

**CPS**  
Cambridge Public Schools

**Cambridge Public Schools' Curriculum Review Cycle**

Phase 1: Analysis/Plan  
Phase 2: Develop/Create Curriculum  
Phase 3: Implementation  
Phase 4: Evaluation

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**CAMBRIDGE PUBLIC SCHOOLS' SCIENCE DEPARTMENT**

**CPS**  
Cambridge Public Schools

**PHASE I**  
Analysis/Plan

[www.cpsd.us](http://www.cpsd.us)

Activity	Purpose	Guiding Questions	Process	Desired Results	Participants
<p>Phase I: Analysis of current Curriculum/Plan Research best practices and study current practices</p>	<ul style="list-style-type: none"> <li>To reflect on critical questions</li> <li>To assess existing program using data.</li> <li>Assess current curriculum</li> <li>To identify evidence-based best practices in the discipline</li> <li>To identify the current essential learning outcomes, assessments, and instructional practices in the discipline</li> <li>To analyze the effectiveness of current practices in the discipline</li> <li>To analyze our curriculum against the district rubric for curriculum design.</li> </ul>	<ul style="list-style-type: none"> <li>What does the research tell us about teaching and learning within this discipline?</li> <li>How do our current: Enduring Understandings (EUs), Essential Questions (EQs), Learning Targets, and Assessments of Learning), instructional practices and resources align with the standards, and current research?</li> <li>Where are our gaps and overlaps?</li> <li>What is our achievement data saying about our curriculum and instructional practices?</li> <li>How can we close learning gaps and raise proficiency?</li> <li>How do we foster student independence and engagement in the curriculum?</li> <li>Is the curriculum accessible to all students?</li> <li>What supports are needed for the student to access the curriculum and be successful?</li> <li>How does our curriculum reflect Differentiation, and appropriate accommodations inclusive practices to meet the needs of all learners?</li> <li>How does our curriculum meet the 4 Cs/21st Century Skills?</li> <li>What are the common formative, summative, and performance assessments that will be used in each grade or course?</li> <li>How does our reporting structure accurately reflect student mastery of / or progress towards standards?</li> <li>What instructional materials and practices are needed for curriculum implementation?</li> <li>What is the professional development plan for implementing the intended curriculum?</li> </ul>	<ul style="list-style-type: none"> <li>Conduct a study of evidence-based best practices of curriculum and instruction in the discipline, including state and national standards, benchmark districts/schools</li> <li>Conduct a study of the current program.</li> <li>Compare and contrast the studies.</li> <li>Update and gather feedback from Principals and other Stakeholders</li> <li>Update Teaching and Learning (TLT) Team.</li> <li>Make revisions to the EUs, EQs, Learning Targets, Assessments based on the findings</li> <li>Update and gather feedback regarding EUs, EQs, Learning Targets, Assessments from the teaching staff, TLT, etc.</li> <li>Submit curriculum revision recommendations.</li> <li>After the EUs, EQs, Learning Targets, and Assessments are revised, identify potential instructional resources and pilot materials using the established criteria</li> <li>Plan and Create Roadmap for Phase II.</li> </ul>	<p>Executive Summary containing:</p> <ul style="list-style-type: none"> <li>Best practice review</li> <li>Current practice review</li> <li>Directions and beliefs</li> <li>Innovation Configuration and any other instructional practices model</li> <li>Criteria for resource selection</li> <li>Roadmap for Phase 2</li> </ul> <p>Curriculum Task Force develops the Curriculum and revises the Executive Summary to include the revised work.</p> <p>Recommendation for:</p> <ul style="list-style-type: none"> <li>Core instructional resources</li> <li>Long term professional development plan</li> <li>Budget proposal</li> </ul> <p>Pacing guide upon selection of core materials (identifies recommendations for when Enduring Understandings, Essential Questions, Learning Targets, and Assessments of Learning will be taught/assessed, materials or activities for use, and assessments to measure student learning), Evidence of Differentiation, UDL, Enrichment, and WIDA standards.</p>	<p>PreK-12 Curriculum Task Forces to be formed in spring-summer prior to year 1:</p> <ul style="list-style-type: none"> <li>Elementary, Middle, HS staff</li> <li>Special Education, Title I/ELL,</li> <li>Coordinator(s)/Administrators</li> <li>Technology</li> </ul> <p>Parent Advisory / University Partners</p>



# SPRING 2013



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# ASSEMBLED TEAM



- Teachers were recruited from across the district
- Representation includes teachers from
  - OSS
  - Library Media
  - Educational Technology
  - Elementary, middle and high school



- Four components:
  - Visioning
  - Data Analysis
  - New MA Standards
  - Understanding by Design

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# VISIONING

- Teachers unpacked the Curriculum Review Cycle rubric
- Teachers approved a Science Department Vision Statement that will drive the work
- Teachers reviewed scholarly articles on Scientific Literacy and developed a CPS definition
- Teachers collaboratively documented the expectations for student work, instructional strategies, methods of assessment and curriculum coherence



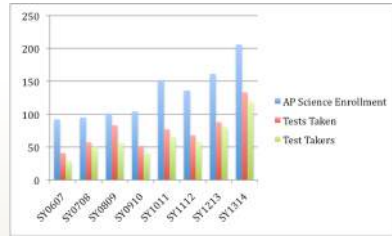
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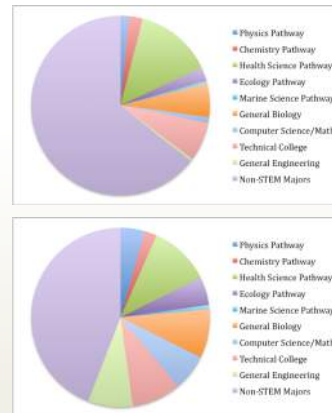


# DATA ANALYSIS

- CRLS AP Enrollment Data



- STEM Majors



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- Elective Data – Disaggregated

CRLS	51.1%	48.9%	1741
	Male	Female	SY1314 Enrollment
Exercise Science	77.8%	22.2%	9
Science Research & Intern	77.8%	22.2%	9
AP Physics B	73.9%	26.1%	23
AP Physics C E&M	70.6%	29.4%	17
AP Physics C Mechanics	69.4%	30.6%	36
Marine Biology	56.4%	43.6%	39
Astronomy	55.6%	44.4%	9
AP Chem	53.8%	46.2%	39
Epidemiology	50.0%	50.0%	16
AP Bio	48.1%	51.9%	52
Zoology	47.4%	52.6%	19
Organic Chemistry	38.5%	61.5%	13
AP ES	36.8%	63.2%	38
Marine Biology Internship	25.0%	75.0%	8
Anatomy & Physiology	22.0%	78.0%	41
Genetics	20.0%	80.0%	20
Oceanography	12.5%	87.5%	8
	10% or more under-represented		
	10% or more over-represented		

CRLS	55.2%	5.1%	39.7%	1741
	Paid	Reduced	Free	SY1314 Enrollment
AP ES	84.2%	5.3%	10.5%	38
Astronomy	77.8%	11.1%	11.1%	9
AP Bio	86.5%	1.9%	11.5%	52
Marine Biology Internship	87.5%	0.0%	12.5%	8
AP Chem	82.1%	5.1%	12.8%	39
Organic Chemistry	76.9%	7.7%	15.4%	13
AP Physics C Mechanics	80.6%	2.8%	16.7%	36
Epidemiology	75.0%	6.3%	18.8%	16
Zoology	78.9%	0.0%	21.1%	19
Science Research & Intern	77.8%	0.0%	22.2%	9
AP Physics C E&M	70.6%	5.9%	23.5%	17
Oceanography	75.0%	0.0%	25.0%	8
Marine Biology	64.1%	10.3%	25.6%	39
AP Physics B	73.9%	0.0%	26.1%	23
Exercise Science	55.6%	0.0%	44.4%	9
Genetics	55.0%	0.0%	45.0%	20
Anatomy & Physiology	46.3%	15.8%	46.3%	41
	10% or more under-represented			
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Phase I: Analysis of Current Curriculum/Planning

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# NEW MA STANDARDS

- Structure of new standards

Current MA Framework		Next Generation Science Standards	
Grade / Domain	Standard	Grade / Domain	Standard
K-2 / Physical Science	Sort objects by observable properties such as size, shape, color, weight, and texture.	1st Grade / Physical Science	Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.* [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.]

- Evaluation of alignment of current elementary content

	E.1.	L.4.	1	P.1.2	Part in K	K-2-ETS1-3.
2		2-ESS2-1.	L.2.3	K	2-PS1-1.	
		2-ESS2-2.		2-LS2-3(MA).	2-PS1-2.	
		2-ESS2-3.		2-LS4-1.	2-PS1-3.	
		2-ESS2-4(MA).			2-PS1-4.	

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# NEW MA STANDARDS

- Exploration of scientific practices
- Overlap of scientific practices and 4C's
- Evaluation of CRLS course progression
- Development of pathways at CRLS

# DEVELOPING PROFICIENCY IN UNDERSTANDING BY DESIGN

Stage I



Activity	Purpose	Guiding Questions	Process	Desired Results	Participants
<p>Phase I: Analysis of current Curriculum/Plan Research best practices and study current practices</p>	<ul style="list-style-type: none"> <li>To reflect on critical questions</li> <li>To assess existing program using data</li> <li>Assess current curriculum</li> <li>To identify evidence-based best practices in the discipline</li> <li>To identify the current essential learning outcomes, assessments, and instructional practices in the discipline</li> <li>To analyze the effectiveness of current practices in the discipline</li> <li>To analyze our curriculum against the district rubric for curriculum design.</li> </ul>	<ul style="list-style-type: none"> <li>What does the research tell us about teaching and learning within this discipline?</li> <li>How do our current: Enduring Understandings (EUs), Essential Questions (EQs), Learning Targets and Assessments of Learning), instructional practices and resources align with the standards, and current research?</li> <li>Where are our gaps and overlaps?</li> <li>What is our achievement data saying about our curriculum and instructional practices?</li> <li>How can we close learning gaps and raise proficiency?</li> <li>How do we foster student independence and engagement in the curriculum?</li> <li>Is the curriculum accessible to all students?</li> <li>What supports are needed for the student to access the curriculum and be successful?</li> <li>How does our curriculum reflect Differentiation, and appropriate accommodations inclusive practices to meet the needs of all learners?</li> <li>How does our curriculum meet the 4 Cs/21st Century Skills?</li> <li>What are the common formative, summative, and performance assessments that will be used in each grade or course?</li> <li>How does our reporting structure accurately reflect student mastery of / or progress towards standards?</li> <li>What instructional materials and practices are needed for curriculum implementation?</li> <li>What is the professional development plan for implementing the intended curriculum?</li> </ul>	<ul style="list-style-type: none"> <li>Conduct a study of evidence-based best practices of curriculum and instruction in the discipline, including state and national standards, benchmark districts/schools</li> <li>Conduct a study of the current program.</li> <li>Compare and contrast the studies.</li> <li>Update and gather feedback from Principals and other Stakeholders</li> <li>Update Teaching and Learning (TLT) Team. Make revisions to the EUs, EQs, Learning Targets, Assessments based on the findings</li> <li>Update and gather feedback regarding EUs, EQs, Learning Targets, Assessments from the teaching staff, TLT, etc.</li> <li>Submit curriculum revision recommendations.</li> <li>After the EUs, EQs, Learning Targets, and Assessments are revised, identify potential instructional resources and pilot materials using the established criteria</li> <li>Plan and Create Roadmap for Phase II.</li> </ul>	<p>Executive Summary containing:</p> <ul style="list-style-type: none"> <li>Best practice review</li> <li>Current practice review</li> <li>Directions and beliefs</li> <li>Innovation Configuration and any other instructional practices model</li> <li>Criteria for resource selection</li> <li>Roadmap for Phase 2</li> </ul> <p>Curriculum Task Force develops the Curriculum and revises the Executive Summary to include the revised work.</p> <p>Recommendation for:</p> <ul style="list-style-type: none"> <li>Core instructional resources</li> <li>Long term professional development plan</li> <li>Budget proposal</li> </ul> <p>Pacing guide upon selection of core materials (identifies recommendations for when Enduring Understandings, Essential Questions, Learning Targets, and Assessments of Learning will be taught/assessed, materials or activities for use, and assessments to measure student learning), Evidence of Differentiation, UDL, Enrichment, and WIDA standards.</p>	<p>PreK-12 Curriculum Task Forces to be formed in spring-summer prior to year 1:</p> <ul style="list-style-type: none"> <li>Elementary, Middle, HS staff</li> <li>Special Education, Title I/ELL,</li> <li>Coordinator(s)/Administrators</li> <li>Technology</li> </ul> <p>Parent Advisory / University Partners</p>



# ESSENTIAL QUESTIONS

- Developing, using and modifying JrK-12 Essential Questions organized by DCI (Disciplinary Core Idea)

District Wide	Lower Elementary	Upper Elementary	Middle School
How does where you live matter?	How does where you live matter?	Why is balance within an ecosystem essential for its sustainability?	How have human activities impacted the balance of the ecosystem in which we live?



## TRANSFER GOALS

- State the long-term accomplishments that students should be able to do with their knowledge
- Transfer goals should be thought of in the 40-40-40 rule
  - What should students be able to do in 40 days? 40 weeks? And 40 years?
- The CRIP team is working to craft JrK-12 transfer goals that address the “40 years.” Individual curriculum design teams will develop transfer goals that address the 40 days and 40 weeks

## Drafting District Wide Transfer Goals – 40 years

Students will independently use their learning to:

- Interpret, evaluate, and critique scientific claims and analyze current issues involving science or technology
- Make personal and civic decisions that are based in sound science
- Engage in sustained, complex and successful scientific inquiry
- Engage in public discourse of scientific and technical issues in the news or the community
- Make informed decisions about personal and societal use of energy

# NEXT STEPS

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Science	Phase 1: Analysis/Plan	Develop	Implement Year 1	Implement Year 2/ Monitor	Implement Year 3/ Monitor	Evaluate

- Summer of 2014: Teacher teams working to develop Stage 1 and Stage 2 of units of study at grades 1, 4, 6 and 9
- Fall of 2014: Teacher teams develop Stage 3 in preparation for budget season
- Cycle begins again for grades 2, 5, 7 and 10 in 2015-2016 and JrK/K, 3, 8, 11 and 12 in 2016-2017



# FROM THE PERSPECTIVE OF A CRIP TEACHER

- Michelle Frazier, 4<sup>th</sup> (soon to be 5<sup>th</sup>) grade teacher at the Baldwin
- Ingrid Gustafson, Instructional Technology Specialist at PAUS and RAUS
- Desiree Phillips, Special Education Teacher in the Physics Department at CRLS

