five individuals representing trade or nontrade fields participated in a focus group. To recruit participants for the K-12 focus group, we worked with the Maryland's K–12 Content Collaboratives to distribute a request for participation to teachers, instructional leaders, and other K–12 staff across content areas. In collaboration with MSDE, we conducted one focus group with these stakeholders. This final focus group included a total of seven instructional leaders from math, ELA, science, and CTE content areas.[4]

Consistent with our approach to the postsecondary focus group protocol, we aligned the protocols for these additional focus groups with the guiding research questions related to expectations for college and career readiness. Appendix C provides the protocols used for both focus groups.

**Focus group data analysis.**

On average, focus groups lasted 60 minutes, and we audio recorded all focus groups for later verbatim transcription. To identify key themes and emerging insights related to guiding Research Questions (RQs) 1–4, we conducted a thematic analysis. Thematic analysis is a

[3] "Trade" fields refer to those that involve specialized skills and advanced training but do not always require a 4-year degree (e.g., construction, electric).

[4] Following the focus groups, we sent a follow-up survey to those stakeholders who had expressed interest in the focus group participation but were not selected. The form includes several key questions from the interview protocol, with open-text responses for individuals to provide feedback. The follow-up survey is open for responses through June 2023; responses will not be included in the content and standards alignment analysis but will be compiled and shared with MSDE as a supplemental source of information.

qualitative analysis method that is designed to identify key themes and patterns in data; in a thematic analysis, researchers look for meaning across a data set and for shared meaning and themes related to identified research questions (Braun & Clarke, 2012).

We began by familiarizing ourselves with the qualitative data, both through the development of "debrief forms" that focused on collaboratively documenting initial takeaways and questions from each focus group. After completion of the focus groups and transcriptions, the research team read each transcript and developed a codebook to include initial broad themes related to the guiding research questions being addressed by this analysis. The researchers then further coded interviews using the qualitative data analysis software NVivo and extracted themes that emerged from the initial broad themes. Finally, we reviewed the coded data to identify preliminary insights related to guiding RQs 1–4, which are presented in Section D.1 Alignment between Maryland CCR Content Standards and Postsecondary Expectations.

## C.3. Content and Standards Alignment Review

The content and standards alignment review process is underway as of the time of this report. Additional details about the methodology for this component of the study is provided in Appendix D of this interim report. We share preliminary findings from ELA and math alignment in the key takeaways section and will provide more detailed findings in our final report.

AIR content expert teams (ELA, math, science, and CTE) are using the information collected from the course and program inventory and the stakeholder engagement, along with the draft conceptual frameworks for postsecondary expectations, to complete an alignment and gap analysis of the Maryland CCR standards and postsecondary expectations. We are using the following multistep process:

**Step 1. Compile Review Materials:** AIR used the information collected through the course inventory and stakeholder input processes to develop a suite of materials that were used to ground the alignment review. These materials included the conceptual frameworks for postsecondary education; output from researcher coding of course syllabi, along with the full syllabi; course descriptions and objectives from the course inventory; and the Maryland Grade K–12 content standards (ELA Grade 9/10 standards and math standards for Algebra I, Algebra II, geometry, and statistics).[5] Exhibit 8 lists the review materials provided to reviewers.

[5] The findings from the ELA and math alignment reviews were key inputs for the science alignment review because specific ELA and math connections are outlined within the Next Generation Science Standards and the majority of first-year credit bearing science courses have prerequisite ELA and math knowledge expectations.

### Exhibit 8. Content and Standards Alignment Review Materials

| Review Materials |
|---|
| **Conceptual Frameworks for Postsecondary Education**. The conceptual frameworks synthesize key topics found across community colleges and course content and serve as an "meta-syllabus" for the courses on which the alignment review is focused (e.g., developmental ELA, developmental math, introductory ELA, introductory math, introductory science, certificate-granting training program). |
| **Maryland CCR Standard.** The Maryland College and Career Ready Standard for content areas (ELA, math, and science) was provided to reviewers. |
| **Coding Output.** Course syllabi and course descriptions were coded using Maryland K-12 content standards, and standard-specific files were created that included all content coded to that standard. Academic content area coverage from syllabi is summarized based on researcher coding of material available in the syllabus, such as the course description, learning objectives, and topics identified in the schedule. The coding structure was built on the Maryland CCR Standard focusing on Grades 9–10 expectations as the content reference point for ELA and math courses and science practice skills for science courses.<br>1. ELA: Coding was done at the anchor standard level (reading literature, reading information texts, writing, speaking and listening, and language).<br>2. Math: Coding was done using the Standards for Mathematical Practices as well as the category level (e.g., algebra).<br>3. Science: Coding was done using the Next Generation Science Standards for science practice. |
| **Course List and Descriptions.** To provide reviewers with a high-level overview of the breadth of courses and how each college describes its course content, course lists with course descriptions were developed for each of the courses on which the alignment review is focused. |
| **Course Objectives.** A searchable and filterable Excel spreadsheet was developed that included all course objectives found within course syllabi for each of the courses on which the alignment review is focused. |
| **Course Syllabi.** The course syllabi submitted by colleges were organized and provided to reviewers. |

**Step 2. Develop Qualitative Alignment Index:** We created a qualitative index of alignment for content teams to use to summarize the degree to which the Maryland K–12 content standards align with postsecondary readiness expectations. Postsecondary readiness expectations are reflected in the conceptual frameworks for postsecondary expectations. Exhibit 9 outlines the five levels of the index framework.

### Exhibit 9. Alignment Index

| Alignment index levels | Content Index | Rigor Index |
|---|---|---|
| 5 | **Very Strong.** The conceptual framework and/or course content clear and sufficient language to suggest that the college courses cover the same content described in the Maryland K-12 content standards. | **Much Higher.** The language in the conceptual framework and/or course content describes a much higher level of cognitive expectation than the high school content standard. |
| 4 | **Strong.** The conceptual framework for postsecondary education and/or course content includes clear and sufficient language to suggest that the college courses cover some of the same content as described in the Maryland K-12 content standards. For example, the overall topics may be the same while the specific content varies considerably. | **Higher.** The language in the conceptual framework and/or course content describes a somewhat higher level of cognitive expectation than the Maryland K-12 content standards. |
| 3 | **Weak.** The conceptual framework for postsecondary education and/or course content includes clear and sufficient language to suggest that the college courses cover little of the same content described in Maryland K-12 content standards. | **Similar.** The language in the conceptual framework and/or course content describes a similar level of cognitive expectation than the Maryland K-12 content standards. |
| 2 | **Very Weak.** The conceptual framework for postsecondary education and/or course content includes clear and sufficient language to suggest that the college courses cover little of the same content described in the Maryland K-12 content standards. | **Lower.** The language in the conceptual framework describes a lower level of cognitive expectation than the Maryland K-12 content standards. |
| 1 | **Not Addressed.** The conceptual framework and/or course content does not include any language suggesting the college courses cover the same content described in the Maryland K-12 content standards. | |
| 0 | **Unable to Determine.** The conceptual framework and/or course content included insufficient detail to determine a rating. | |

**Step 3. Code Alignment of Standards:** Content expert teams reviewed materials regarding expectations, identified academic standards, and coded the standards using the alignment index. In addition to coding, reviewers provided narrative justifications for their coding that reference evidence from data collected (e.g., course inventory, programmatic survey, focus groups) on alignment or misalignment. The following is a summary of the process for coding alignment of standards.

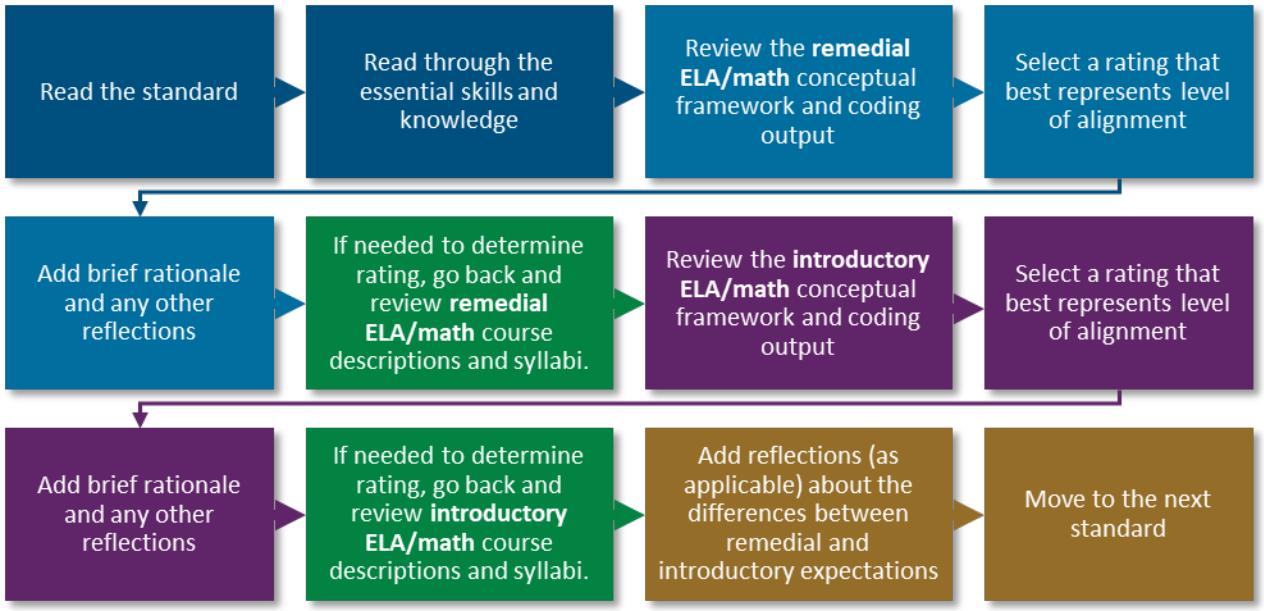
### ELA and Math

In general, both the ELA and math alignment sessions followed a similar process for the alignment review of the developmental and introductory courses by asking the reviewers to complete the following:

- Read the available materials related to the Maryland CCR ELA/Math Content Standards.
- Read the available materials related to the postsecondary course content (e.g., conceptual framework for postsecondary education, coding output, course objectives).
- Determine a rating reflecting the degree of alignment of both content and rigor.
- Write a brief rationale to justify the rating as well as any other reflections.

Exhibit 10 provides a more detailed overview of the alignment process.

**Exhibit 10. ELA and Math Alignment Process**




Given the complexity of aligning the standards to content synthesized across 16 community colleges, the alignment process was designed to be completed in facilitated small-group virtual sessions. This approach allowed reviewers to ask questions and clarify assumptions in real-time as well as have access to a facilitator who could answer process and technical questions.

We implemented multiple strategies to address interrater reliability. First, small-group alignment sessions allowed the reviewers to raise questions, clarify concepts, and calibrate alignment approaches in real time. Second, reviewers were asked to include a rationale to justify their ratings, which will be part of our analysis to identify potential outliers. Third, at

least one AIR staff attended all small-group alignment sessions to provide a throughline and share how different groups are approaching similar questions. Fourth, we used a shared document to capture key discussion and decision points that would inform calibration of the alignment approach across the small groups. Finally, following completion of the alignment sessions, AIR will present preliminary findings to reviewers in a debriefing session to capture final reflections and discuss any areas where there was high variation among ratings.

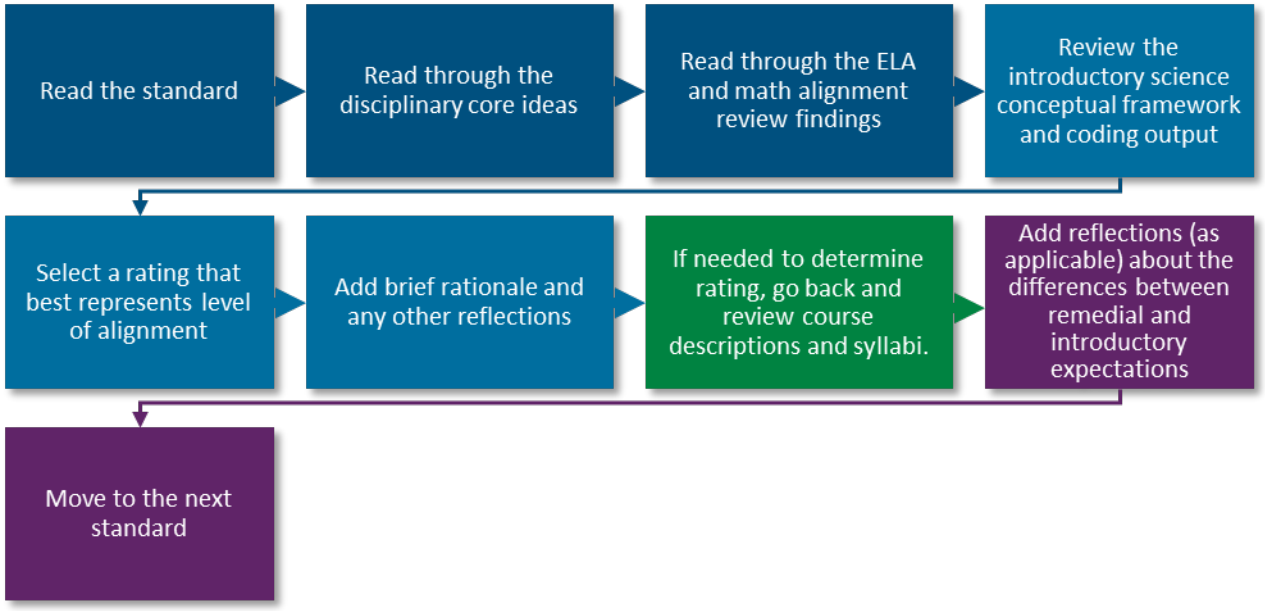
**Science**

The process for the science alignment review was similar to the process for ELA and math; however, the findings from the ELA and math alignment reviews were key inputs because specific ELA and math connections are outlined within the Next Generation Science Standards (NGSS) and the majority of first-year credit-bearing science courses have prerequisite English and math knowledge expectations. For the science alignment, we looked at the extent to which the academic content standards reflect levels of literacy and math for students to be successful in a first-year credit-bearing science course. We also looked at whether the content outlined within the NGSS Disciplinary Core Ideas related to physical and life science was included in course expectations and content. The science reviewers were asked to complete the following:

- Read the connected ELA and math content standards and NGSS Physical and Life Science Disciplinary Core Ideas.
- Read through the ELA and math alignment findings.
- Read the available materials related to the postsecondary course content (e.g., conceptual framework, coding output, course objectives).
- Determine a rating reflecting the degree of alignment of both content and rigor.
- Write a brief rationale to justify the rating as well as any other reflections.

Exhibit 11 provides a more detailed overview of the science alignment process.

**Exhibit 11. Science Alignment Process**



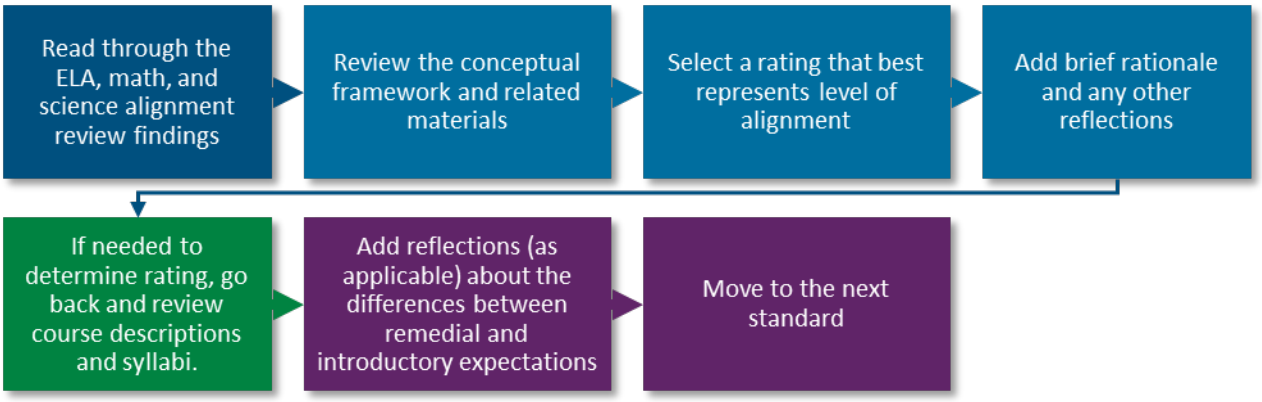

### Certificate-Granting Training Programs

The process for the certificate-granting training programs alignment review was similar to the other content alignment reviews; however, the findings from the ELA, math, and science alignment reviews were key inputs because literacy, numeracy, and scientific practices are reflected in the O*NET Basic Skills and OCTAE Employability Skills Framework (Applied Knowledge). These resources were key inputs into the development of the conceptual framework for certificate-granting training programs, given the limited publicly available information about Maryland community college prerequisite knowledge expectations for such programs. The reviewers were asked to complete the following:

- Read the connected ELA and math content standards and NGSS Scientific and Engineering Practices.
- Read through the ELA, math, and science alignment findings.
- Read the available materials related to the postsecondary expectations (e.g., conceptual framework, coding output, program information).
- Determine a rating reflecting the degree of alignment of both content and rigor.
- Write a brief rationale to justify the rating as well as any other reflections.

Exhibit 12 provides a more detailed overview of the certificate-granting training programs alignment process.

**Exhibit 12. Certificate Granting and Training Programs Alignment Process**




**Step 4. Analyze Alignment Ratings and Justifications:** Following the completion of coding, we are developing content maps to provide an easily digestible visual representation of alignment between Maryland K–12 content standards and postsecondary expectations. There is no expectation that all course content will be aligned to the content of every single high school standard included in the alignment review. In fact, the underlying assumption is that all high school standards should not be fully aligned given the breadth and depth of the high school standards and the specific focus areas on which postsecondary courses are grounded. Although we do not anticipate that each high school standard will be reflected in the developmental education and introductory course content, we expect the content maps to depict evidence of alignment based on the reviewer ratings and analysis of the alignment. In addition to the content maps, AIR will conduct a qualitative analysis of the narrative justifications reviewers provide for the ratings to identify themes related to alignment or misalignment to inform actionable recommendations.

In the final report, we will present the content maps and related key takeaways based on the alignment review.

## C.4. Top-Performing Education Systems

To identify the knowledge and skills that top-performing education systems consider necessary for students to be college and career ready, we conducted a landscape scan and analysis of top-performing education systems, both national and international. In collaboration with MSDE, we identified three U.S. states and four countries on which to focus the landscape analysis. For each of these systems, we examined the design of their K–12 and higher education systems, definitions of college and career readiness, expectations for college and career readiness, and assessments that measure students' level of readiness (e.g., performance tasks, standardized tests). Synthesized findings from the landscape analysis address guiding RQs 5–8 (see Exhibits 1 and 2).

### *Identification and Selection of Education Systems for Analysis*

**Education systems: National.**

To identify the national top-performing education systems for the landscape analysis, we considered factors like ACT and SAT benchmarks, K–12 performance, and postsecondary attainment by state. We identified the top-performing states on each of these factors, and then narrowed the options to those states that perform highly across all factors. In consultation with MSDE, we identified Colorado, Connecticut, and Massachusetts for in-depth analysis, with an eye toward comparability with Maryland and availability of data. More information about factors that informed this selection follows.

- **ACT and SAT Performance:** The ACT assessment defines a set of CCR benchmarks that signal whether students may be considered ready for college or the workforce; students who meet these benchmarks have a 75% or better chance of earning Grade C or above in first-year entry-level courses of corresponding subjects. The ACT CCR benchmarks are 18 for ELA, 22 for math, 22 for reading, and 23 for science. Similarly, The College Board (2023) defines SAT CCR benchmarks that signal college readiness and success. SAT CCR benchmarks include a score of 480 on Evidence-Based Reading and Writing and a score of 530 on math. The U.S. states with the greatest share of students meeting the ACT and SAT benchmarks include Connecticut, Illinois, New Jersey, Massachusetts, Idaho, Colorado, Rhode Island, New Hampshire, Maine, and Hawaii (Alas, 2021).
- **National Assessment of Educational Progress (NAEP):** NAEP, which is administered by the National Center for Education Statistics, is an assessment that provides key information about achievement and student learning experience in a range of K–12 subjects. We examined 2022 NAEP scores by state in eighth-grade reading and math (NAEP also provides twelfth-grade assessments, but not all states participate). The states with the highest average scale scores in reading include New Jersey, Massachusetts, Utah, Connecticut, Vermont, Idaho, Colorado, New Hampshire, Wisconsin, and Ohio. The states with the highest average scale scores in math include Massachusetts, Utah, Idaho, South Dakota, Wisconsin, Wyoming, New Jersey, Minnesota, Nebraska, and Virginia (NAEP, 2022).
- **Postsecondary Attainment:** We also reviewed state data on postsecondary credential attainment, including 4-year public institutions, 4-year state-aided independent institutions, community colleges, and other post-high school certifications and credentials. Nationwide, 54% of individuals over the age of 25 have a postsecondary credential. The top states in terms of credential attainment include the District of Columbia, Massachusetts, New York, New Jersey, Vermont, Minnesota, Connecticut, and New Hampshire (Lumina Foundation, 2023). Measures of postsecondary attainment

are included as a complement to the other factors in this list because they measure the attainment of the state's population rather than the postsecondary attainment of the students educated in the state's K–12 education system.

**Education systems: International.**

In collaboration with MSDE, we developed an initial list of top-performing international education systems using the most recent data available from two international educational assessments: the 2018 Programme for International Student Assessment (PISA)[6] and the 2019 the Trends in International Mathematics and Science Study (TIMSS)[7] (Exhibit 13). This list is based on countries that performed well on one or both assessments (above the OECD average on PISA and/or above the center point on TIMSS) as well as countries of particular interest to MSDE.

### Exhibit 13. Initial List of Top-Performing International Education Systems

| Country | Assessments used to identify top-performing systems |
|---|---|
| **Canada** | PISA (2018) |
| **China (Taipei)** | PISA (2018); TIMSS (2019; Math Grade 8); TIMSS (2019; Science Grade 8) |
| **Estonia** | PISA (2018) |
| **Finland** | PISA (2018); TIMSS (2019; Science Grade 8) |
| **France** | PISA (2018) |
| **Germany** | PISA (2018); TIMSS (2019; Math Grade 8); TIMSS (2019; Science Grade 8) |
| **Hong Kong** | PISA (2018); TIMSS (2019; Math Grade 8) |
| **Japan** | PISA (2018); TIMSS (2019; Math Grade 8); TIMSS (2019; Science Grade 8) |
| **Poland** | PISA (2018) |
| **Singapore** | PISA (2018); TIMSS (2019; Math Grade 8); TIMSS (2019; Science Grade 8) |
| **South Korea** | PISA (2018) |
| **Taiwan** | PISA (2018) |

Assessment scores serve as a starting point, but they only tell part of the story. Structural differences between some international systems and the U.S. education system (e.g., central vs. decentralized system, funding mechanisms, number of years of compulsory education) have an

[6] Launched in 2000, The Programme for International Student Assessment (PISA) is a standardized test initially developed by experts across the Organization for Economic Cooperation and Development (OECD) countries. PISA assesses reading, math, and science knowledge, and how to apply that knowledge, among 15-year-old students across multiple nations. See https://ncee.org/top-performing-countries/

[7] Since 1995, TIMSS has assessed students in math and science in Grades 4 and 8 every four years, and is sponsored by the International Association for the Evaluation of Educational Achievement. In 2019, TIMSS was administered across 64 countries and eight benchmarking systems. See https://timss2019.org/reports/achievement/

impact on assessment scores. For example, China is often included on lists of top education systems using assessment scores; however, China segregates advantaged students and disadvantaged students more than the OECD country average (Schleicher, 2019), leading us to exclude it from the analysis. In looking at both academic performance and structural components of the education system, we selected four countries for the in-depth landscape analysis that represent different features of the top-performing international education systems: Estonia, Germany, Japan, and Singapore. Exhibit 14 provides a short description of each system.

### Exhibit 14. International Education Systems Included in Landscape Analysis

| Country | Description |
|---|---|
| **Estonia** | Estonian students ranked first in reading and science and third in math of all OECD countries on the 2018 PISA. Socioeconomic status (SES) has a relatively low impact on performance compared to OECD nations; for instance, Estonia has the largest share of students from the lowest socioeconomic quartile scoring in the highest quartile on the PISA (NCEE, 2021). Additionally, Estonian Grades K–12 schools are decentralized, with a great deal of autonomy, similar to Grades K–12 schools in the United States (European Commission, 2023). Students are required to attend school between the ages of 7 and 17. |
| **Germany** | German students score above the OECD average on PISA and TIMSS, and Germany has made substantial progress in this area over the last two decades. After the first round of PISA scores were released in 2001, Germany implemented widespread education reforms to improve performance, which has led to the country's strong performance among OECD countries. Like the United States and Estonia, Germany's education system is decentralized. Compulsory education is from age 6 to 15 or 16, depending on the region (NCEE, 2023). However, outcomes for students in Germany are highly stratified. The mean performance gap between advantaged and disadvantaged students in 2018 was 113 score points in Germany, the equivalent of 3.5 years of schooling (OECD, 2018). |
| **Japan** | Japan scores in the top five of education systems in the world based on PISA and TIMSS scores, and its scores also show greater equity than in many other OECD jurisdictions, with the impact of SES on student performance well below the OECD average. Teachers and expenses are paid by the central government, and the common curriculum provides consistent expectations nationwide. These policies have in part supported relatively equal opportunities in education for those from different socioeconomic backgrounds (NCEE, 2023). |

| Country | Description |
|---|---|
| **Singapore** | Singapore is within the top two performing countries in nearly all PISA and TIMSS categories, and it has higher racial and ethnic diversity as compared to other East Asian countries. Singapore's education system has been credited with the country's rapid development in the past decade (Vaidiyanthan, 2020). Primary education (six years) is compulsory for students between the ages of 6 and 15 (Singapore Ministry of Education, 2021). The education system is highly stratified; those from higher SES have been improving academically at a much greater rate than those from lower SES groups (PISA, 2018). |

### *Approach to the Landscape Analysis*

The landscape analysis consisted of online searches and reviews of existing research literature to collect information on a set of key components, including the following:

- design components of K–12 and higher education system (e.g., access, supports),
- definitions of CCR,
- level of integration of expectations for CCR,
- assessments of CCR (e.g., performance tasks), and
- academic and nonacademic standards for CCR.

We are synthesizing the information collected on these key components to provide an analysis of the focus states and countries. To do this, we gathered literature and relevant information for each state and country, and coded each document based on themes of interest, such as "CCR definitions," "types of higher education (postsecondary) programs," "requirements for entry to such programs," "assessments," and "contextual factors." Based on this information, we are conducting a comparative analysis to explore commonalities and differences across states and countries to extract the relevant findings and lessons that may inform improving CCR for all students in Maryland.

## C.5. Sources of Bias in CCR Assessments

To identify potential sources of bias in assessments, the primary activity was a literature review, for which we reviewed existing research literature on assessments commonly used to determine college and career readiness (e.g., ACCUPLACER, PARCC); potential sources of bias in these types of assessments and on standardized assessments in general; and studies that specifically tested commonly used CCR assessments for bias. We primarily reviewed academic journal sources (e.g., *Community College Review*, *Educational Researcher*, *Education Economics*); we prioritized sources that were published within the last five years, were from peer-reviewed journals, or were from independent third-party organizations.

Because much of the available literature is related to the types of assessments that are used and to sources of bias in assessments in general, rather than specific studies about bias in individual assessments, we also identified literature on potential sources of bias that come from inequities in preparation for assessments. In addition to the literature review, we included questions about potential sources of bias in assessments in the postsecondary focus group protocol. To identify insights from the focus group data, we conducted a thematic analysis as described in Section C.2 Postsecondary Readiness Expectations (see Appendix A for the programmatic survey and Appendix C for the focus group protocol).

## D. Discussion of Preliminary Insights

Using the data collected through the course inventory, programmatic survey, focus groups, follow-up surveys, and the landscape scan and literature review, we conducted preliminary analyses to provide emerging insights related to the three key objectives of the study and related guiding research questions of the content and standards alignment analysis:

- **Objective 1:** Assess the extent to which Maryland's College and Career Ready Academic Content Standards align with postsecondary expectations in (1) entry-level credit-bearing ELA, math, and science courses; (2) developmental ELA and math courses; and (3) certificate-granting workforce training programs. [RQs 1–4]
- **Objective 2:** Identify how top-performing educational systems define students as "college and career ready" and explore the extent to which those expectations align to Maryland's expectations. [RQs 5–8]
- **Objective 3:** Identify potential areas of bias within assessments used to determine CCR. [RQ 9]

In the sections that follow, we provide preliminary insights about each objective, informed by our guiding research questions (see Exhibit 2). The final report will include more in-depth analyses and findings, along with detailed findings on the content and standards alignment review, which was still in progress at the time of this report's publication.

### D.1. Alignment Between Maryland CCR Content Standards and Postsecondary Expectations

In this section, we address guiding RQs 1–4 by providing preliminary insights on the extent to which the Maryland K–12 content standards are aligned with the expectations that postsecondary stakeholders have for incoming students. We also share insights on the extent to which the content and expectations laid out in entry-level and developmental courses are aligned with the Maryland K–12 content standards.

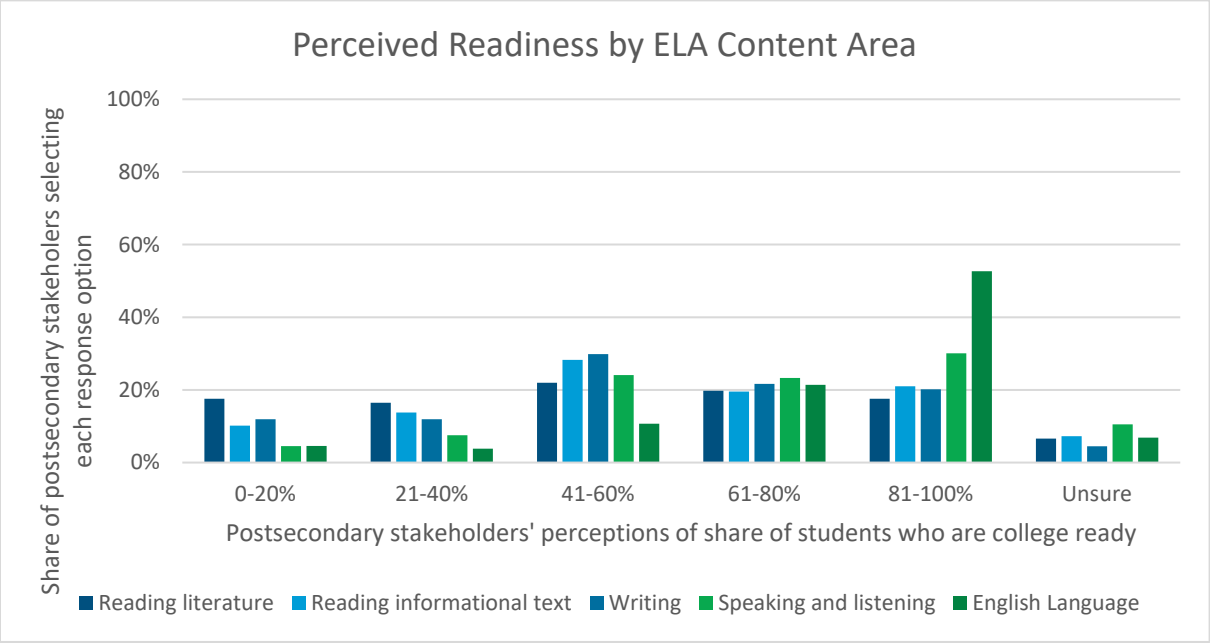
#### *Perceptions of Student Readiness for Postsecondary Courses*

**Postsecondary stakeholders identified reading, writing, precalculus, and scientific thought as areas many incoming students struggle with.**

Through the programmatic survey, we captured perspectives about college readiness from stakeholders at Maryland community colleges. Exhibit 15 provides a snapshot of the perceptions of respondents related to student readiness for ELA, organized by the categories within the Maryland CCR ELA standards. Broadly, postsecondary stakeholder responses suggest

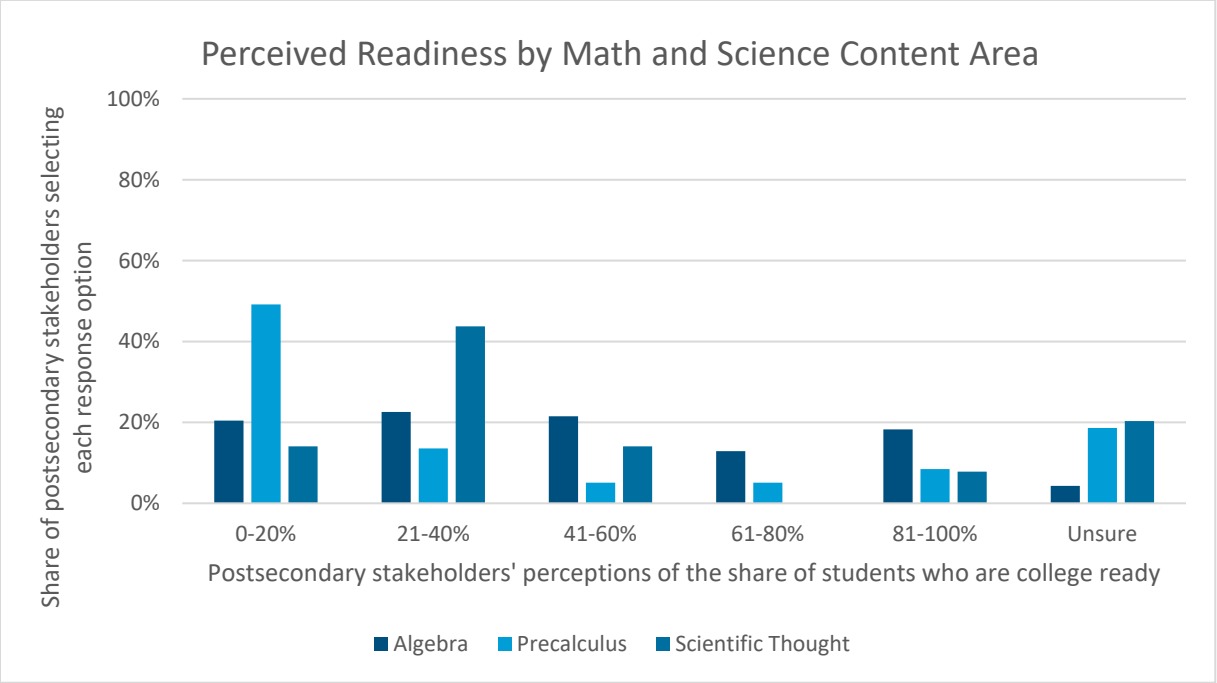
that students' ELA readiness is stronger for the "English language" component of the ELA standards than it is for other components. When asked about the proportion of students, at entry, who are college ready in ELA, more than half of respondents (53%) reported that 81% or more of their students were college ready in "English language." Fewer respondents reported that students were college ready for speaking and listening; only 30% of the respondents reported that 81% or more of their students were college ready in "English language." Perceptions of readiness for reading literature and writing were mixed.

**Exhibit 15. ELA Readiness Perceptions by Maryland CCR ELA Standards (Strands)**




In terms of perceptions for math readiness, Exhibit 16 provides a snapshot organized by categories within the Maryland CCR Math Standards. Overall, postsecondary stakeholders' perceptions indicate that their students are less college ready in math than in ELA.

**Exhibit 16. Math Readiness Perceptions by Maryland CCR Math and Science Standards**




Most respondents reported that, overall, their students were not college ready in math and science. Only 18% of respondents said that 81% or more of their students were college ready in algebra. And just 8% of respondents thought that 81% or more of their students were college ready in precalculus and scientific thought.

Overall, preliminary insights from the programmatic survey are consistent with focus group comments that suggest many students are unprepared, especially in math. Across focus groups, postsecondary stakeholders noted that many students are not performing at the college level. Consistent with the survey findings, ELA stakeholders reported that critical reading and writing are areas where students are not performing at college level, as one stakeholder's comment exemplifies:

> Some of our students are being held back by their ability to read and write.

Math and science stakeholders also expressed concern about their students' readiness for entry-level courses, especially with regard to scientific thinking and algebra. Comments from the USM Provosts echoed focus group participants' sentiments. In general, USM Provosts raised concerns regarding the level of academic readiness of many students at college entry. In particular, critical reading was raised as a growth area for incoming students.

**Postsecondary stakeholders view nonacademic skills as an important component of determining college and career readiness.**

Our preliminary analyses suggest that nonacademic skills, like self-direction, time management, critical thinking, and other social-emotional factors, should be considered alongside academic skills in determining college and career readiness. Faculty noted that the extent to which students have developed these skills can be a source of inequity for students despite placement in courses based on academic measures. For example, one faculty member described how nonacademic skills can be barrier for students:

> I feel like the biggest barrier when students are successful or not has to do with their non-cognitive skills, their ability to manage time to meet deadlines, to be able to transition from a really more structured environment of high school to having the free time.

Consistent with these findings, USM Provosts observed that faculty are struggling to support the increasing number of students entering college with lower levels of preparedness and engagement as well as high levels of social-emotional challenges. Other respondents commented that faculty need training to address student success from an angle that considers the "whole student" (e.g., background, lived experience).

Workforce stakeholders also pointed to the importance of these nonacademic skills for students to be workforce ready. Focus group participants highlighted skills like critical thinking and understanding of workplace norms and expectations as especially important for students to develop. For example, one workforce stakeholder said:

> The question is expectations of high school students to show that they're career ready. I would probably say that the greatest indicator of success is whether they've had an internship.

**Postsecondary stakeholders point to the need for multiple measures for determining college and career readiness.**

Focus group participants shared course prerequisites and several assessments that their colleges use to assess student readiness for college and to place students in courses, including grade point average (GPA), ACCUPLACER, ALEKS, and student self-assessments. However, stakeholders reported concerns with overreliance on these measures alone, especially given their perspectives on the importance of nonacademic skills as described in the previous section. For example, several focus group participants agreed that standardized testing is not always a complete assessment of college readiness. One stakeholder described:

> We've been doing a lot of research with our ALEKS and placement scores. … What we see is that there is very little correlation between placement score and success in a class.

In addition, stakeholders noted that although the assessments for reading and writing readiness may be effective, they do not measure the critical thinking, independence, self-direction, and other nonacademic skills that students are expected to demonstrate to be successful in college-level courses. Another stakeholder comment exemplified this idea:

> Students should be able to follow directions in a timely fashion, ask for assistance [or] clarification, tolerate ambiguity and diverse viewpoints, and develop effective meta-cognitive strategies.

Stakeholder comments related specifically to assessments suggest that considering multiple indicators of readiness may be the best approach for assessing college readiness. For instance, one stakeholder described how considering success in high school Algebra 2 alongside GPA may be more effective than GPA alone:

> GPA is not working for us, it just isn't at all. I had a student [who] came in at very good GPA, but the last math class they had was Algebra 1 two years ago. And they had been placed into college algebra because of the GPA. And there was no way they could thrive there because they were missing all of Algebra 2. So it was a problem.

USM Provosts' opinions were aligned with focus group participants' perspectives. One respondent suggested placement tests support student success by helping students enroll in courses for which they are prepared. Still, several respondents discussed the need for a "variety of methods" for assessing incoming student preparedness, as some methods can be a barrier for students. For example, placement tests can be a barrier to some students who cannot pay the fees or who require accommodations.

**Student supports play an important role in ensuring incoming students are college ready.**

Faculty in focus groups noted the importance of having resources for additional student support and the need to provide scaffolding to ensure student success. The effects of the COVID-19 pandemic, the increasing number of dually enrolled students, and a lack of academic skills were cited as reasons for why postsecondary stakeholders have observed an increase in students who need scaffolded support. Comments from focus group participants, along with the syllabi collected through the programmatic survey, point to a range of supports, including tutoring and writing centers, zero-cost textbook models, and disability support services.

Stakeholders also highlighted a need for wraparound services, especially to support nonacademic college and career readiness factors (e.g., self-direction, critical thinking), which can be a source of inequity for students despite their placement into courses. They also pointed to the importance of understanding other factors that affect students' success in placement tests and entry-level and developmental courses, like balancing family and work responsibilities or managing disabilities. Stakeholders noted that these issues became more pronounced during the COVID-19 pandemic and questioned the reliability of placement tests during that period.

### *Perceptions of Content Alignment Between CCR Standards and Postsecondary Entry-Level Courses*

Preliminary insights related to alignment of postsecondary content with Maryland CCR standards come from the course inventory, programmatic survey, and focus groups. Full analyses that include the content and standards alignment review, which is ongoing at the time of this report's writing, will inform key takeaways presented in the final report.

**Postsecondary course content is generally aligned with Maryland K–12 content standards, but some content areas may be emphasized more than others.**

Initial analysis of data from focus groups suggests that, at a high level, there is overall alignment between Maryland K–12 content standards and the content and expectations of postsecondary courses. Participants in the ELA focus group identified reading comprehension and writing as foundational content knowledge for college and career readiness. In the math focus group, participants identified fractions and proportional reasoning as important foundational content knowledge, followed by logic. Finally, science focus group participants indicated that they did not require in-depth science content knowledge for incoming students, but that critical reasoning and writing, scientific thought, and basic math skills are important for success in entry-level science classes.

Preliminary results of the review of syllabi identify the primary content emphases in each content area and course type (Exhibit 17). Based on preliminary alignment analysis, for both developmental and first-year credit bearing ELA courses, Writing and Language strands of the Maryland CCR ELA standards had the highest alignment to postsecondary course content followed by Reading Informational Text. The rigor of developmental courses is typically at similar or lower expectations than those in Grade 9/10 ELA standards; rigor within first-year credit-bearing ELA was typically at similar or higher expectations. In math, generally, high school standards classified within algebra and functions demonstrated alignment with college-level expectations. Few introductory or developmental college courses include expectations for geometry.

**Exhibit 17. Content Emphasis from Preliminary Syllabi Review**

| Course type | Content emphasis |
|---|---|
| **Developmental ELA** | Producing clear, coherent, organized writing. |
| **First-Year Credit-Bearing ELA** | Producing clear, coherent, organized writing: gathering source information and integrating that information appropriately. |
| **Developmental Math** | Algebra, followed by functions. |
| **First-Year Credit-Bearing Math** | Algebra, functions, number and quantity, geometry, and statistics. |
| **First-Year Credit-Bearing Science** | Obtaining, evaluating, and communicating information; planning and carrying out investigations. |

## D.2. Characteristics of Top-Performing Education Systems

Several key themes emerged from the landscape analysis of top-performing education systems—select U.S. states and countries—that may be useful for Maryland to consider in developing and refining the state CCR system (including content standards and the readiness standards). In this section, we address guiding RQs 5–8 by first discussing the CCR definitions across the three focal top-performing U.S. states and how they compare to the Maryland definition. We also identify common practices across those states. Next, we present a discussion of themes extracted from our preliminary analysis of top-performing international education systems, focusing on insights most relevant to Maryland.

### *Top-Performing States' CCR Systems*

The analysis of three top-performing states—Colorado, Connecticut, and Massachusetts—revealed some preliminary insights related to CCR, as presented in this section.

**Definitions of college and career readiness vary across top-performing states.**

Exhibit 18 shows the definitions of college and career readiness across the three focal top-performing states (Colorado, Connecticut, and Massachusetts) and Maryland. Both Maryland and Massachusetts specify that students who are college and career ready will be able to enroll in credit-bearing classes, and the two states also focus on skills required to be successful in college or a career. Massachusetts breaks these skills down by subject: English and math. Connecticut quantifies requirements with specific testing parameters. Colorado's definition refers to state standards and requirements, and includes that a student should not need remediation, as similarly mentioned by Maryland's and Massachusetts' statements on credit-bearing courses.

### Exhibit 18. College and Career Readiness Definitions by State

| State | College and career readiness definition |
|---|---|
| **Colorado** | "CCR is currently indicated by the percentage of students that graduate from high school with a postsecondary and workforce readiness (PWR) endorsement, the high school graduation rate, and the proportion of students who scored at or above achievement level on college entrance exams. To be considered for a PWR-endorsed diploma, a student must (1) satisfy the existing Higher Education Admissions Recommendations (HEAR) (which are currently under review and specify that students should complete recommended courses: four years of English, four years of math, three years of natural/physical science, three years of social science, one year of foreign language and two years of academic electives) or HEAR proxies (e.g., completion of a college-level course in a subject area with a grade of C or better), (2) meet a postsecondary institution's Admissions Index, and (3) demonstrate they do not require remediation by testing above existing approved cut scores in math and literacy" (Colorado Department of Labor and Employment, 2021). |
| **Connecticut** | "To be considered CCR according to CCR-Exam metric, a student must meet any one of the following: (a) SAT: an Evidence-Based Reading and Writing score of at least 480 and a Math score of at least 530; (b) ACT: on at least 3 of 4 exams, an English score of 18, a reading score of 22, a math score of 22, and/or a science score of 23; (c) AP Exam score of 3 or higher; or (d) International Baccalaureate exam: a score of 4 or higher" (Caro & Kiehne, n.d.). Connecticut also defines CCR as "individual meets the admissions requirements for a two-or four-year college or university. This typically includes meeting high school graduation requirements, maintaining an acceptable GPA in specified courses, and obtaining satisfactory SAT or ACT scores" (Connecticut State Department of Education, 2023). |
| **Massachusetts** | "Massachusetts students who are college and career ready and prepared for civic life will demonstrate the knowledge, skills and abilities that are necessary to successfully complete entry-level, credit-bearing college courses, participate in certificate or workplace training programs, enter economically viable career pathways, and engage as active and responsible citizens in our democracy." To be considered college and career ready under this definition, students must meet a set of learning competencies, capacities, and experiences: (1) achieve "college-ready levels of competence" in ELA and math, in addition to competencies identified by the MassCore program of study (four units of English, four units of math, three units of science, three units of history, two units of foreign language, unit of arts, five additional "core" courses); 2) workplace readiness competencies including work ethic and professionalism and communication and interpersonal skills; and (3) apply "academic strategies to problem solving in diverse professional and life contexts" (Massachusetts Board of Elementary and Secondary Education, 2013). |

Additionally, Maryland has different college and career readiness assessments compared to the top-performing states, as shown in Exhibit 19. Maryland is the only one of these four states that relies on the standardized *state* assessments as an indicator of CCR.

**Exhibit 19. Comparison of College and Career Readiness Assessments by State**

| State | College and career readiness assessment |
|---|---|
| **Colorado** | • ACT: 18 on English and 19 on math<br>• Advanced Placement: 2 on English and 2 on math<br>• SAT: 470 on English and 500 on math, or<br>• ASVAB: 31 on English and 31 on math |
| **Connecticut** | • SAT: 480 on Evidence-Based Reading and Writing; 530 on math<br>• ACT, on at least 3 of 4 exams: English score of 18, reading score of 22, math score of 22, and/or science score of 23<br>• AP Exam: score of 3 or higher<br>• International Baccalaureate Exam: score of 4 or higher |
| **Maryland (Interim CCR Standard)** | • MCAP or PARCC: score of 4 or 5 in English and math<br>• SAT: 530 on math |
| **Massachusetts** | • ACT WorkKeys National Career Readiness Certificate (based on earning a score of 3 or better on Applied Math, Workplace Documents, and Graphic Literacy WorkKeys assessments)<br>• ACT |

**Top-performing states provide formal CCR counseling to students before Grade 10 and an easily accessible CCR plan.**

The three focal top-performing state education systems—Colorado, Connecticut, and Massachusetts—provide formal CCR counseling to students prior to or starting in Grade 9, which is consistent with research that points to the success of such counseling programs (Bhat & Stevens, 2022; Bryan et al., 2021; Martinez et al, 2017). In conjunction with counseling, these states provide students and families with an easily accessible, individualized CCR plan prior to Grade 10, and in some cases as early as elementary school. Massachusetts offers the My Career and Academic Plan electronic platform option for students to begin using in either sixth or ninth grade. Connecticut requires students to work with a Student Success Plan beginning in sixth grade, and Colorado employs the Individual Career and Academic Plan beginning in ninth grade. In contrast, The *Blueprint for Maryland's Future* mandates a CCR plan to students only after they do not meet specific benchmarks in Grade 10, which may be too late to develop a student's understanding of their college and career options and associated educational requirements. The state of Maryland does require that students develop "individual academic and career" plans prior to Grade 9; however, this is distinct from the CCR plan mandated in the *Blueprint* and may not be consistently used across local education agencies (Maryland Division of State Documents, 2023).

### *Insights from Top-Performing Countries*

In this section we present some preliminary insights learned from studying the four focal top-performing countries, and we highlight observations that may be relevant to MSDE. Comparisons between Maryland (or any U.S. state) with top-performing international systems are difficult given key differences, such as country size and population, centralization of the education system, cultural differences, and the lack of "college and career readiness" as a concept outside of the United States. With these challenges in mind, we focused on factors that resonate with U.S. contexts such as racial and ethnic diversity, use of standardized assessments, and ability tracking. As described in Section C.4, the research team reviewed international data and collaborated with MSDE to select the following countries to examine closely: Estonia, Germany, Japan, and Singapore.

While the observations gleaned from studying these countries may be useful, we ultimately agree with previous researchers that within-U.S. comparisons (i.e., comparisons with other states) are much more useful and meaningful than international comparisons when it comes to understanding best practices in education (Carnoy et al., 2015). What follows are (1) brief descriptions of each country's education system and context; and (2) preliminary findings highlighting promising practices from our cross-country analysis conducted thus far.

**Estonia.** Although Estonia's school system is decentralized with a large degree of autonomy, the central government sets national standards and establishes principles of education funding, supervision, and quality assessment. While most basic (primary and lower secondary) and upper secondary schools are owned and run by municipalities, most vocational schools are owned by the central government (OECD, 2020). Some of Estonia's education components are centralized and schools adhere to a national curriculum. For example, each of Estonia's 15 counties has a municipal education office that oversees their share of a total of 589 schools across the country. These offices manage school operations, including selecting school leaders and supporting extracurricular activities and other school services. In addition, municipalities sometimes come together to share resources, such as teachers, services, or extracurricular facilities. As a result, schools have a high level of autonomy for resource allocation and staffing (NCEE, 2023). Estonia also manages school choice, and schools are economically integrated—all students receive free lunch and textbooks as well as computers and Internet (Kaplan et al., 2020; NCEE, 2023).

**Germany.** Germany's governance of education is highly decentralized. The central Ministry of Education and Research oversees vocational education, education research, and some aspects of higher education. The ministry also monitors the allocation of slots in the higher education programs in the professions (including teaching) based on a national analysis of supply and demand across the economy. The central government sets regulations for the civil service

workforce, which includes the majority of the teacher workforce, although salary levels are set at the state level. The 16 *Länder* (states) in the country have primary responsibility for all other aspects of the early childhood, primary, secondary, and higher education systems (NCEE, 2023). Also, Germany's vocational education and training provides dual programs in over 300 trades. German schools have three tracks, typically beginning in Grade 5: *gymnasium* (college preparatory, 8 to 9 years), *Realschule* (general education leading to technical school or university, 6 years), and *Hauptschule* (vocational training, 5 years).

**Japan.** In Japan, there is no ability tracking during compulsory education, teachers are paid centrally, and there is a common nationwide curriculum. These policies have supported Japan in providing students from low-income backgrounds with relatively equal educational opportunities; for example, socioeconomic status accounts for only 8% of the variation in reading performance, as compared to the 13% OECD average (NCEE, 2023). Most students select an academic upper-secondary school, and for those who want a vocational option, there are several choices: specialized vocational high schools, colleges of technology, and specialized training colleges. Students in the 3-year specialized vocational high school take core academic courses in addition to focusing on one of seven areas of specialization. Further, there are integrated schools that combine academic and vocational coursework. Admission to academic upper-secondary school is competitive: the schools are ranked based on their success in sending graduates to prestigious universities. Each school has its own admissions process and requirements, but most require students to take a test. The graduation rate from upper-secondary school is approximately 98% (NCEE, 2023).

**Singapore.** The Singapore Ministry of Education regulates the country's highly centralized education system for primary, secondary, and tertiary education. Singapore's higher education pathways offer 2- and 3-year certificate programs, and technical diploma programs (similar to apprenticeship programs). To move on to secondary education opportunities, students in Singapore must pass differing levels of exams, and students fall into either academic (O-Level) or technical (N-Level) tracks for assessments (NCEE, 2023). Singapore offers a National Institute of Technical Education Certificate. While academic achievement is highly stratified by socioeconomic status, for students who pursue vocational pathways, these can lead to high-income careers. Similar to Estonia and Japan, Singapore uses a national curriculum for all school systems.

**Preliminary cross-country observations.**

Our in-depth analysis of the education and postsecondary preparation systems in the focal countries is ongoing and will be presented in the final report; here, we offer some preliminary insights gleaned from our initial review.

**Top-performing countries offer multiple rigorous tracks.**

Vocational or technical tracks are among several options for upper-secondary school leading to a postsecondary career, with specific sets of requirements for completing each secondary track so that it feeds directly into the corresponding career pathway. In Estonia, for example, two tiers of vocational education are offered: a basic track and a comprehensive vocational education and training program, which allows students to obtain a bachelor's degree. The pathways offered may be focused on academics, arts, or technical fields; and there is a clear connection between secondary training and postsecondary options. The existence of multiple track options requires students to make career-based decisions earlier than in the United States (e.g., around Grade 5 in Germany) and offers different academic content and courses to students based on their choices.

**Technical secondary programs are high quality and regulated centrally.**

Technical or vocational programs in the focal countries are rigorous and effective for preparing students for the workforce. Graduates from such programs are generally able to find success in their fields and earn high incomes. In some cases, graduates of technical programs earn higher incomes than graduates of academic university programs; however, the incomes of technical workers do not grow as much over time as those of academically trained workers.

Although the four focal countries have national curricula with some local control or autonomy (or variations depending on pathways), there is a national or centralized body that oversees the quality of both academic and technical programs. Singapore has a National Certificate for the Institute of Technical Education programs. In 2014, Japan began developing a national qualifications framework covering seven levels of qualifications, from entry to professional level, with corresponding assessments of knowledge and practical skills (NCEE, 2023). In Estonia, several advisory bodies and industry organizations—including the Chamber of Commerce and Industry, Employers' Confederation, and Confederation of Trade Unions—advise the Ministry of Education and Research on vocational curriculum. This oversight and regulation may contribute to the high quality of vocational programs and to the correlation between strong educational training with higher paying jobs.

**Postsecondary readiness consists of academic and non-academic skills.**

While the term "college and career readiness" is not explicitly used in the four focal countries, their educational systems effectively prepare most students for academic or technical career pathways. To successfully complete secondary school, students in these countries must master academic and "life" skills. Competencies related to character, values, critical thinking, success in a global economy, and collaboration must be mastered for students to successfully move on to—and succeed in—postsecondary programs. While it was difficult to obtain details about specific courses required for successfully completing secondary school (or upper-secondary

school, in some countries), most countries require similar academic courses: math, home language, foreign language, and science. In Singapore, the national mathematics exam for completion of secondary school assesses a student's mastery of basic mathematics concepts, including algebra, geometry, statistics, and data analysis. But the desired outcomes for students also include "excellence in life skills, knowledge skills, and subject discipline knowledge organized into eight core skills and values: character development, self-management skills, social and cooperative skills, literacy and numeracy, communication skills, information skills, thinking skills and creativity, and knowledge application skills" (NCEE, 2023). In Estonia, all students are required to complete a creative project or a research project to graduate from "basic" secondary school, which ends in Grade 9. At that point, they are required to pass an exam to move on to upper-secondary school or may advance via teacher recommendation.

**Comparisons with international education systems may be of limited value.**

As mentioned previously, cultural norms, laws, regulations, differences in racial and ethnic compositions, and differences in educational systems mean that international practices are not easily comparable with the United States. However, these preliminary insights may be valuable for Maryland to consider. One major contextual difference between the education system in the United States and these four national education systems is the lack of a centralized core curriculum in the United States. Some countries have a standardized curriculum, but they offer several pathways for students to successfully complete secondary school to be prepared to move on to university or the workforce. While some curricula are standardized, some countries offer local autonomy to regions or localities as well, like in the United States. Regardless of structure, a national/standard curriculum should be balanced with offerings that appeal to a wide variety of students, such as multiple pathways (e.g., science, arts), CTE, and work-based learning. For states looking to serve a diverse range of students, these multiple offerings are important. However, equity must be prioritized, so that students from lower socioeconomic status backgrounds are not tracked into CTE pathways while higher SES students primarily participate in "academic" or university-bound pathways. Similarly, no matter what curriculum or pathway program students participate in, the core academics should be rigorous enough that students master the skills and content necessary to avoid remediation in college.

The final report will reflect the deeper analysis of cross-country postsecondary readiness systems currently underway and build on the preliminary insights presented here to describe more concrete findings for MSDE's consideration.

## D.3. Sources of Bias in Assessments

This section presents findings related to the potential sources of bias in assessments of college and career readiness (guiding RQ 9). In addition to focus group data, we explore research on

different types of bias as they relate to common college and career readiness assessments. We share preliminary insights from the literature review and from the focus groups, offering considerations for Maryland in the development of CCR standards, including inequities in preparation for assessments that contribute to bias and the importance of using multiple measures for placement to account for potential sources of bias in individual assessments.

**Standardized assessments frequently are subject to cultural bias.**

Our literature review suggests that large-scale assessments can be subject to varying types of bias. The research shows that cultural bias in standardized testing is well-documented (Bazemore-James, 2017). On average, students of color score lower on college admissions tests, leading to significantly reduced chances of higher education, merit scholarships, and therefore access to a better quality of life (Bhattacharya, 2022; Rosales, 2021). The cause of the bias is mostly attributed to language used in the tests, which is normed to background knowledge often held by White, middle-class students (Choi, 2020). Most of the research looks at the SAT and ACT tests, but studies are emerging that raise questions of equity on ACCUPLACER (Helvie, 2020). Data on performance by race on these tests raises questions about whether students have been incorrectly placed into developmental coursework because of a biased assessment (Helvie, 2020). In another example exhibiting cultural bias, research on the Florida Postsecondary Education Readiness Test (PERT) showed racial bias among Hispanic students; researchers found that PERT scores did not accurately predict first-year college GPA for Hispanic students as it did for the other students in the study (Criss, 2021). In addition, some studies raise equity concerns about the reliance on college admissions tests to determine CCR. For example, Klasik and Strayhorn (2018) found that a college readiness benchmark based on the SAT could differ substantially across student groups and college selectivity. Citing equity, access, and relevance concerns, colleges across the country have moved toward test-optional admissions policies, with one in four institutions no longer requiring submission of SAT or ACT scores in student applications (Einhorn, 2022; Tugend, 2019). Although research on Maryland-specific assessments like the Maryland Comprehensive Assessment Program and the Partnership for Assessment of Readiness for College and Careers is limited, cultural bias also may exist on these specific assessments given existing documentation of cultural bias in large-scale assessments.

**Inequities exist in opportunities to prepare for assessments.**

Several postsecondary stakeholders shared their perspectives on the importance of preparation for placement tests, noting that inequitable opportunities to prepare for placement tests exist. For example, one stakeholder noted that not all students are able to participate in test preparation courses because of financial and/or time constraints. Stakeholders also noted the opportunity gap for students in districts with fewer resources, recognizing that those students

may not receive good advice about college preparation and pathways. These stakeholder reflections are consistent with existing research that points to inequities in preparation for such assessments. Overall, according to Doran (2022), although the assessments themselves may not be biased, the educational opportunity and preparation for those assessments is inequitable, as students in different school systems are exposed to varied curricula and preparation opportunities yet are expected to perform comparably on assessments. Additionally, some states offer "pathways" that push students into various college and career tracks. For students in these states who choose or are tracked into a career pathway based on performance or subjective observations of school staff, entering college may be difficult (Sattem & Hyslop, 2021).

In addition, another stakeholder reflected on the importance of advising in advance of placement testing:

> They will be asked just to take the test and they don't know that that is for them to be placed. And some of them will be placed to developmental math because they did not do well in their test.

Others echoed this sentiment, noting that effective advising is key to preparing students and ensuring that they understand the purpose of placement tests like ACCUPLACER. Although postsecondary stakeholders are referring to postsecondary-based advising, advising to prepare students before leaving high school may also support better understanding of and preparation for placement tests.

Relatedly, stakeholders suggested that using multiple measures to place students in appropriate entry-level or developmental courses is important. For example, one stakeholder described their institution's process for placing students:

> [Students' placement exams] are auto scored by ACCUPLACER, but we also read them. And so it's also a conversation. So any student who needs developmental coursework must have a conversation with an advisor and sometimes English faculty are pulled into those conversations. So we look at a variety of things. Is the student non-traditional? Are they recent high school graduates? What program are they looking for? Where do they live? Are they going to be doing most of their coursework remotely? So it is a conversation with an advisor and that has improved placement immensely.

Similarly, research shows that placement tests can underestimate students' likelihood of being ready for college-level work (Bahr et al., 2019). More specifically, college and career readiness indicators may undermeasure students' postsecondary potential by "undermatching" those

students, which is especially prevalent in states that use only a single measure of college and career readiness (Zhou, 2023).

## E. Summary of Key Takeaways

In this section, we summarize our preliminary insights and offer recommendations for Maryland to consider based on those insights. We also highlight key limitations and caveats important for interpreting the results and outline our plan for incorporating the findings from the content and standards alignment review in the final report.

### E.1. Key Takeaways From the Preliminary Analysis

#### *Consider Nonacademic Indicators of College and Career Readiness Alongside the Provision of Supports That Develop These Nonacademic Skills*

The preliminary analysis on alignment suggests that high school academic content is generally aligned with college and career needs. Early results from the standards alignment show that overall, the Maryland K-12 content standards, which students should meet by the end of Grade 10, align to the content expectations of postsecondary course content in ELA and math. However, many students are not ready at college or workforce entry. Postsecondary stakeholders consistently emphasized the importance of critical thinking, self-direction, and social-emotional skills, which can be assessed through mechanisms like student surveys; however, these types of surveys typically rely on student self-reported information and may be subject to reliability and validity concerns. In addition, workforce stakeholders' perspectives suggest that workforce readiness is built through experience, like internships and work-based learning. Many syllabi indicated course activities that provide employability skills practice.

Postsecondary stakeholders discussed the importance of not only considering additional measures of college and career readiness but also of providing supports to students to develop these skills. In particular, stakeholders reflected on the need for supports for mental health, disability, and social-emotional issues, especially in the wake of the COVID-19 pandemic. Course syllabi also consistently pointed to available supports for students in these areas.

#### *Utilize Multiple Measures to Assess College and Career Readiness More Equitably*

Data from focus groups and from the literature review on bias in assessments point to the importance of using multiple measures to assess college and career readiness. Postsecondary stakeholders reflected on the varied levels of preparation and educational opportunity their students have, in addition to noting that even though students may meet content standards, they are not always ready for postsecondary coursework.

The research literature is consistent with our preliminary qualitative findings; relying on only one assessment measure may lead to inaccurate course placement and resulting lack of

postsecondary success (Ganga & Mazzariello, 2019). The use of multiple measures has been shown to increase equitable placement: when SAT and ACT scores alone are used to place students into developmental education, colleges will see proportionally more Black and Hispanic students in developmental education than White students (Helvie, 2020).

### *Provide Consistent, Rigorous College Preparatory Curriculum and Counseling Early in Students' Educational Journeys*

Our analysis of top-performing education systems revealed several key commonalities related to curriculum and support. While the exact definitions of CCR vary somewhat across the states we examined (Colorado, Connecticut, and Massachusetts), all provide rigorous college preparatory curriculum—and, notably, counseling and easily accessible CCR planning to students and their families beginning prior to Grade 10.

Although high-performing education systems in other countries are difficult to compare with the United States, they offer a potential takeaway for consideration and deeper analysis: strong, high-quality secondary or upper-secondary pathways that offer academic and technical training. These programs are closely linked to postsecondary opportunities and career pathways, leading to high-earning jobs. The programs are also overseen, regulated, and evaluated by a high-level central (national) body to ensure quality. Furthermore, postsecondary readiness in top-performing countries is defined not only by academic content but also mastery of important life skills.

## E.2. Main Limitations to the Preliminary Analysis

When interpreting the findings presented in this report, it is important to consider the potential limitations of the data and analysis. In particular, the following limitations may affect the conclusions one can draw from the study results so far:

- We have not yet completed the content and standards alignment review, which will produce a substantive portion of the results. The main limitation to the alignment review is that reviewers relied primarily on what was explicitly included in college course materials (e.g., course descriptions, syllabi), which varied across colleges in the level of detail provided on course content and student learning objectives. While some input was provided through stakeholder engagement activities, those conversations resulted in more general references to expectations related to academic content.
- The course inventory and programmatic survey, which provides the bulk of the data that will inform the alignment review, is limited to community colleges. Although this is an appropriate starting point for this research, given the focus on entry-level and developmental course expectations, future studies should consider a deeper review of

course requirements and expectations at all postsecondary institutions in Maryland as well as other areas of study beyond ELA, math, and science.

- Drawing comparisons with international education systems is challenging due to fundamental differences between these countries and the United States. For future studies, additional in-depth analyses of CCR expectations and education systems within the United States beyond those conducted in this study may provide more useful comparisons with Maryland and yield more actionable takeaways.
- The alignment study was intended to focus on expectations for college and career readiness, primarily gathering perspectives from postsecondary stakeholders. Future studies regarding career readiness should consider deeper engagement with workforce and K-12 stakeholders.

## E.3. Next Steps for the Content and Standards Alignment Analysis

For the interim report, we focused primarily on preliminary analyses of data collected via the course inventory, programmatic survey, focus groups, and literature reviews. For the final report, we will expand on the preliminary analysis to provide a more comprehensive picture of alignment between Maryland Grades K–12 content standards and postsecondary expectations. In particular, we will provide an in-depth analysis resulting from the content and standards alignment review, drawing connections between the alignment review and the preliminary insights in this report. The final report also will include updated and synthesized findings from the predictive validity analysis.

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# Appendix A. Programmatic Survey

The Programmatic Survey that we shared with the Maryland community colleges to follow up on the course inventory is provided below.

Course you are providing information for *(Please provide information for one course per submission)*:

Drop down menu with courses identified through course inventory, specific to each college.

1. What is your role? Please select all that apply.
    - Faculty
    - Staff
    - Administrator
    - Department Chair
    - Dean
    - Other (please specify below)
2. Please upload the syllabus for this course below:
    - You are welcome to share any of the following in addition to the course syllabus:
        - Learning objectives
        - Assessments
        - Grading rubrics
    - At entry, approximately what proportion of your students do you believe are college ready in the following areas:
        - Reading literature
            - 0–20%
            - 21–40%
            - 41–60%
            - 61–80%
            - 81–100%
            - Unsure
            - Not relevant for my course/program
        - Reading informational text
            - 0–20%
            - 21–40%
            - 41–60%
            - 61–80%
            - 81–100%
            - Unsure
            - Not relevant for my course/program
        - Writing
            - 0–20%

    - 21–40%
    - 41–60%
    - 61–80%
    - 81–100%
    - Unsure
    - Not relevant for my course/program
- Speaking and listening
    - 0–20%
    - 21–40%
    - 41–60%
    - 61–80%
    - 81–100%
    - Unsure
    - Not relevant for my course/program
- English language
    - 0–20%
    - 21–40%
    - 41–60%
    - 61–80%
    - 81–100%
    - Unsure
    - Not relevant for my course/program
- Algebra
    - 0–20%
    - 21–40%
    - 41–60%
    - 61–80%
    - 81–100%
    - Unsure
    - Not relevant for my course/program
- Precalculus
    - 0–20%
    - 21–40%
    - 41–60%
    - 61–80%
    - 81–100%
    - Unsure
    - Not relevant for my course/program
- Scientific thought
    - 0–20%
    - 21–40%
    - 41–60%

- 61–80%
- 81–100%
- Unsure
- Not relevant for my course/program

3. How are course learning objectives set and revised?
4. Is there anything else you would like to share regarding expectations for college and career readiness for students in your courses?

# Appendix B. Courses Included in Course Inventory

## Exhibit B1. Course Inventory: Developmental English

| College | Course title |
|---|---|
| **Allegany College of Maryland** | Reading/Writing Workshop I |
| | English Leap |
| | Reading/Writing Workshop II |
| **Anne Arundel Community College** | Academic Literacies |
| | Support for Academic Writing and Research |
| **Baltimore City Community College** | Integrated Reading and English |
| | Integrated Reading and English I |
| | Reading and English Skills II |
| **Carroll Community College** | Accelerated Learning Prog for ENGL-101 |
| | Integrated Reading and Writing 1 |
| | Integrated Reading and Writing 2 |
| **Cecil College** | Integrated Reading and Writing |
| **Chesapeake College** | PASS English |
| | English Accel Learning [ALP] |
| **College of Southern Maryland** | The Academic Essay |
| | The Academic Presentation |
| | The Academic Portfolio |
| **Community College of Baltimore County** | Advanced Academic Literacy |
| **Frederick Community College** | Introduction to College Reading and Writing |
| | Reading and Writing in the Academic Disciplines |
| **Garrett College** | Integrated Reading and Writing |
| | Prep for College Writing |
| **Hagerstown Community College** | Writing Strategies for English Language Learners College Success |
| | Writing Strategies for College Success |
| **Harford Community College** | Basic Writing |
| | Associated Reading and Writing |

| College | Course title |
|---|---|
| | Integrated Reading and Writing |
| | Accelerated Writing |
| **Howard Community College** | Acad Reading/Writing |
| | Adv Reading/Writing |
| | Info Literacy/Success |
| **Montgomery College** | Introduction to College Writing Support |
| **Prince George's Community College** | Developmental Reading |
| | Foundations of English |
| | Advanced Foundations College English |
| **Wor-Wic Community College** | Reading for Speakers of Other Languages |
| | Grammar and Writing Skills for Speakers of Other Languages |
| | Listening and Speaking Skills for Speakers of Other Languages |
| | Foundations of College Literacy |
| | College Reading |
| | Basic Writing |
| | Basic Writing, Accelerated |
| | College Literacy: Reading and Writing |

### Exhibit B2. Course Inventory: First-Year Credit-Bearing English

| College | Course title |
|---|---|
| **Allegany College of Maryland** | English Composition I |
| **Anne Arundel Community College** | Academic Writing and Research 1 |
| **Baltimore City Community College** | English Writing |
| | Introduction to the Term Paper and Research Methods |
| **Carroll Community College** | Focus |
| | College Writing |
| **Cecil College** | College Composition |

| College | Course title |
|---|---|
| **Chesapeake College** | Communication on the Job |
| | Composition |
| **College of Southern Maryland** | Composition and Rhetoric |
| **Community College of Baltimore County** | College Composition 1 |
| **Frederick Community College** | Advanced Reading for Composition |
| | English Composition |
| | English Composition and Literature |
| **Garrett College** | Comp I–Expository Writing |
| | Comp II–Intro to Literature |
| **Hagerstown Community College** | English Composition |
| | English Composition for English Language Learners |
| | English Composition for College Success |
| | Technical Writing |
| **Harford Community College** | English Composition |
| **Howard Community College** | Special Topics in Lit |
| | College Composition |
| | First Year Experience |
| **Montgomery College** | Introduction to College Writing |
| | Principles of English Grammar |
| | College Vocabulary Development |
| | Introduction to World Mythology |
| | Introduction to Literature |
| **Prince George's Community College** | Composition I: Expository Writing |
| **Wor-Wic Community College** | Fundamentals of English I |
| | Fundamentals of English I, Accelerated |

## Exhibit B3. Course Inventory: Developmental Math

| College | Course title |
|---|---|
| **Allegany College of Maryland** | Beginning Algebra |
| | Inter Algebra |
| | Beginning & Inter Algebra |
| **Anne Arundel Community College** | Pre-Statistics |
| | Foundations of College Algebra |
| | Intro to College Algebra |
| | Precalculus Foundations |
| | Introduction to Precalculus |
| | Quantitative Foundations |
| **Community College of Baltimore County** | Pre-Algebra |
| | Introductory Algebra |
| | Intermediate Algebra |
| **Baltimore City Community College** | Integrated Pre-Algebra and Introductory Algebra |
| | Intermediate Algebra |
| **Carroll Community College** | Independent Study Transitional Mathematics Advancement |
| | Foundations for Statistics |
| | Pre-Algebra |
| | Foundations for College Mathematics |
| | Foundations for College Mathematics Pt. 2 |
| **Cecil College** | Introductory & Intermediate Algebra |
| | Advanced Intermediate Algebra (STEM) |
| **Chesapeake College** | Pre-Algebra Arithmetic |
| | Elementary Algebra |
| | Intermediate Algebra |
| | Special Topics in Dev Math |

| College | Course title |
|---|---|
| **College of Southern Maryland** | Pre-Algebra Topics |
| | Elementary Algebra Skills and Concepts I |
| | Elementary Algebra Skills and Concepts II |
| | Intermediate Algebra Skills and Concepts |
| **Frederick Community College** | Preparation for College Mathematics |
| | Instruction with Algebra |
| | Algebraic Support |
| **Garrett College** | Introductory Algebra |
| | Intermediate Algebra |
| | Fundamentals of Mathematics |
| | Intermediate Algebra with Geometry |
| **Hagerstown Community College** | Foundations of Algebra |
| | Foundations of Reasoning & Statistics |
| **Harford Community College** | Integrated Review for Contemporary Mathematics |
| | Intens Rev of Intermediate Algebra |
| | Topics in Introduction to Statistics |
| | Pre-Algebra I |
| | Pre-Algebra II |
| | STEM Track I |
| | STEM Track II |
| | STEM Track III |
| | STAT Track Mathematics |
| **Howard Community College** | Mathematical Foundations |
| | Basic Algebra & Geometry |
| | Basic Algebra and Geometry Extension |
| | Intro to Elementary Algebra |
| | Elementary Algebra |
| | Elementary Algebra Extension |
| | Intermediate Algebra |

| College | Course title |
|---|---|
| | Essentials of Intermediate Algebra |
| | Intermediate Algebra Support |
| | Adv. Topics in Intermediate Algebra |
| **Montgomery College** | Elements of Statistics Support |
| | Survey of College Mathematics Support |
| | Elements of Mathematics 1 Support |
| | Foundations of Algebra Support |
| | Foundations of Algebra |
| | Foundations of Mathematical Reasoning |
| | Introduction to Trigonometry |
| **Prince George's Community College** | Fundamental Mathematics with Pre-Algebra |
| | Introductory Algebra |
| | Foundations of Math Reasoning |
| | Intermediate Algebra |
| | Principles for Applied College Algebra |
| **Wor-Wic Community College** | Pre-Statistics |
| | Pre-Algebra |
| | Elementary Algebra |
| | Intermediate Algebra |

### Exhibit B4. Course Inventory: First-Year Credit-Bearing Math

| College | Course title |
|---|---|
| **Allegany College of Maryland** | College Algebra |
| **Anne Arundel Community College** | The Nature of Mathematics |
| | College Algebra |
| | Statistics |
| **Baltimore City Community College** | College Algebra and Trigonometry |
| | Precalculus I: College Algebra |
| | Modern Elementary Statistics |

| College | Course title |
|---|---|
| **Carroll Community College** | Introduction to College Mathematics |
| | College Algebra |
| | Intro to Statistical Methods |
| | Geometry |
| **Cecil College** | Technical Math |
| | Topics in Mathematics Literacy |
| | Introduction to Statistics |
| | Mathematics Concepts & Structure I |
| | Precalculus |
| **Chesapeake College** | Foundations of Mathematics |
| | Finite Mathematics |
| | College Algebra |
| | Precalculus |
| | Intro to Applied Calculus |
| | Intro to Statistics |
| **College of Southern Maryland** | Quantitative Literacy and Reasoning |
| **Community College of Baltimore County** | Finite Mathematics and Modeling |
| **Frederick Community College** | Foundations of Mathematics |
| | Foundations of Mathematics with Algebra |
| | Statistics |
| | Statistics with Algebra |
| | Statistics with Probability |
| | College Algebra |
| | College Algebra with Support |
| **Garrett College** | College Algebra |
| | Pre-Calculus |
| **Hagerstown Community College** | Fundamental Concepts of Mathematics I |
| | Fundamental Concepts of Mathematics II |
| | Statistics |

| College | Course title |
|---|---|
| | Introduction to Applied Algebra |
| | Quantitative Reasoning |
| | Precalculus I |
| **Harford Community College** | College Algebra |
| | Contemporary Mathematics |
| | Trigonometry |
| | Precalculus Mathematics |
| | Concepts in Mathematics I |
| **Howard Community College** | Concepts of Math 1 |
| | Mathematical Literacy |
| | Statistics |
| | College Algebra |
| | Precalculus I |
| | Precalculus I & II |
| **Montgomery College** | Elements of Statistics |
| | Survey of College Mathematics |
| | Elements of Mathematics I |
| | Precalculus |
| **Prince George's Community College** | Mathematical Ideas |
| | Applied College Algebra |
| | Precalculus Part I |
| **Wor-Wic Community College** | Mathematical Applications |
| | Fundamental Concepts I |
| | Fundamental Concepts II |

### Exhibit B5. Course Inventory: First-Year Credit-Bearing Science

| College | Course title |
|---|---|
| **Allegany College of Maryland** | General Biology I |
| | Inquiries in Physical Science I |
| **Cecil College** | General Biology |
| | General Physical Science with Lab |
| **Chesapeake College** | Fundamentals of Biology |
| | Physical Science |
| **Frederick Community College** | Fundamental Concepts of Biology |
| | Physical Sciences |
| **Garrett College** | Principles of Biology |
| **Hagerstown Community College** | Unity and Diversity of Living Things |
| | Human Biology |
| | General Physical Science |
| **Harford Community College** | Fundamentals of Biology |
| | Physical Science I |
| **Montgomery College** | General Biology |
| | Physical Science 1 |
| **Wor-Wic Community College** | Fundamentals of Biology |
| | Physical Science |

# Appendix C. Focus Groups

## Postsecondary Education Focus Group Additional Details

### Exhibit C1. Number of Participants by Subject Area in the Postsecondary Focus Groups

| Subject area | Number of participants |
|---|---|
| English Language Arts | 6 |
| Math | 6 |
| Science | 7 |
| Career and Technical Education | 5 |
| Developmental Education | 6 |
| **Total** | **30** |

### Exhibit C2. Number of Participants by Institution Type in the Postsecondary Focus Groups

| Institution type | Number of participants |
|---|---|
| Public 2-year (community colleges) | 16 |
| Public 4-year | 11 |
| Private 4-year (state-aided independent institutions) | 2 |
| High school | 1 |
| **Total** | **30** |

## Postsecondary Education Focus Group Protocol

### Maryland College and Career Readiness Empirical Study

**Postsecondary Faculty College and Career Readiness Expectations**

Interviewer:

Participants/Institution:

Date/Time:

**Introduction:**

Thank you all for agreeing to participate in this focus group. I am _____ and also on the call is _____. We work for the American Institutes for Research, or AIR, an independent, non-profit research organization that, in partnership with the Maryland State Department of Education, is conducting a study on the skills, knowledge, and abilities required of students to be college and career ready under the *Blueprint for Maryland's Future.* The *Blueprint* defines an initial standard for college and career readiness, or CCR, which aims to ensure that students are leaving high school prepared to be successful and directs this study to be completed to help determine the long-term CCR Standard.

As part of this study, AIR is completing several data collection activities, including gathering publicly available information about course requirements and expectations and conducting focus groups with faculty and staff from Maryland's postsecondary institutions and with members of the K–12 and workforce communities. We will synthesize and analyze the information across the data sources and create a report that will be shared with the Maryland State Department of Education, or MSDE, and the Maryland State Board of Education to articulate postsecondary readiness expectations for Maryland high school graduates.

You were invited to attend this focus group because you submitted a form to us to express your interest in participating. The purpose of today's focus group is for you to share your perspective on college and career readiness—and what it means for your students. This information will help MSDE and the State Board make improvements to the readiness standards for high school students.

Everything you share in this focus group will be kept confidential, and we encourage you to share freely and openly. In our report, we will not share any participant or institution names, or other information that would allow anyone to identify you. At most, we may attribute findings to institution type, for example, community college or four-year institution, and role, for example, faculty or staff. We also ask that you keep our conversation in this focus group confidential.

Today's focus group will take about an hour. Participation in this focus group is voluntary. You may choose to answer or not answer any question and may leave the focus group at any time without any consequences.

Are there any questions before we proceed? [*Interviewer: Wait for responses]*

Do I have everyone's consent to participate in the interview? [*Interviewer: Wait for responses]*

We would like to request your permission to record the focus group to assist us with our note taking. We will use the recording only for our data collection and will not give access to anyone

outside of the research team. Any references to names, institutions, or other identifiable information will not be used in the reporting.

Do I have everyone's consent to record? [Interviewer: If everyone says yes, begin recording and note the date, time, and participants of the session]

| Question | Notes | RQ |
|---|---|---|
| **Participant Introductions (8 Minutes)**<br>*First, we want to hear a little about you and your backgrounds.* | | |
| 1. Please introduce yourselves by stating your name, your institution, and …<br><br>*[Interviewer to use the following that matches the population in the focus group]*<br>a. what entry-level course(s) you teach? *[or]*<br>b. how you are associated to the certificate-granting program at your institution?<br>[CHATBOX]<br><br>*[Interviewer: If you have enough time ask the following question]*<br><br>2. What is one thing you are proud of about your institution? | | N/A |
| **Course Readiness (40 Minutes)**<br>*Thank you, all, for those introductions. We will now move forward with our questions regarding the readiness expectations of students exiting high school and entering college. To help you further understand what we mean by readiness, please view the screen to see a few options that showcase readiness via skills or knowledge.* [Interviewer: Share screen and allow a few minutes for participants to view slide.] | | |
| 3. What **skills and knowledge do you expect** of students who are college and career ready?<br><br>Probes: What abilities or background knowledge do you expect your students, entering college, to have to successfully engage with the content of your entry-level course(s)/training programs?<br><br>How would you describe a successful student in your entry-level course(s)/training programs? | | RQ1<br>RQ2 |

| Question | Notes | RQ |
|---|---|---|
| 4. Upon entering your entry-level course(s)/training programs, to what extent do students **meet those expectations** for readiness? Generally, about what share of students meet those expectations? *[Interviewer: If there are nonteaching staff in your focus group, add:* "If you are not in an instructional role, think about whether the students you work with are meeting expectations."]<br><br>Probe: For students who are not meeting expectations for readiness, what skills, abilities, or background knowledge would they benefit from developing? | | RQ1<br>RQ2 |
| 5a. What are the **prerequisites** for your entry-level course(s)/training programs, if any? *(e.g., courses, GPA)*<br><br>5b. What **placement tests or other measures** are used to place students in your entry-level course(s)/training programs? *(e.g., ACCUPLACER)*<br><br>5c. To what extent do you think these prerequisites and placement tests or other measures **align** with your entry-level courses'/training programs' learning objectives? Can you give us examples?<br><br>5d. To what extent do you feel the **prerequisites and placement tests or other measures reflect what is needed** to succeed in your entry-level course(s)/training programs? | | RQ3<br>RQ4 |
| 6a. To what extent do you feel that entry-level course/training program prerequisites or requirements for enrollment can be **barriers** to access or success for some students? Can you share an example?<br><br>6b. To what extent do you think first-year students **understand that some** | | RQ9 |

| Question | Notes | RQ |
|---|---|---|
| **prerequisites may not be college credit-bearing**?<br><br>Probe: Have you had any experiences with students that suggest that the current prerequisite arrangement is inequitable? | | |
| 7. Thinking generally about students who are entering college, to what extent do you think existing **policies related to college and career readiness expectations can be barriers** to student success? To what extent do you think they can support or facilitate student success? | **Skip if answered before.** | RQ9 |
| **Course Design (12 Minutes)**<br>*Thank you for all the information on course readiness. Now I am going to ask a few questions about your approach to teaching and learning in your courses.* | | |
| 8a. What are the **learning objectives** of your entry-level college course(s)/training programs? [CHATBOX]<br><br>8b. Do you ever **adjust/alter the learning objectives or curriculum to meet the needs** of your students? If so, can you share an example?<br><br>Probe: To what extent does your entry-level course design incorporate teaching students learning techniques such as time management, test-taking skills, note-taking skills, collaborative learning, and technology proficiency? Can you give us examples? | | RQ1<br>RQ2 |
| 9. What are some **strategies you engage in to be considerate of diversity, equity, and inclusion**? Can you give us examples? | | RQ9 |

| Question | Notes | RQ |
|---|---|---|
| 10a. In 2022, Maryland passed the "Transfer with Success" law that states that every credit-bearing community college course must transfer to a 4-year university. To what extent do you think 2-year and 4-year course expectations are aligned?<br><br>10b. To what **extent has this law impacted the way you design your entry-level course/training programs content and materials**? How so? | | RQ1<br>RQ2 |
| **Wrap-Up (5 Minutes)**<br>*That brings us to the conclusion of the focus group.* | | |
| 11. Before we end the call, is there anything we have not covered but is important for me to know? | | |

Thank you all for your participation today. To quickly debrief our conversation, we discussed college and career readiness expectations of incoming college students, prerequisites and requirements of courses, and the entry-level postsecondary courses and certificate-granting postsecondary training programs. As a reminder, this information will help the State Board make improvements to the readiness standards for high school students. You should expect a report to be made public by September 1, 2023. If you have any additional questions, please feel free to contact Lillianna Franco Carrera at lcarrera@air.org.

## Workforce Focus Group Protocol

# Maryland College and Career Readiness Empirical Study

**Workforce—College and Career Readiness Expectations**

Interviewer:

Participants/Institution:

Date/Time:

**Introduction:**

Thank you all for agreeing to participate in this focus group. I am _____ and also on the call is _____. We work for the American Institutes for Research, or AIR, an independent, non-profit research organization that, in partnership with the Maryland State Department of Education, is conducting a study on the skills, knowledge, and abilities required of students to be college and career ready under the *Blueprint for Maryland's Future.* The *Blueprint* defines an initial standard for college and career readiness, or CCR, which aims to ensure that students are leaving high school prepared to be successful and directs this study to be completed to help determine the long-term CCR Standard.

As part of this study, AIR is completing several data collection activities, including gathering publicly available information about course requirements and expectations and conducting focus groups with faculty and staff from Maryland's postsecondary institutions and with members of the K–12 and workforce communities. We will synthesize and analyze the information across the data sources and create a report that will be shared with the Maryland State Department of Education, or MSDE, and the Maryland State Board of Education to articulate postsecondary readiness expectations for Maryland high school graduates.

You were invited to attend this workforce focus group because you submitted a form to us to express your interest in participating. The purpose of today's focus group is for you to share your perspective on college and career readiness—and what it means for your business or organization. This information will help MSDE and the State Board make improvements to the readiness standards for high school students.

Everything you share in this focus group will be kept confidential, and we encourage you to share freely and openly. In our report, we will not share any participant or organization names, or other information that would allow anyone to identify you. At most, we may attribute

findings to organization type, for example, different industries. We also ask that you keep our conversation in this focus group confidential.

Today's focus group will take about an hour. Participation in this focus group is voluntary. You may choose to answer or not answer any question and may leave the focus group at any time without any consequences.

Are there any questions before we proceed? [*Interviewer: Wait for responses]*

Do I have everyone's consent to participate in the interview? [*Interviewer: Wait for responses]*

We would like to request your permission to record the focus group to assist us with our note taking. We will use the recording only for our data collection and will not give access to anyone outside of the research team. Any references to names, organizations, or other identifiable information will not be used in the reporting.

Do I have everyone's consent to record? [*Interviewer: If everyone says yes, begin recording and note the date, time, and participants of the session*]

| Question | Notes | RQ |
|---|---|---|
| **Participant Introductions (8 Minutes)**<br>*First, we want to hear a little about you and your backgrounds.* | | |
| 1. Please introduce yourselves. Use the Chatbox to share your name, your business or organization, and the context of your typical interactions with high school graduates (for example as a supervisor). | | N/A |
| **Career Readiness (40 Minutes)**<br>*Thank you, all, for those introductions. We will now move forward with our questions regarding the readiness expectations of students exiting high school and entering the workforce. To help you further understand what we mean by readiness, please view the screen to see a few options that showcase readiness via skills or knowledge.* [Interviewer: Share screen and allow a few minutes for participants to view slide] *The left-hand column references college-ready skills and the right-hand column references career-ready skills. With our focus today on entry-level staff straight out of high school, there may be characteristics in both columns that seem relevant at entry.* | | |
| 3. What **skills and knowledge do you expect** of your entry-level staff who are coming straight out of high school that shows they are career ready?<br><br>Probes: What abilities or background knowledge do you expect those joining your | | RQ1 and RQ2 but for different outcomes: Entry-level training programs and roles |

| Question | Notes | RQ |
|---|---|---|
| organization to have to be successful in your entry-level training programs and roles?<br><br>How would you describe a successful individual during your entry-level training programs and afterward, in entry-level roles? | | |
| 4. In your experience, what proportion of those entry-level staff **meet your expectations** for readiness when they enter your entry-level training program?<br><br>Probe: For individuals who are not meeting expectations for readiness, what skills, abilities, or background knowledge would they benefit from developing? | | RQ1 and RQ2 but for different outcomes: Entry-level training programs and roles |
| PLEASE USE THE CHATBOX TO RESPOND TO THESE QUESTIONS:<br>5a. What are the **prerequisites or requirements** for your entry-level training programs, if any? *(Examples are specific courses and high school GPA.)*<br><br>5b. What **placement tests or other measures** are used to place individuals in your entry-level training programs or roles? *(Examples are pre-employment tests.)*<br><br>5c. To what extent do you think these prerequisites and placement tests or other measures **align** with your entry-level training program learning objectives and role needs? Can you give us examples? | | RQ3 and RQ4 but for different outcomes: Entry-level training programs and roles |
| 6a. To what extent do you feel that entry-level training program prerequisites or selection/placement tests can be unfair **barriers** to access or success for some individuals? Can you share an example? | | RQ9 |
| 7. Are there any state **policies related to college and career readiness expectations that can be barriers** to individual success? To | **Skip if answered before.** | RQ9 |

| Question | Notes | RQ |
|---|---|---|
| what extent do you think they can support or facilitate individual success? | | |
| **Training Course Design (12 Minutes)**<br>*Thank you for all the information on readiness. Now I am going to ask a few questions about your approach to development for entry-level roles.* | | |
| 8a. What are the **learning objectives** of your entry-level training programs? [CHATBOX]<br><br>8b. Do you ever **adjust/alter the training program learning objectives or curriculum to meet the needs** of your staff? If so, can you share an example? | | RQ1 and RQ2 but for different outcomes: Entry-level training programs and roles |
| 9. What **strategies do you use to be considerate of diversity, equity, and inclusion**? Can you give us examples? | | RQ9 |
| **Wrap-Up (5 Minutes)**<br>*That brings us to the conclusion of the focus group.* | | |
| 11. Before we end the call, is there anything we have not covered but is important for me to know? | | |

Thank you all for your participation today. To quickly debrief our conversation, we discussed your college and career readiness expectations of incoming individuals; prerequisites and requirements for training programs and roles; and related diversity, equity, and inclusion strategies. As a reminder, this information will help the State Board make improvements to the readiness standards for high school students. You should expect a report to be made public by September 1, 2023. If you have any additional questions, please feel free to contact Lillianna Franco Carrera at lcarrera@air.org.

## Grades K–12 Education Focus Group Protocol

# Maryland College and Career Readiness Empirical Study

**Grades K–12—College and Career Readiness Expectations**

Interviewer:

Participants/Institution:

Date/Time:

**Introduction:**

Thank you all for agreeing to participate in this focus group. I am _____ and also on the call is _____. We work for the American Institutes for Research, or AIR, an independent, non-profit research organization that, in partnership with the Maryland State Department of Education, is conducting a study on the skills, knowledge, and abilities required of students to be college and career ready under the *Blueprint* for Maryland's Future. The *Blueprint* defines an initial standard for college and career readiness, or CCR, which aims to ensure that students are leaving high school prepared to be successful and directs this study to be completed to help determine the long-term CCR Standard.

As part of this study, AIR is completing several data collection activities, including gathering publicly available information about course requirements and expectations and conducting focus groups with faculty and staff from Maryland's postsecondary institutions and with members of the K–12 and workforce communities. We will synthesize and analyze the information across the data sources and create a report that will be shared with the Maryland State Department of Education, or MSDE, and the Maryland State Board of Education to articulate postsecondary readiness expectations for Maryland high school graduates.

You were invited to attend this workforce focus group because you submitted a form to us to express your interest in participating. The purpose of today's K–12 focus group is for you to share your perspective on college and career readiness—and what it means for your students. This information will help MSDE and the State Board make improvements to the readiness standards for high school students.

Everything you share in this focus group will be kept confidential, and we encourage you to share freely and openly. In our report, we will not share any participant or organization names, or other information that would allow anyone to identify you. At most, we may attribute

findings to school type. We also ask that you keep our conversation in this focus group confidential.

Today's focus group will take about an hour. Participation in this focus group is voluntary. You may choose to answer or not answer any question and may leave the focus group at any time without any consequences.

Are there any questions before we proceed? [*Interviewer: Wait for responses]*

Do I have everyone's consent to participate in the interview? [*Interviewer: Wait for responses]*

We would like to request your permission to record the focus group to assist us with our note taking. We will use the recording only for our data collection and will not give access to anyone outside of the research team. Any references to names, organizations, or other identifiable information will not be used in the reporting.

Do I have everyone's consent to record? [*Interviewer: If everyone says yes, begin recording and note the date, time, and participants of the session*]

| Question | Notes | RQ |
|---|---|---|
| **Participant Introductions (5 Minutes)**<br>*First, we want to hear a little about you and your backgrounds.* | | |
| 1. Please introduce yourselves. Use the Chatbox to share your name, your school and/or district, and the courses you teach. | | N/A |
| **Course and Career Readiness (40 Minutes)**<br>*Thank you, all, for those introductions. We will now move forward with our questions regarding the readiness expectations of students exiting high school and entering college or the workforce. To help you further understand what we mean by readiness, please view the screen to see a few options that showcase readiness via skills or knowledge.* [Interviewer: Share screen and allow a few minutes for participants to view slide] *The left-hand column references college-ready skills and the right-hand column references career-ready skills.* | | |
| 2. What **skills and knowledge do you expect** of students who are college and career ready?<br><br>Probes: What abilities or background knowledge do you expect those joining the workforce or college to have to be successful in industry entry-level training programs, roles, or college courses? | | RQ1<br>RQ2 |

| Question | Notes | RQ |
|---|---|---|
| 3. By the end of high school, what proportion of your students meet your expectations for college and career readiness? | | RQ3<br>RQ4 |
| 4. In your experience, what proportion of high school students at the end of 10th grade **meet your readiness expectations when entering an additional program?** For example, when they enter industry entry-level training programs, roles, or college courses?<br><br>Probe: For individuals who are not meeting expectations for readiness, what skills, abilities, or background knowledge would they benefit from developing? | ***[Bigger picture is by end of high school; don't get hung up on 10th grade.]*** | RQ1<br>RQ2 |
| 5. To what extent do 10th-grade readiness expectations affect opportunities in 11th or 12th grade (e.g., access to dual enrollment)? | | RQ9 |
| **Barriers & Strategies (10 Minutes)**<br>Thank you for answering these questions regarding readiness. Now we will be focusing on barriers and strategies for equity. | | |
| 6a. Are there any state **policies related to college and career readiness expectations that can be barriers** to individual success?<br><br>6b. To what extent do you think they can support or facilitate individual success? | **Skip if answered before.** | RQ9 |
| 7. To what extent do you feel that any of the following may be unfair barriers to access or success for some individuals?<br>• Entry-level course/training program prerequisites<br>• Requirements for enrollment<br>• Selection/placement tests<br><br>Can you share an example? | | RQ9 |
| 8. What **strategies do you use to be considerate of diversity, equity, and inclusion**? Can you give us examples? | | RQ9 |
| **Wrap-Up (5 Minutes)**<br>*That brings us to the conclusion of the focus group.* | | |

| Question | Notes | RQ |
|---|---|---|
| 9. Before we end the call, is there anything we have not covered but is important for me to know? | | |

Thank you all for your participation today. As a reminder, this information will help the State Board make improvements to the readiness standards for high school students. You should expect a report to be made public by September 1, 2023. If you have any additional questions, please feel free to contact Lillianna Franco Carrera at lcarrera@air.org.

# Appendix D. Alignment Review Materials, Alignment Index, and Alignment Tool

To conduct the alignment review, AIR drafted review materials, developed an alignment index to qualitatively code content and rigor, created an alignment tool to support the alignment review, convened reviewers and facilitated alignment sessions, and analyzed the data from the alignment sessions. An overview of the review materials, alignment index, and alignment tool follows.

## Maryland CCR Standard for Content Areas Included in Alignment Review

Exhibit D2 outlines the ELA and math academic standards used to conduct the alignment review and a short rationale for their inclusion.

### Exhibit D1. Content Area Standards in the Maryland CCR Standard Included in the Alignment

| Content area | Course content standards | Rationale |
|---|---|---|
| **ELA** | Grade 9/10 Standards | The *Blueprint* sets the expectation that students are college and career ready by the end of Grade 10. |
| **Math** | Algebra I, Algebra II, Geometry, Statistics Standards | The *Blueprint* outlines multiple potential math pathways for students to meet the CCR Standard by Grade 10, all of which include either Algebra I, Algebra II, or geometry. We also included statistics in the review since the number of students who enroll in college statistics courses as their first-year credit-bearing course is substantial. |

## Alignment Tool and Note-Taking Tool

AIR developed a coding template called the Alignment Tool to guide reviewers through the alignment process and create a space for each reviewer to independently rate alignment. Reviewers select a rating for each standard that best represents the extent to which there is evidence of content alignment and rigor alignment between the conceptual framework for postsecondary education and/or course content and the Maryland CCR Standard.

The Alignment Tool includes a field for reviewers to provide a narrative justification for their rating (e.g., evidence of alignment and/or misalignment) as well as any general comments about the standard or course content expectations. AIR also created a Note-Taking Tool for reviewers to capture notes and thoughts during the alignment review but prior to entering any final information in the Alignment Tool.

## Reviewers and Alignment Sessions

AIR and its partner, CALCO, identified a set of reviewers with relevant expertise and experience to conduct the alignment reviews. Given that the findings from the ELA and math alignment reviews would also be used to ground the science and workforce alignment reviews, we identified a larger number of reviewers for those content areas to ensure a diversity of experience and perspectives contributed to the findings. Exhibit D4 lists the reviewers for each content area and their organizational affiliation. Additional information about the background and expertise for each reviewer follows.

### Exhibit D2. Alignment Reviewers

| ELA reviewers | Math reviewers | Science and workforce reviewers |
|---|---|---|
| Lori Belzman, CALCO | Alka Arora, AIR | Tori Cirks, AIR |
| Christina Davis, AIR | Christy Brooks, AIR | Marissa Sprang, AIR |
| Courtney Gross, AIR | Beverly Gilbert, CALCO | Alka Arora, AIR |
| LaSantra Ledet, CALCO | Tami Hocker, CALCO | Cory Stai, AIR |
| Nara Nayar, AIR | Amanda Mickus, AIR | |
| Jasmine Park, AIR | Treshonda Rutledge, AIR | |
| Cory Stai, AIR | Kerry Vieth, AIR | |

## Alignment Reviewer Biographies

### *Math Reviewers*

**Alka Arora, PhD,** is a senior researcher at AIR with more than 20 years of experience in national and international assessments. She has served as senior STEM expert and technical advisor to the National Center for Education Statistics (NCES) and for the National Assessment of Educational Progress (NAEP), and the U.S. participation in the Trends in International Mathematics and Science Study (TIMSS) and Program for International Student Assessment (PISA) since 2013. Dr. Arora also provides support for the reporting activities for various surveys, including conducting analysis, interpreting the results, and writing reports for the stakeholders. She also undertakes research work involving secondary analysis of large-scale international (TIMSS and PISA) and national (NAEP) assessment data. Before joining AIR, Dr. Arora was the assistant research director at the TIMSS and Progress for International Reading Literacy Study (PIRLS) International Study Center at Boston College, where she had primary responsibilities to coordinate all stages of TIMSS and TIMSS Advanced assessment, including development of assessment framework, achievement items, scoring guides, data analysis, and

reporting activities. Prior to coming to the United States, she served as a high school mathematics and science teacher for a decade in India. Dr. Arora has a doctorate in educational research, measurement, and evaluation from Boston College, and she is also a certified PMP.

**Christina (Christy) Brooks, EdD,** is a technical assistance consultant at AIR. With a focus on mathematics instruction from kindergarten to twelfth grade, Dr. Brooks currently serves as a coach on the Long Beach Network for School Improvement project. In this role, she provides valuable support to middle school teacher teams, guiding them in utilizing improvement science PDSA (Plan, Do, Study, Act) cycles to enhance student mathematics achievement. Her extensive educational background encompasses various roles such as classroom teacher, instructional coach, administrator, university instructor, and state-level educational consultant. In terms of certifications, Dr. Brooks holds elementary teaching certifications in Missouri, Illinois, and Texas. Additionally, she is certified as an elementary math specialist and a Grades K–8 principal. Her educational qualifications include a doctorate in educational technology, an Education Specialist degree in instructional leadership with an Elementary Math Specialist endorsement, a Master of Education degree in curriculum and instruction, a Master of Education in educational administration, and a Bachelor of Arts degree in elementary education with a concentration in mathematics.

**Beverly Gilbert, MEd,** serves as the head of CALCO's education division, leading strategic direction and providing oversight for a variety of education and workforce development consulting projects. Prior to joining CALCO, Ms. Gilbert worked for 20 years at SIATech Charter School in multiple administrative roles, including executive director of School Engagement, national director of Professional Development, and Learning Support and Curriculum developer. In addition, Ms. Gilbert was a mathematics educator for more than 10 years. Her expansive experience includes supporting instructional professional learning, standards alignment, and the implementation of career technical education practices within all school learning environments of SIATech, including implementation of college and career pathways within a student advisory and individual learning plan system. She also implemented student agency supports including an advisory system, cohort social learning, college and career pathways, career and technical education, standards-based grading policies, and individual learning plans. She has also developed math curriculum through research of core standards and trained instructional teams on the same. In addition, she participated in the study of international math standards as part of a visiting team to schools throughout China and Japan and discussions at the International Mathematics Conference hosted in China. Ms. Gilbert has a Bachelor of Science in mathematics from Wheaton College and master's in education and teaching from Point Loma Nazarene University, as well as numerous educational credentials.

**Tami Hocker,** EdD, is a secondary mathematics and virtual school coordinator for the School District of Manatee County, in Bradenton, Florida; and a senior subject matter expert for CALCO Consulting Group. Dr. Hocker's professional career spans 40 years in the field of secondary mathematics across seven states (Arkansas, Arizona, California, Florida, Georgia, New Mexico, and Texas). She has lived in Manatee County for 23 years, but her husband's military career and her administrator position for a nationally accredited public charter school organization contributed to the multistate experience. Dr. Hocker has 20 years of experience coordinating and writing standards-based curriculum across multiple states. Her experience spans being a teacher, computer liaison, mentor teacher, department chair, math coach, instructional specialist, curriculum specialist, curriculum coordinator, founding school board member, AdvancED/Cognia reviewer, and professional development presenter. Dr. Hocker earned her doctorate and master's degree in curriculum and instruction from Southeastern University of Florida, researching the effects of Growth Mindset instruction on at-risk students' perceptions of math, math anxiety levels, and mindset.

**Amanda Mickus** is a research associate at AIR. Her primary responsibilities include providing content expertise and research support to senior staff members on cognitive item development for NAEP Mathematics, Science, and Technology and Engineering Literacy assessments. This work improves the federally mandated assessment and establishes a better understanding to stakeholders of what U.S. students know and can do. Mickus also conducts international comparison studies and coordinates the Education Statistics Summer Internship Program. She has extensive experience in Grades K–12 mathematics instruction and assessment. Previously, Mickus was an academic designer at McGraw-Hill Education. Mickus holds a Bachelor of Science degree from Miami University and a Master of Arts degree from Georgetown University.

**Treshonda Rutledge** is a technical assistance consultant at AIR. Her primary responsibilities include coaching and providing technical training and assistance support in Grades K–12 mathematics education. Rutledge also contributes to mathematics content alignment projects. She has extensive research and practice experience in research-to-practice partnerships, mathematics teacher leadership, equitable mathematics instruction, and culturally responsive mathematics practices. Previously, Rutledge was a Grades K–12 mathematics teacher, mathematics instructional coach, personalized learning facilitator, turnaround teacher, secondary mathematics district resource teacher, clinical coordinator, and advisor for secondary mathematics preservice teachers. Rutledge is dissertating for a doctorate in mathematics education at the University of Central Florida.

**Kerry Vieth, PhD,** is a senior researcher at AIR with expertise in the design, development, and reporting of large-scale assessments, including at the international, national, and state levels. She leads the NAEP Delivery and Technology Panel, a new independent expert panel

commissioned by the NCES to offer guidance for NAEP's delivery platform and technological future. Dr. Vieth also supports NAEP assessment operations and U.S. participation in TIMSS. Prior to joining AIR, Dr. Vieth managed the TIMSS mathematics assessments at the TIMSS and PIRLS International Study Center at Boston College, including the assessment frameworks, achievement items and instruments, data reviews, scale anchoring, and content-related technical documentation. She supported TIMSS's transition to digitally based assessment in 2019, led the development of innovative scenario-based problem solving and inquiry tasks, contributed to the design and production of the TIMSS international reports, and facilitated international meetings with representatives from more than 70 participating entities. She also developed statewide summative assessment solutions and led research and assessment design activities for a through-year assessment pilot as the director of Assessment Solutions at New Meridian. Dr. Vieth earned her doctorate in measurement, evaluation, statistics, and assessment at Boston College.

### *ELA Reviewers*

**Lori Belzman** is the director of Professional Development for SIATech High Schools and a senior subject matter expert for CALCO Consulting Group. Belzman has worked in the educational field for 28 years in several roles, including secondary English teacher, 9th Grade Academy department chair, learning support specialist, curriculum coordinator, induction director, director of Professional Development, and both WASC and LCAP coordinator. She is certified as a secondary English teacher as well as in administrative services. Her degrees include a Bachelor of Arts in psychology and a Master of Education in curriculum and instruction. Over the last 22 years, she has worked across multiple states (Arkansas, Arizona, California, Florida, Georgia, and New Mexico) supporting charter schools in the areas of curriculum, instruction, compliance, accreditation, and professional learning. She has developed customized standards-based curriculum in English, social studies, and electives for at-promise students and worked with teachers to implement effective instructional practices and systems.

**Christina Davis** is a researcher at AIR. Her primary responsibilities include providing expertise in human and automated scoring as well as in printed materials and accommodation forms as the lead of the Materials Preparation, Distribution, Processing, and Scoring contract. Davis also serves as content lead for the Reading, Writing, Civics, and U.S. History assessments. Additionally, Davis serves as lead reviewer of NAEP-related OMB package submittals and provides support for digitally based assessment platform considerations. She has extensive experience in reviewing design and operations plans, proposed items and scoring rubrics, item performance data, and item sensitivity/bias. Outside of NAEP, Davis is a member of AIR's Diversity, Equity, and Inclusion Council, a PALS Reading Fuchs tutoring consultant, and a What Works Clearinghouse certified reviewer (Group Design Standards v4.1). Previously, Davis was a Response to Instruction and Intervention specialist for Grades 1–5 in Upper Darby School

District, Pennsylvania. Davis holds a Bachelor of Science in education in elementary education from West Chester University of Pennsylvania and an master's in education policy studies from George Washington University.

**Courtney Gross** is a research associate at AIR. Her primary responsibilities include supporting the NCES on the NAEP assessment operations team. Gross reviews cognitive items, item development plans, technical memos, and other documentation related to NAEP Reading activities. Additionally, she works with NCES to plan, monitor, and review Next Generation NAEP student platform functionalities and requirements. She has extensive experience in Grades K–12 ELA, reading, writing, and social studies instruction, pedological knowledge, and research. Moreover, she has experience supporting projects that specialize in assisting states with revising and implementing state social studies standards. More recently, Gross co-authored a landscape report to research and analyze the state of high-quality instructional materials in Grades K–12 social studies education. Prior to working at AIR, Gross taught ELA, social studies, and special education at the elementary school level (Grades K–6) and served as a primary literacy advisor in Jamaica with the Peace Corps. Gross holds a Bachelor of Science in secondary English education from Black Hills State University in South Dakota, and she holds a Master of Arts in curriculum and instruction from the University of Maryland.

**LaSantra Ledet** is an educational consultant at CALCO. She has prolific expertise in using Common Core State Standards to drive instruction and validate summative assessments. As a Maryland educator and instructional team leader, Ledet specifically used the Maryland College and Career Ready Standard to develop, modify, and deliver instruction, along with studying the resulting Maryland Comprehensive Assessment Program data at the state, county, and school levels to further enhance the alignment of the Maryland CCR Standard with state and county instructional mandates. As Instructional Team leader in Howard County, Maryland, Ledet was responsible for leading teams piloting curricula designed to remove socio-demographic barriers in instructional materials and assessments, and to report on the findings of these pilots. As a classroom instructor with a Maryland Reading Specialist certification, Ledet regularly employed the practice of triangulating assessments, when developing instructional goals at any level. Ledet has a professional certification in Teaching English as a Second/Other Language and as a Reading Specialist. She has her Bachelor of Elementary Education from University of Louisiana and her Master of Reading Education from Towson University.

**Nara Nayar** is a technical assistance consultant at AIR. Her primary responsibilities include leading the Indigenous Student Identification Project team, which provides backbone supports to a collective impact effort of the Indigenous Education State Leaders Network. Other recent roles include leading development of introductory workforce curriculum for the National Office of Job Corps, managing evaluation projects. She has extensive experience in career and

technical education and transitions from Grades K–12 education to college and careers. Nayar has worked in education research, evaluation, technical assistance, and policy at the state and local levels for more than 25 years; in 2016, Nayar founded a small community sexuality education program in her hometown, for which she still volunteers as board member and facilitator. She holds a master's degree in education from Stanford University.

**Bitnara Jasmine Park, PhD,** is a senior researcher at AIR, where she applies her statistical and psychometric knowledge and skills to generate valid and reliable empirical evidence to inform educational policy and practice. Her primary projects include technical review and research activities for various national and international large-scale assessments such as NAEP, administered by NCES in the U.S. Department of Education. She also serves as a reading expert on multiple projects, including publishing key reports such as the NAEP *2018 Oral Reading Fluency Report*, leading reading research studies, participating in ELA curriculum and assessment comparison studies, developing the U.S. Encyclopedia chapter and the U.S. curriculum questionnaire for the 2021 PIRLS, evaluating the effectiveness of literacy interventions and technical adequacy of literacy assessments, and developing literacy assessments for teachers. Dr. Park received her doctorate from the University of Oregon, specializing in educational assessment and quantitative methodology.

**Cory Stai, MEd,** is a senior consultant at AIR, where he provides technical assistance on evidence-based literacy instruction, curriculum development, assessment and evaluation, and organizational leadership. Stai currently works with Regional Educational Laboratory (REL) Midwest, the Lead for Literacy Center, and the Region 1 Comprehensive Center. Prior to joining AIR, he worked at the Minnesota Department of Education as the state literacy specialist, where he oversaw the data collection and technical assistance for Minnesota's third-grade reading proficiency statute, supported ELA standards implementation, and co-led the successful Striving Reader's Comprehensive Literacy grant bid and initial implementation. In addition, Stai is a former classroom teacher and reading intervention specialist. Stai holds a certification in Grades K–12 reading and a Master of Education in literacy education from the University of Minnesota.

### *Science and Workforce*

**Tori Cirks** is a principal technical assistance consultant at AIR. Her primary responsibilities include managing research and technical assistance projects and teams; designing and providing technical assistance to local, state, and federal clients to improve system outcomes; and leading work focused on continuous improvement, college and career readiness, dropout prevention, career and technical education, early college and postsecondary success, and student-centered learning models such as competency-based education and deeper learning. Currently she serves as the project director for the Early College/Innovation Pathway Program

Reviews project and as senior advisor to the Early College/Innovation Pathways Cost Analysis Study in Massachusetts. She also serves as the principal investigator for a social capital developmental evaluation funded by the Clayton Christensen Institute, and as a senior advisor to the College and Career Readiness Empirical Study in Maryland. She served as co-principal investigator (PI) of a student agency study funded by Jobs for the Future, the Nellie Mae Education Foundation, and the Overdeck Foundation, which aimed to identify instructional practices to support student agency; served as the partnership facilitator for the Iowa Technology and Learning Networked Improvement Community as part of REL Midwest; and served as the research lead for the Southwest Networked Improvement Community Partnership through REL Southwest. She served as lead for the Rural Research Alliance for REL Midwest, facilitating the development of a rural research agenda and leading regional outreach to rural stakeholders. She served as the Employability Skills lead for the Michigan Career and Technical Education Career Readiness Education System Study, a role in which she managed a team that conducted labor-market data analyses, developed employer surveys, and designed and facilitated employer focus groups. She served on the leadership team of the College and Career Readiness and Success Center as technical assistance liaison to four regional comprehensive centers, as competency-based education lead, and as outreach-dissemination task lead. Cirks holds a master's degree from American University.

**Marissa Spang** is a researcher at AIR. Her primary responsibilities include conducting research and providing subject matter expertise and technical assistance, particularly in ways that build consensual and collaborative relations with Indigenous Tribes, families, and students. She is a member of the Northern Cheyenne and Crow Nations (in Montana) and holds a master's degree in learning sciences and human development from the University of Washington. She has more than 15 years of professional experience working in urban, rural, and Tribal community settings, designing STEM learning environments for teachers and students that weave Indigenous and Western science, implementing educational systems change, and conducting program evaluation. She has worked as a PI, supervisor, and instructor in Grades K–12, higher education, and community-based systems.

## Analyzing Alignment Ratings and Justifications

To analyze the level of alignment between Maryland Grades K–12 content standards and postsecondary course content, we will aggregate the individual ratings from each reviewer separately for both content and rigor using the median rating across reviewers.

- **Content.** Using the 0–5 Alignment Index, if the median rating is a 0, the course content available was insufficient to determine alignment. If the median rating is a 1, the course content does not address the standard. If the median rating is a 2 or 3, the course

content does not align with the standard. If the median rating is 4 or 5, the course content aligns to the standard.

- **Rigor.** Using the 0–5 Alignment Index, if the median rating is a 0, the course content available was insufficient to determine alignment. If the median rating is a 1, the course content does not address the standard. If the median rating is a 2, the course content describes a lower level of cognitive expectation than the high school standard. If the median rating is a 3, the course content describes a similar level of cognitive expectation as the high school standard. If the median rating is 4 or 5, the course content describes a higher level of cognitive expectation as the high school standard.

There is no expectation that all course content will be aligned to the content of every single high school standard included in the alignment review. In fact, the underlying assumption is that all high school standards should not be fully aligned given the breadth and depth of the high school standards and the specific focus areas found on which postsecondary courses are grounded. Although we do not anticipate that each high school standard will be reflected in the developmental education and introductory course content, we plan to develop content maps to depict evidence of alignment based on the reviewer ratings and an analysis of the alignment.

In addition to the content maps, AIR will conduct a qualitative analysis of the narrative justifications reviewers provide for the ratings to identify themes related to alignment or misalignment to inform actionable recommendations.

For the alignment review, reviewers relied primarily on what was explicitly included in college course materials (e.g., course descriptions, syllabi), which varied across colleges in the level of detail provided about course content and student learning objectives. While some input was provided through stakeholder input activities, those conversations resulted in more general references to expectations related to academic content.

## About the American Institutes for Research®

Established in 1946, the American Institutes for Research® (AIR®) is a nonpartisan, not-for-profit organization that conducts behavioral and social science research and delivers technical assistance both domestically and internationally in the areas of education, health, and the workforce. AIR's work is driven by its mission to generate and use rigorous evidence that contributes to a better, more equitable world. With headquarters in Arlington, Virginia, AIR has offices across the U.S. and abroad. For more information, visit AIR.ORG.

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