Slides presented at the
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College- and Career-Ready Graduation Requirements

February 18, 2015

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NEXT GENERATION SCIENCE STANDARDS
For States, By States

College- & Career-Ready Graduation Requirements

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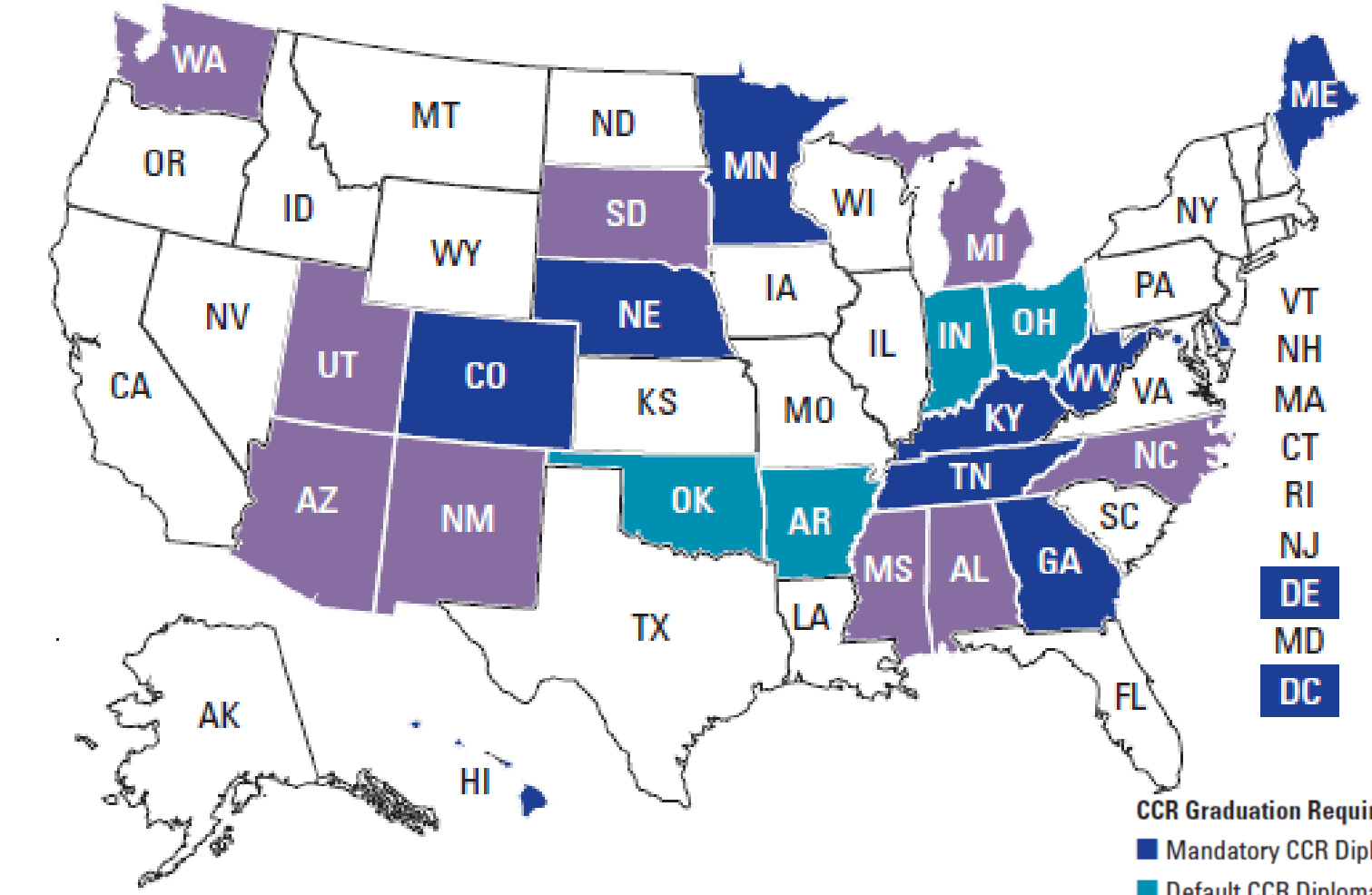
Achieve

As of 2014, 23 States and DC Have Adopted Policies that Require Students to Default Into a CCR Course of Study



CCR Graduation Requirements by Type of Requirements

- Mandatory CCR Diploma (11)
- Default CCR Diploma with Minimum Opt-Out (4)
- Default CCR Diploma with Personal Modification (9)

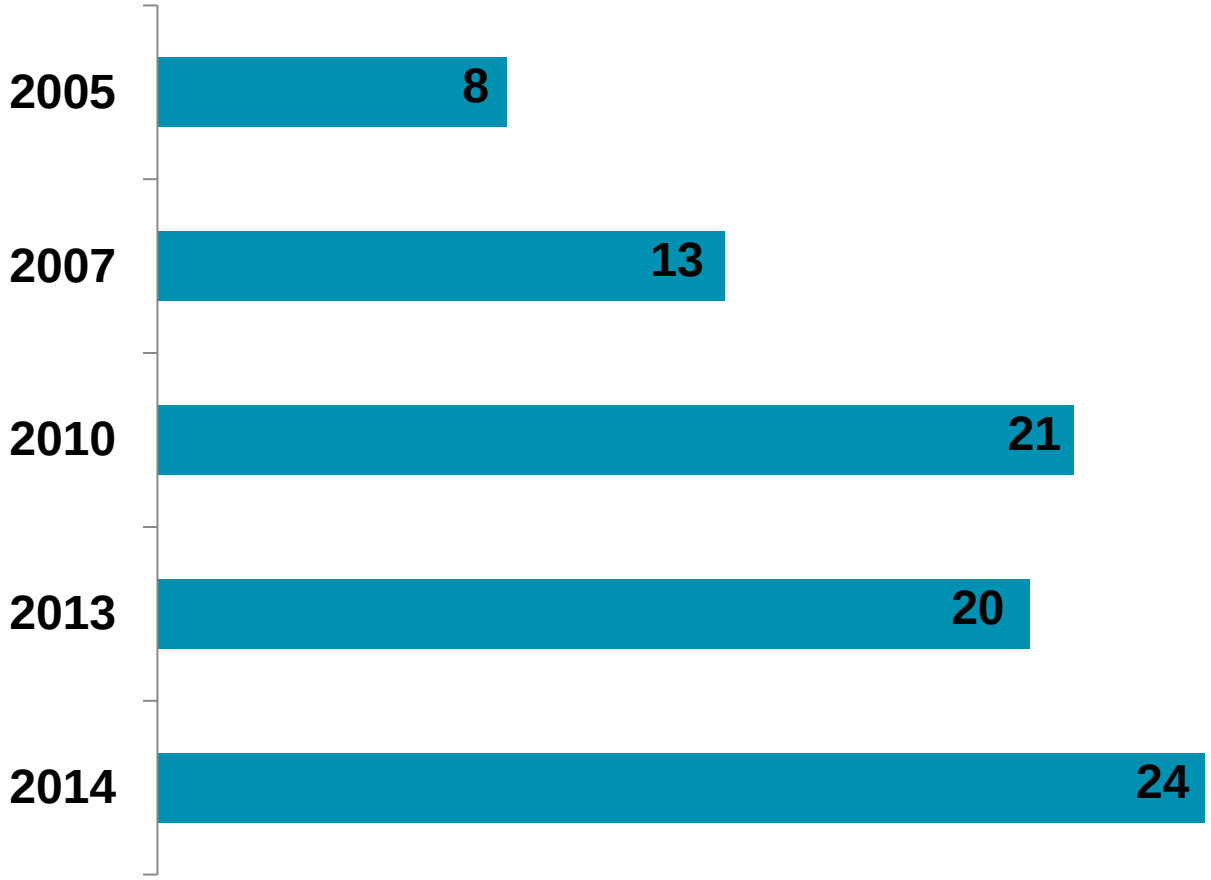
Establishing CCR Graduation Requirements

Achieve considers states' mathematics and ELA/literacy high school graduation requirements to be at the CCR level if students are expected to complete a course of study **aligned with state-adopted CCR standards**.

States have structured their CCR graduation requirements in one of two ways:

- In states with **Mandatory Requirements**, students earn a HS diploma only if they complete the required courses.
- In states with **Default Requirements**, students are automatically enrolled in the CCR curriculum in 9th grade but allowed to opt out if their parents sign a waiver. States establish a default approach in one of two ways, either with a "minimum diploma" or a "personal modification" opt-out.

State Progress on Adopting College- and Career-Ready Graduation Requirements



Science really is different

College and Career Readiness Advisory and Review Meeting

In February 2012, the NGSS team conducted a landscape analysis and convened experts in research, science education and career readiness.

Four Findings from the Landscape Analysis:

- A college- and career-ready high school curriculum includes concepts of biology, chemistry, and physics.
- It is recommended that a Career and Technical Education curriculum for all major career fields include four credits of science. Many of these include courses in biology, chemistry, physics, and earth science.
- The vast majority of flagship public universities require at least two science credits for entry into college, with a strong majority requiring at least three.
- Academic requirements for STEM careers are often more rigorous than other sectors, and the proportion of STEM careers requiring some kind of postsecondary education is expected to grow by 90 percent in 2018.

College and Career Readiness Advisory and Review Meeting

The group recommendations were:

- College and career readiness in science should result in scientific literacy as defined by the Framework.
- Students receiving instruction covering the Disciplinary Core Ideas (DCIs) from the Framework would be considered science literate at the completion of instruction.
- The messaging and focus of the NGSS should center on ensuring that all students have access to the knowledge that will give them opportunities to enter any career/college course they choose.
- Deliberate thought should be given to ensuring the NGSS contains the skills and concepts needed for entering college freshman and for entry-level certificate programs.

Recommendations were applied to the next round of revisions.

College and Career Ready State Review

In June 2012, Lead States identified teams including 2- and 4-year postsecondary education institutions and businesses to review the draft standards to determine whether proficiency in the NGSS would prepare students for success in colleges and careers.

The 135 participants represented:

- 60 colleges, universities and technical colleges/programs
- 14 hiring managers
- 7 education-based organization not affiliated with SEAs

Defining College and Career Readiness in Science…The Conversation to Date

Students need:

- To make sense of the world and approach problems not previously encountered— new situations, new phenomena, and new information
- A solid grasp of key science concepts and the ability to relate that knowledge across disciplines
- To apply and communicate that knowledge flexibly across various disciplines, proficiencies they can acquire through the continual exploration of DCIs, science and engineering practices, and crosscutting concepts

Appendix C: College and Career Readiness

*In the end, as the research shows, it is **the science and engineering practices learned in conjunction with rigorous content that best prepares students for success** in postsecondary education and careers.*

***More research is needed** around the alignment of high school and postsecondary expectations, course pathways, and **flexible options that engage** students' interests and best prepare students for postsecondary and career opportunities.*

Appendix D: All Standards, All Students

- The NGSS are intended to provide a foundation for all students, including those who can and should surpass the NGSS performance expectations.
- At the same time, the NGSS make it clear that these increased expectations apply to those students who have traditionally struggled to demonstrate mastery even in the previous generation of less cognitively demanding standards.
- Seven case studies of diverse student groups that address what classroom teachers can do to ensure that the NGSS are accessible to all students.
- Illustrate learning opportunities through connections to the NGSS and the CCSS for English language arts and mathematics as well as use of effective classroom strategies. The vignette emphasizes what teachers can do to successfully engage students in learning the NGSS.

Appendix K: Model Course Mapping in Middle and High School for the NGSS

Provides three model course maps

- Conceptual Progressions Model
- Science Domains Model
- Modified Science Domains Model

Appropriate Context

- Model course maps are starting points
- Model course map organization is built
- on the structure of the *Framework*
- All Standards, All Students
- Model course maps are not curriculum
- All practices and crosscutting concepts in all courses
- Engineering for all

COURSE 1

PS1.A	HS-PS1-1.
	HS-PS1-2.
	HS-PS1-3.
	HS-PS1-4.
PS1.B	HS-PS1-5.
	HS-PS1-6.
	HS-PS1-7.
PS2.A	HS-PS2-1.
	HS-PS2-2.
	HS-PS2-3.
PS2.B	HS-PS2-4.
	HS-PS2-5.
	HS-PS2-6.
PS3.A	HS-PS3-2.
	HS-PS3-3.
PS3.B	HS-PS3-1.
	HS-PS3-4.
PS4.A	HS-PS4-1.
	HS-PS4-2.
	HS-PS4-3.
	HS-PS4-5.
LS2.A	HS-LS2-1.
	HS-LS2-2.
ESS1.B	HS-ESS1-4.
ESS2.B	HS-ESS2-1.
	HS-ESS2-3.
ESS2.C	HS-ESS2-5.
ESS3.A	HS-ESS3-2.
ETS1.A	HS-ETS1-1
ETS1.B	HS-ETS1-3
	HS-ETS1-4
ETS1.C	HS-ETS1-2

COURSE 2

PS3.C	HS-PS3-5.
PS4.B	HS-PS4-4.
LS1.A	HS-LS1-1.
	HS-LS1-2.
	HS-LS1-3.
LS1.B	HS-LS1-4.
LS1.C	HS-LS1-5.
	HS-LS1-6.
	HS-LS1-7.
LS2.B	HS-LS2-3.
	HS-LS2-4.
	HS-LS2-5.
LS3.A	HS-LS3-1.
LS3.B	HS-LS3-2.
	HS-LS3-3.
ESS1.A	HS-ESS1-1.
	HS-ESS1-2.
	HS-ESS1-3.
ESS2.A	HS-ESS2-1.
	HS-ESS2-2.
	HS-ESS2-3.
	HS-ESS2-4.
ESS2.D	HS-ESS2-6.
ESS3.B	HS-ESS3-1.

COURSE 2 Repeats

PS3.D	HS-PS3-3.
	HS-PS3-4.
	HS-PS4-5.
	HS-LS2-5.
	HS-ESS1-1.
PS4.B	HS-PS4-3.
	HS-PS4-5.

COURSE 3

PS1.C	HS-PS1-8.
LS2.C	HS-LS2-6.
	HS-LS2-7.
LS2.D	HS-LS2-8.
LS4.A	HS-LS4-1.
LS4.B	HS-LS4-2.
	HS-LS4-3.
LS4.C	HS-LS4-4.
	HS-LS4-5.
LS4.D	HS-LS4-6.
ESS1.C	HS-ESS1-5.
	HS-ESS1-6.
ESS2.E	HS-ESS2-7.
ESS3.C	HS-ESS3-3.
	HS-ESS3-4.
ESS3.D	HS-ESS3-5.
	HS-ESS3-6.

COURSE 3 Repeats

PS1.C	*HS-ESS1-5.*
	HS-ESS1-6.
LS2.C	HS-LS2-2.
LS4.C	HS-LS4-2.
	HS-LS4-3.
	HS-LS4-6.
ESS2.D	HS-ESS2-4.
	HS-ESS2-7.
	HS-ESS3-6.
ESS3.A	HS-ESS3-1.
ETS1.A	HS-ETS1-1
ETS1.B	HS-ETS1-3
	HS-ETS1-4
ETS1.C	HS-ETS1-2

AP/IB Partnerships

Advanced Placement

- The NGSS Accelerated Model Course Pathways provide examples of how the NGSS can be tailored for accelerated students. Created by AP teachers, these models are designed to help schools and districts to envision pathways for students intending to take advanced science courses and to promote rigorous STEM pathways.

International Baccalaureate

- The NGSS IB resource is being developed by educators with expertise in both IB and the NGSS and will help schools and districts understand the similarities between the NGSS and the IB programme. In addition, it will provide guidance on how the NGSS and IB programme can work in tandem to support advanced coursework in science.

Level of specificity of graduation requirements varies within and across states

…Anywhere from unspecified requirements

to

specifying biology, chemistry and physics…

Current Science Graduation Requirements Landscape

- 5 states require all students to complete 4 units of science
- 6 states offer diplomas that require 4 units of science
- 37 states require students to complete 3 units of science
- 6 states require 2 units of science