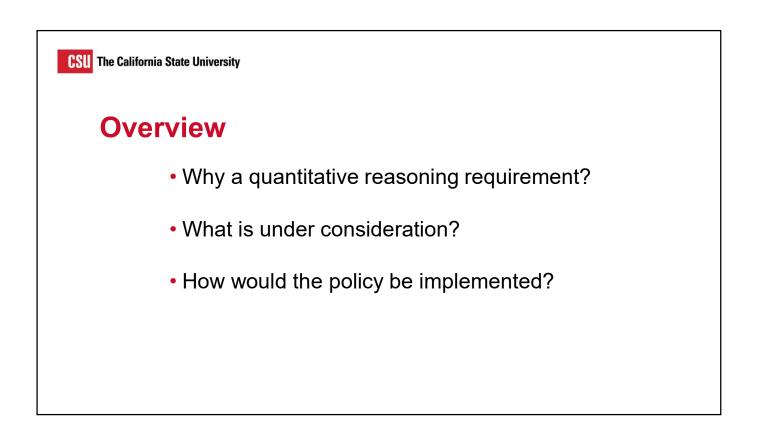**CSU** The California State University

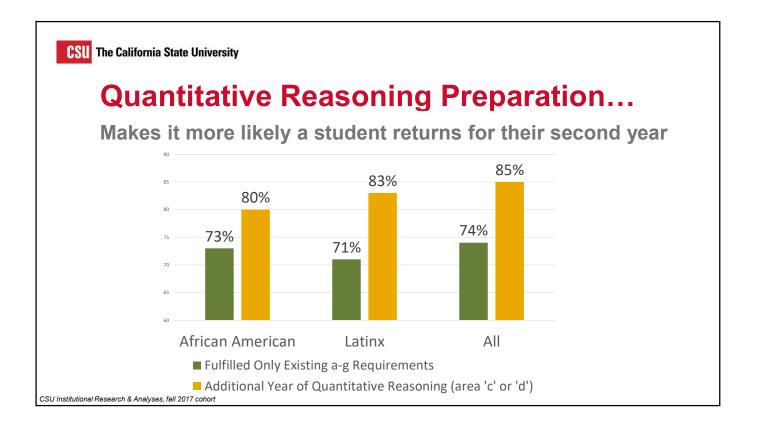# Special Public Comment Open Forum on Quantitative Reasoning Proposal

**CSU Board of Trustees
Committee on Educational Policy—Item 1
August 29, 2019**

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Overview

- Why a quantitative reasoning requirement?

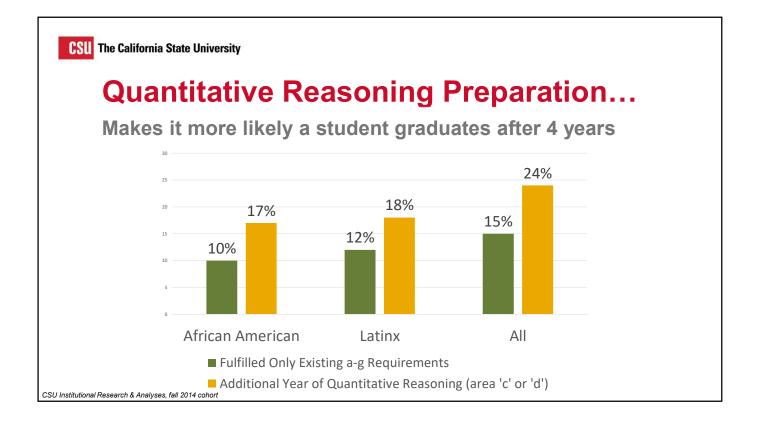- What is under consideration?

- How would the policy be implemented?

"…in this data-rich era when information from the Internet is available instantly, all students must graduate with the ability to analyze and synthesize knowledge of the world around them."

Association of American Colleges & Universities

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Quantitative Reasoning Preparation…

Makes it more likely a student returns for their second year

- Fulfilled Only Existing a-g Requirements
- Additional Year of Quantitative Reasoning (area 'c' or 'd')

CSU Institutional Research & Analyses, fall 2017 cohort

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Quantitative Reasoning Preparation…

Makes it more likely a student graduates after 4 years

Chart (fall 2014 cohort):
- African American: 10% (Fulfilled Only Existing a-g Requirements), 17% (Additional Year of Quantitative Reasoning)
- Latinx: 12%, 18%
- All: 15%, 24%

Legend:
- Fulfilled Only Existing a-g Requirements
- Additional Year of Quantitative Reasoning (area 'c' or 'd')

CSU Institutional Research & Analyses, fall 2014 cohort

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Quantitative Reasoning Preparation…

Makes it more likely a student graduates after 6 years

Chart (fall 2012 cohort):
- African American: 39%, 50%
- Latinx: 47%, 57%
- All: 50%, 62%

Legend:
- Fulfilled Only Existing a-g Requirements
- Additional Year of Quantitative Reasoning (areas 'c' or 'd')

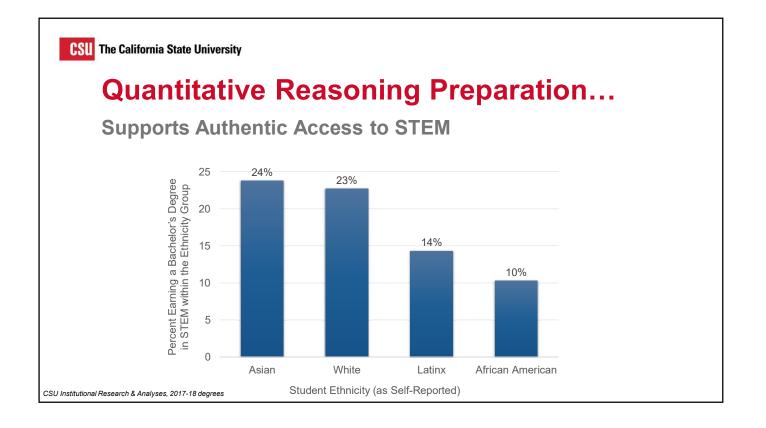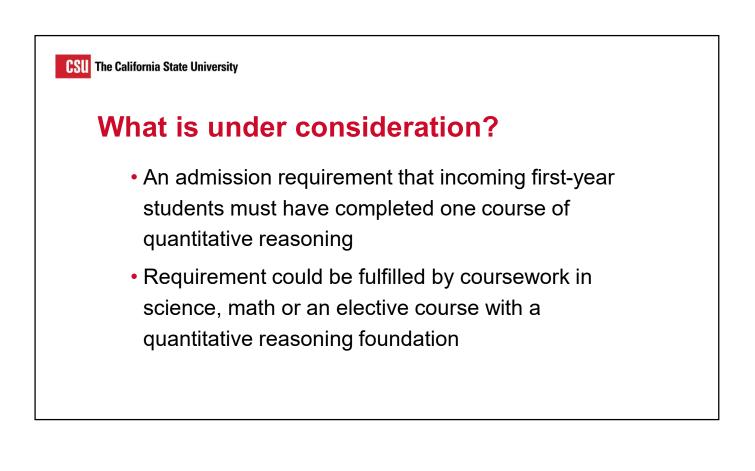*CSU Institutional Research & Analyses, fall 2012 cohort*

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Quantitative Reasoning Preparation…

Supports Authentic Access to STEM

- More than half of California high school seniors are interested in pursuing a STEM major in college
- Only 31% met the ACT benchmark for college readiness in STEM
  - 11% of Latinx high school graduates
  - 10% of African American high school graduates

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Quantitative Reasoning Preparation…

Supports Authentic Access to STEM

CSU Institutional Research & Analyses, 2017-18 degrees

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What is under consideration?

- An admission requirement that incoming first-year students must have completed one course of quantitative reasoning

- Requirement could be fulfilled by coursework in science, math or an elective course with a quantitative reasoning foundation

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Current "a-g" Requirements

Area	Subject	Courses
a.	History and Social Science	2
b.	English	4
c.	Mathematics	3
d.	Laboratory Science	2
e.	Language Other Than English	2
f.	Visual and Performing Arts	1
g.	College Preparatory Elective or an additional course from a-f	1
Total Required Courses		15

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Proposed "a-g" Requirements

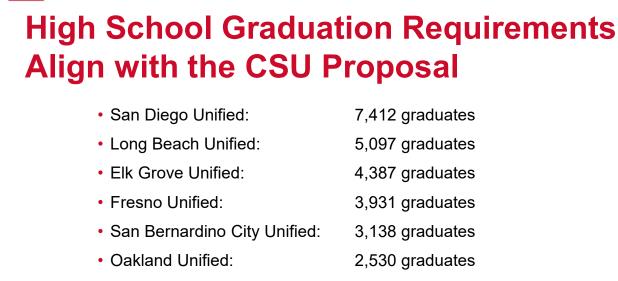| Area	Subject	Courses
a.	History and Social Science	2
b.	English	4
c.	Mathematics	3
d.	Laboratory Science	2
e.	Language Other Than English	2
f.	Visual and Performing Arts	1
g.	College Preparatory Elective or an additional course from a-f **AND a course from c, d or a quantitative reasoning course within g**	**2**
Total Required Courses		**16**

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Examples of Qualifying Courses

College Preparatory Electives (Area 'g')

- Personal Finance
- Introduction to Business
- Coding
- Robotics
- Healthcare Analysis
- Economics
- Agricultural Biology

- Veterinary Science
- Forensics
- Green Technology
- Sports Medicine
- Engineering
- Computer Science
- Game Development

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Policy would "Do No Harm"

- Many PK-12 school districts have graduation requirements that align with the CSU proposal

- All comprehensive CA high schools offer at least one qualifying course

- If a student does not have access to a qualifying course, they would receive a waiver of the requirement

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High School Graduation Requirements Align with the CSU Proposal

- San Diego Unified: 7,412 graduates
- Long Beach Unified: 5,097 graduates
- Elk Grove Unified: 4,387 graduates
- Fresno Unified: 3,931 graduates
- San Bernardino City Unified: 3,138 graduates
- Oakland Unified: 2,530 graduates
- Stockton Unified*:   2,018 graduates

*Beginning with the Class of 2023
www.ed-data.org

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High School Graduation Requirements Align with the CSU Proposal

- Baker Valley Unified: 10 graduates
- Dunsmuir Joint Union High: 15 graduates
- Shandon Joint Unified: 20 graduates
- Point Arena Joint Union High: 28 graduates
- Anderson Valley Unified: 30 graduates
- Ferndale Unified: 32 graduates
- Tulelake Basin Joint Unified: 38 graduates

www.ed-data.org

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Fortuna High School (Humboldt County)

- Sustainable Agriculture Biology
- Agriculture and Soil Chemistry
- Programming Fundamentals (dual enrollment)
- Intro to Game Development (dual enrollment)
- Anatomy
- Chemistry (Honors)
- AP Calculus A/B

- Green Technology
- Financial Management
- Pre-calculus
- Statistics/Probability
- Calculus AB
- Environmental Science
- Chemistry and Agri-science
- STEM Physics
- Statistics

AP = Advanced Placement

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River City High School (Yolo County)

- AP Calculus AB
- AP Calculus BC
- AP Computer Science
- AP Statistics
- Statistics
- Math Analysis
- Pre-Calculus
- Anatomy & Medical Terminology
- Agriculture Biology
- Farm to Fork

- Farm to Fork 2
- Medical Interventions
- Innovations in Green Technology
- Human Body Systems
- Principles of Technology
- Principles of Biomedical Science
- Physiology
- AC-DC Circuity
- Advanced Robotics Engineering
- Complementary Metal-Oxide Semiconductor Design

- Earth Science
- Forensic Science
- Intermediate Electronics
- Computer Game Design and Programming
- Introduction to Animal Science
- Digital Electronics
- Biomedical Innovation
- Engineering Design

AP = Advanced Placement

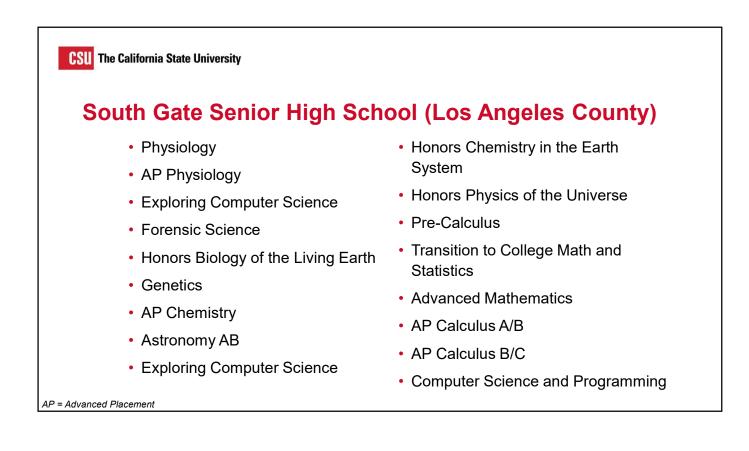**CSU** The California State University
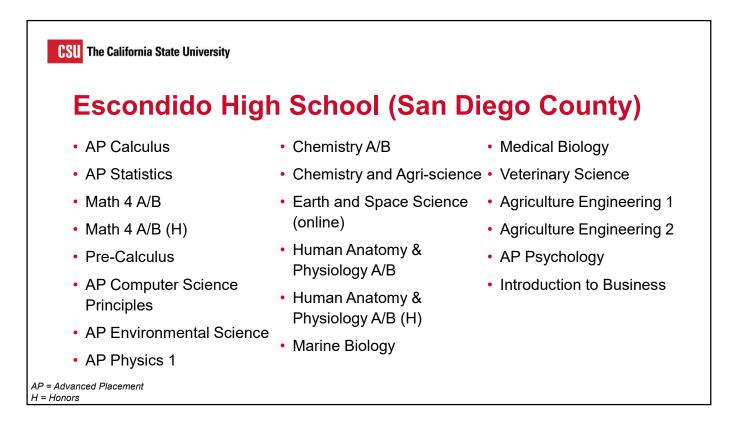
Taft Union High School (Kern County)

- AP Calculus AB
- AP Statistics
- Math Analysis
- Agricultural Soils and Chemistry
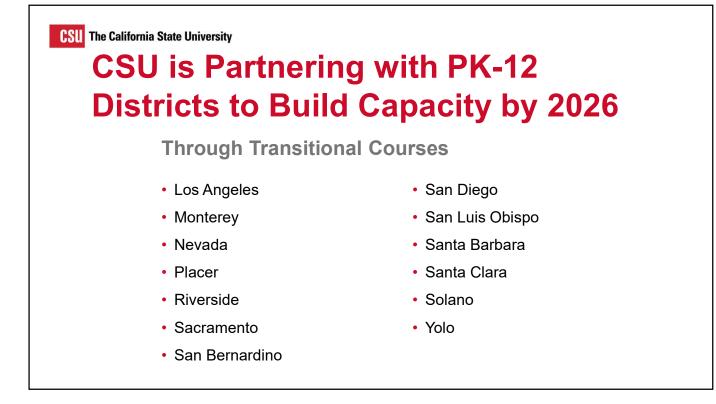- Agriculture Biology
- Physics

- Chemistry
- AP Chemistry
- Veterinary Science
- Ag Mechanics 1
- AG VET Sci II
- Agriculture Science
- Business Applications

- CDE Veterinary Science
- Horticulture & Environmental Design
- Introduction to Business & Marketing
- STEM Robotics
- STEM Robotics 2

AP = Advanced Placement

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South Gate Senior High School (Los Angeles County)

- Physiology
- AP Physiology
- Exploring Computer Science
- Forensic Science
- Honors Biology of the Living Earth
- Genetics
- AP Chemistry
- Astronomy AB
- Exploring Computer Science
- Honors Chemistry in the Earth System
- Honors Physics of the Universe
- Pre-Calculus
- Transition to College Math and Statistics
- Advanced Mathematics
- AP Calculus A/B
- AP Calculus B/C
- Computer Science and Programming

AP = Advanced Placement

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Escondido High School (San Diego County)

- AP Calculus
- AP Statistics
- Math 4 A/B
- Math 4 A/B (H)
- Pre-Calculus
- AP Computer Science Principles
- AP Environmental Science
- AP Physics 1
- Chemistry A/B
- Chemistry and Agri-science
- Earth and Space Science (online)
- Human Anatomy & Physiology A/B
- Human Anatomy & Physiology A/B (H)
- Marine Biology
- Medical Biology
- Veterinary Science
- Agriculture Engineering 1
- Agriculture Engineering 2
- AP Psychology
- Introduction to Business

AP = Advanced Placement
H = Honors

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CSU is Partnering with PK-12 Districts to Build Capacity by 2026

Through Transitional Courses

- Los Angeles
- Monterey
- Nevada
- Placer
- Riverside
- Sacramento
- San Bernardino

- San Diego
- San Luis Obispo
- Santa Barbara
- Santa Clara
- Solano
- Yolo

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CSU is Partnering with PK-12 Districts to Build Capacity by 2026

Through Transitional Courses

Course Title	Number of Schools	Students (approx.)
Transition to College Level Mathematics	8	197
Transition to College Mathematics and Statistics	48	2,131
Quantitative Reasoning with Advanced Math Topics	52	4,293
Mathematical Reasoning with Connections	48	2,963
Discrete Mathematics for Pre-College Students	12	1,204
Totals	**168**	**10,788**

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CSU is Partnering with PK-12 Districts to Build Capacity by 2026

- Investing an additional $10 million in STEM teacher preparation

- Providing in-service training and professional development

- Leveraging the CSU Center for Advancement in the Instruction of Quantitative Reasoning

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In Summary

This proposed policy…

- Provides students with flexibility

- Provides PK-12 districts support and time to prepare

- Aligns with the direction of California PK-12 education

- Ensures that no student is denied access to the CSU through matters beyond their control

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What comes next?

- **September 24-25:** Presentation of formal proposal to the board as an information item

- **November 19-20:** Presentation of formal proposal to the board for action

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www.calstate.edu