

October 2006

## **Status Report on English and Science College Readiness – Information Item**

### **Introduction**

College Readiness is a key educational strategy included in Section 8, Helping Students Make the Transition to College, of the state's *2004 Strategic Master Plan for Higher Education*. In 2005, the state legislature and the governor appropriated \$600,000 for the HECB to define college readiness in science and English.

Developing college readiness definitions is considered one important step in helping teachers of English and science, spanning K-12 and higher education, work toward an identifiable goal and imperative - preparing students for the rigors of postsecondary education and 21<sup>st</sup> century careers that increasingly require a higher level of skills and knowledge.

In defining English and science college readiness, the HECB seeks to define what is needed for students to be able to successfully complete entry-level college coursework, without remediation, in two- and four-year colleges and universities.

### **Background**

Large numbers of Washington's students graduate from high school unprepared for postsecondary education. In 2003, for example, 56 percent of students who graduated from high school enrolled in a public two- or four-year college or university within one year of graduation. Of these students, 54 percent required remediation in English or mathematics, meaning they were required to enroll in and pay for non-credit bearing courses to obtain the skills that they should have received in high school. In addition, 11 percent of students who enrolled in the state's four-year colleges within one year of high school graduation required remediation in English or mathematics.

## Project Organization and Implementation

HECB Academic Affairs staff began planning for the English and science college readiness project shortly after the 2005 legislative session. Pre-project planning included reviewing previous college readiness work such as the HECB *2000 Competency-Based Standards Report*, the Transition Math Project, the American Diploma Project (Achieve, Inc.), Standards for Success, and ACT benchmarks.

The attached organization chart illustrates the collaborative nature of the college readiness project. It includes a project coordination team, external consultants, content development teams, and expert review teams.

Project implementation to date:

- **October 12, 2005:** Project Coordination Team (PCT) convened; the PCT consists of representatives of K-12 and higher education stakeholders; see attachment.
- **January 12-13, 2006:** English and science content development teams convened for a two-day work session; these cross-sector teams were composed of 19 - 20 members – teachers and faculty representing K-12, and two- and four-year colleges and universities.
- **January-June 2006:** Following the two-day January work session, draft definitions were written and edited using an online tool accessed by content team members; online editing was followed by small group synthesis work sessions.
- **March-April 2006:** Content teams met to develop second draft of definitions in English and science, followed by online editing and small group synthesis work sessions.
- **June 27-28, 2006:** Nearly 80 teachers and faculty convened to provide feedback on a second draft of college readiness definitions in both English and science.
- **July-September 2006:** Additional online editing and synthesis produced the third draft of college readiness definitions; see attachment.
- **October 19-27, 2006:** English and science content and development teams will meet for two days (separately) to review the third draft and approve as preliminary college readiness definitions; to be field tested in an anticipated Phase II of the English and science college readiness project.

## **College Readiness Discussion**

**Attachment 1:** College Readiness Project Organization Chart

**Attachment 2:** Members, Project Coordination Team

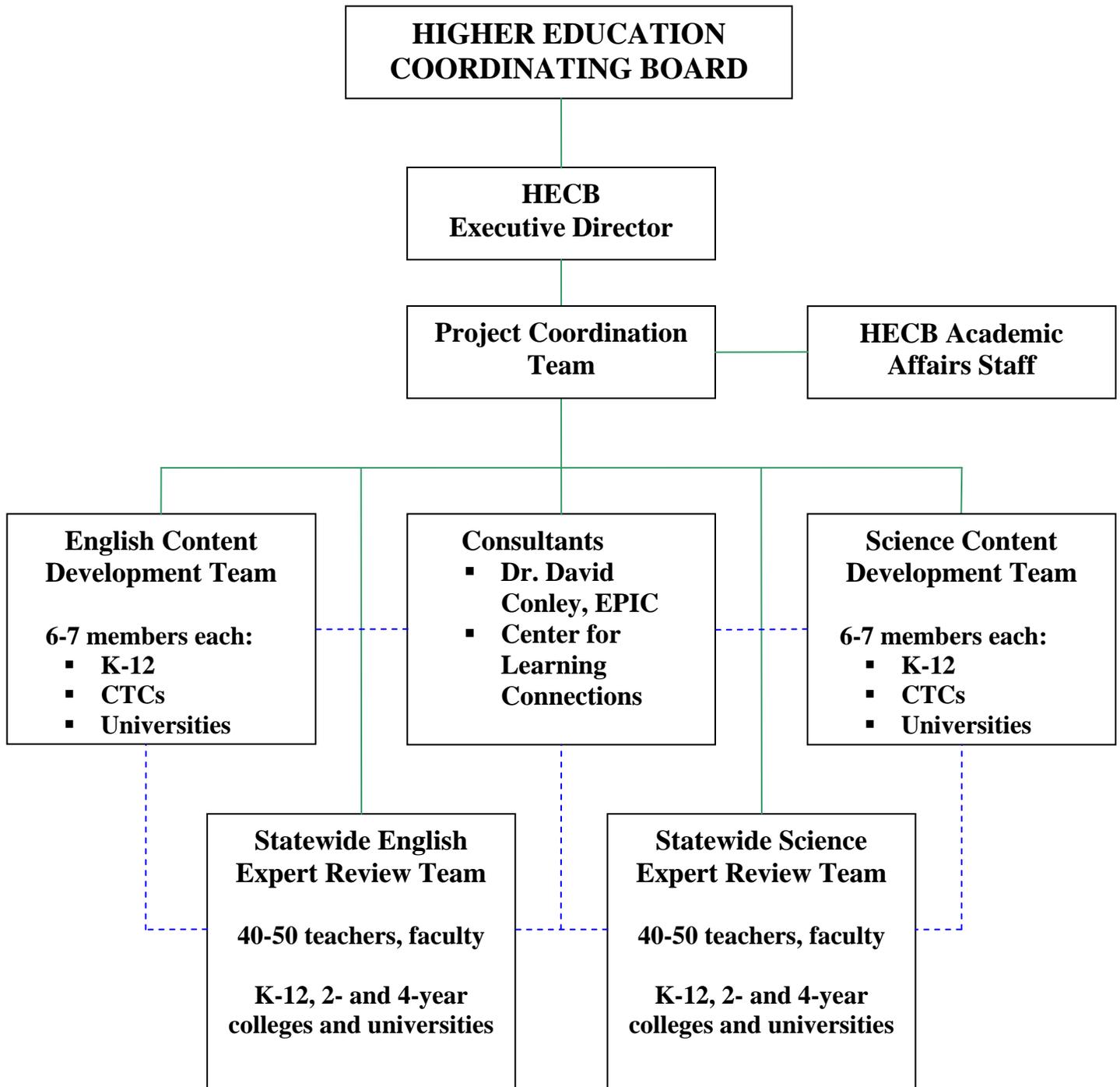
**Attachment 3:** Third Draft: English College Readiness Definitions

**Attachment 4:** Third Draft: Science College Readiness Definitions

**Attachment 5:** Brief Outline of Anticipated Phase II of English & Science  
College Readiness Project



Attachment 1





Attachment 2

**College Readiness Project  
Project Coordinating Team**

**Bob Butts**  
State Board of Education

**Cindy Morana**  
Council of Presidents

**Lin Douglas**  
Professional Educators Standards Board

**Gail Oxley**  
Washington School Counselor Association

**Matt Grant**  
Olympia School District

**Wendy Rader-Konofalski**  
AFT Washington

**Mary Kenfield**  
Washington State PTA

**Doug Scrima**  
The Evergreen State College

**Kyra Kester**  
Office of the Superintendent of Public  
Instruction

**Madeleine Thompson**  
Workforce Training and Education  
Coordinating Board

**Jim Meadows**  
Washington Education Association

**Dennis Wallace**  
Washington Association for Career and  
Technical Education

**Martharose Laffey**  
Washington State School Directors'  
Association

**Bob McMullen**  
Association of Washington School  
Principals

**Debora Merle**  
Governor's Office

**Bill Moore**  
State Board for Community and Technical  
Colleges

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**College Readiness Project Staff and  
Consultants:**

Ricardo Sanchez, Project Manager  
Higher Education Coordinating Board

John House, Project Coordinator  
Center for Learning Connections  
Highline Community College

Dr. David Conley  
Educational Policy Improvement Center



Attachment 3

Higher Education Coordinating Board  
ENGLISH COLLEGE READINESS DEFINITIONS

September 28, 2006

**DEFINITION 0**

**ATTRIBUTES**

The joint/common attributes are in black type; the English-only attributes are in blue type

Success in college depends on a student's ability to respond to the challenges presented by new problems and new ideas. In addition to the definitions that follow, the attributes described below are essential to success in college-level English courses.

| COMPONENT                                   | EVIDENCE OF LEARNING   |
|---|--|
| 0.1 Demonstrate intellectual engagement.    | <ul style="list-style-type: none"> <li>■ Recognize that ideas and knowledge are constructed and contested.</li> <li>■ Perceive that every discipline is a way of understanding and not just a sequence or compilation of discrete information.</li> <li>■ Develop intellectual curiosity: actively explore new ideas, posing questions about meaning, significance, and implications.</li> <li>■ Recognize one's own assumptions and allow them to be challenged as part of the learning process.</li> <li>■ Question, integrate, synthesize and connect new ideas to previously learned concepts.</li> <li>■ Actively seek to use the resources, tools and strategies necessary to accomplish tasks.</li> </ul>   |
| 0.2 Take responsibility for own learning.   | <ul style="list-style-type: none"> <li>■ Engage in self reflection and self evaluation (i.e. examine and learn from errors, seek help when needed and understand that failure is part of the learning process).</li> <li>■ Participate in class and when absent seek ways to learn the material covered in class.</li> <li>■ Take advantage of available resources - class time, notes, textbooks, assignments, tutoring services, supplemental materials, instructors, peers, equipment and electronic resources.</li> <li>■ Prepare work assigned for class; devote the time necessary to be successful, and plan ahead to meet deadlines.</li> <li>■ Seek help addressing issues outside the classroom that may interfere with the learning process.</li> <li>■ Contribute to and benefit from group problem-solving activities.</li> </ul> |
| 0.3 Persevere through the learning process. | <ul style="list-style-type: none"> <li>■ Understand that sustained effort is an important component of successful learning.</li> <li>■ Persist at tasks for which simply replicating an example will not work and which may be unlike tasks encountered through previous experience.</li> <li>■ Successfully complete tasks which may be time-consuming and require organizing and applying multiple steps, concepts, or techniques</li> <li>■ Recognize when an approach is unproductive and make logical modifications and/or switch to another approach.</li> </ul> <p>Accept ambiguity as part of the learning process.</p>  |

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Success in college depends on a student's ability to respond to the challenges presented by new problems and new ideas. In addition to the definitions that follow, the attributes described below are essential to success in college-level English courses.

| COMPONENT   | EVIDENCE OF LEARNING  |
|---|---|
| 0.4 Pay attention to detail.  | <ul style="list-style-type: none"> <li>■ Develop strategies to correctly follow all parts of oral and written directions without needing additional reminders.</li> <li>■ Understand the importance of accuracy and use conventions appropriate to the discipline.</li> <li>■ Work toward precision in the use of the discipline-specific language.</li> <li>■ Take time to review or edit work prior to submission.</li> </ul>   |
| 0.5 Demonstrate ethical behavior.                                       | <ul style="list-style-type: none"> <li>■ Treat others with respect through appropriate interpersonal behaviors.</li> <li>■ Follow established guidelines for academic honesty, such as the WAC (Washington Administrative Code) for student code of conduct. Refrain from academically dishonest behaviors, such as copying another's assignment, copying and pasting from the internet, AND using sources without attribution.</li> <li>■ Take into account how one's decisions impact self, others and the larger society.</li> <li>■ Exhibit an awareness of and respect for different cultural perspectives.</li> </ul>   |
| 0.6 Communicate effectively across a variety of audiences and purposes. | <ul style="list-style-type: none"> <li>■ Choose language appropriate to the academic, social and cultural conventions of the particular audience.</li> <li>■ Contribute relevant ideas, clear illustrations and clarifying examples with AN awareness of how your contribution will impact others.</li> <li>■ Express disagreement in ways that permit continued dialogue.</li> </ul>   |
| 0.7 Recognize the role of language in communication.                    | <ul style="list-style-type: none"> <li>■ Understand that language is fluid and evolves over time.</li> <li>■ Understand that language is a means to inquire, understand differences, beliefs, perspectives and philosophies of self and others, and thus a means for effective and responsible human interaction.</li> <li>■ Understand that language reflects a person's identity, and that people communicate in many different ways, depending on culture, class, environment and location.</li> <li>■ Understand that attitudes about language need to be examined because language often reflects unchallenged biases.</li> <li>■ Demonstrates creativity in the uses of the English language, in interpreting text and in constructing written products.</li> </ul> |
|   |   |

**DEFINITION 0**

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Success in college depends on a student's ability to respond to the challenges presented by new problems and new ideas. In addition to the definitions that follow, the attributes described below are essential to success in college-level English courses.

| COMPONENT  | EVIDENCE OF LEARNING  |
|--|---|
| <p>0.8 Understand that evaluation of one's own and others' communication is a lifelong process.</p>                                      | <ul style="list-style-type: none"> <li>■ Use and monitor the qualities of effective communication (e.g. body language, pace, volume, tone, expression.)</li> <li>■ Assess the effect of presentation on audience (e.g., use verbal and nonverbal audience response and feedback to determine effect).</li> <li>■ Offer constructive, non-threatening feedback to peers in support of improving both formal and informal communication.</li> <li>■ Seek, consider, and use feedback from a variety of sources to improve written and verbal communication (e.g., teachers, peers, community members, and family members).</li> </ul> |
| <p>0.9 Use interpersonal skills and strategies in a multicultural context to work collaboratively, solve problems and perform tasks.</p> | <ul style="list-style-type: none"> <li>■ Detect and respond to the clarification needs of others (e.g. inviting questions, adding examples, using specific references).</li> <li>■ Create group consensus for success and evaluate self and others according to the criteria established.</li> </ul>  |

**DEFINITION 1**

**READING, ANALYSIS AND INTERPRETATION**

NOTE: This definition assumes the student is already proficient with the concepts and procedures described in the Washington State Grade Level Expectations for Reading and Communication through Grades 9/10.

In a college setting meaning is both constructed and contested. Critical reading is thus important. One definition of critical thinking says it is a process by which we evaluate facts in their exact arrangement and proportion in order to understand the certainty of our opinions or interpretations. Reading, then, becomes a conscious, constructive mental activity wherein the reader analysis and interprets texts. Students should be able to read for information, but college students will also understand how texts work and how readers work to construct meaning through interaction with text.

| COMPONENT  | EVIDENCE OF LEARNING   |
|--|--|
| 1.1 Create meaning from information.   | Construct personal meaning from visual and auditory information and understand that meaning in relationship to past knowledge as well as others' responses.  |
| 1.2 Critically view text; evaluate the qualities of evidence. [See Reading GLE 2.3.3]  | <ul style="list-style-type: none"> <li>■ Analyze the ways in which a text's organizational structure supports or confounds its meaning or purpose. [See Reading GLE 2.3.1]</li> <li>■ Evaluate the kind, breadth, and appropriateness of evidence used to support the writer's reasoning. [See Reading GLE 2.4.4]</li> <li>■ Identify the reader's own social and cultural points of view and biases that influence perceptions of and responses to a text.</li> <li>■ Analyze two or more texts addressing the same topic to determine how writers reach similar or different conclusions about social and cultural perspectives, issues, and/or themes. [See Reading GLEs 2.4.6, 2.4.7]</li> <li>■ Understand how rhetorical devices enhance meaning in both literary and non-literary texts. [See Reading GLEs 2.2.2, 2.2.3, 2.3.4, 2.4.4]</li> <li>■ Identify places in texts where power and privilege impact the intended or unintended message.</li> <li>■ Examine the effect of textual portrayals of race, gender, religion, sexuality, class, and culture on society and its more and less privileged groups.</li> </ul> |
| 1.3 Analyze writer's purpose and evaluate how a writer's style influences different audiences. [See Reading GLE 2.4.2]         | <ul style="list-style-type: none"> <li>■ Compare how diverse writers use varying styles to achieve similar purposes. [See Reading GLE 2.4.2]</li> <li>■ Connect a writer's use of word choice and figurative language to interpretations of literary and non-literary texts. [See Reading GLE 2.3.3]</li> <li>■ Examine how specific rhetorical techniques may be used to achieve a specific meaning and purpose.</li> <li>■ Understand that a writer uses vocabulary as a rhetorical device to accomplish his/her purpose. [See Reading GLE 2.4.2]</li> </ul>   |
| 1.4 Apply advanced comprehension monitoring strategies during and after reading. [See Reading GLEs 2.1.3, 2.1.4, 2.1.5, 2.1.7] | <ul style="list-style-type: none"> <li>■ Summarize informational and technical texts, including information provided by visual components. [See Reading GLE 2.1.7]</li> <li>■ Write a sentence that captures the writer's central thought or the answer to his or her key question. [See Reading GLE 2.4.7]</li> <li>■ Write a sentence that states an arguable concept or conclusion that can be drawn from multiple selections (for example, a thesis statement for a synthesis essay). [See Reading GLE 2.4.5]</li> </ul>   |
|  |  |

**DEFINITION 1**

READING, ANALYSIS AND INTERPRETATION

*Note: This assumes that students have read from both traditional and contemporary sources, and both fiction and nonfiction.*

In a college setting meaning is both constructed and contested. Critical reading is thus important. One definition of critical thinking says it is a process by which we evaluate facts in their exact arrangement and proportion in order to understand the certainty of our opinions or interpretations. Reading, then, becomes a conscious, constructive mental activity wherein the reader analysis and interprets texts. Students should be able to read for information, but college students will also understand how texts work and how readers work to construct meaning through interaction with text.

| COMPONENT  | EVIDENCE OF LEARNING   |
|--|--|
| <p>1.5 Analyze texts to develop insights and/or draw conclusions. [See Reading GLE 2.4.1, 2.1.7]</p>                                 | <ul style="list-style-type: none"> <li>▪ Discover connections between reading and life. [See Reading GLE 2.4.6]</li> <li>▪ Synthesize information from both informational and literary sources to draw conclusions that go beyond those found in individual sources. [See Reading GLE 2.4.5]</li> <li>▪ Create a statement that best represents an arguable conclusion that may be drawn from a selection. [See Reading GLE 2.4.6]</li> <li>▪ Recognize that a variety of approaches may be used to critique text (e.g., personal, historical, sociological).</li> </ul> |
| <p>1.6 Understand contemporary and traditional literature and nonfiction written in a variety of genres. [see Reading GLE 3.4.2]</p> | <ul style="list-style-type: none"> <li>▪ Read with understanding lengthy and complex fiction and nonfiction texts (e.g., environmental, science, socio-political, economic, history, current events).</li> </ul>   |
| <p>1.7 Analyze recurring themes in non fiction and fiction. [see Reading GLE 3.4.3]</p>  | <ul style="list-style-type: none"> <li>▪ Characterize the presentation of a similar theme or topic across genres (e.g., memoirs, journals, autobiographies, essays) and explain how the selection of genre shapes the theme or topic.</li> <li>▪ Compare the development of a theme in fiction with the development of the same theme in nonfiction.</li> </ul>  |

**DEFINITION 2**

NOTE: This definition assumes the student is already proficient with the concepts and procedures described in the Washington State Grade Level Expectations for Writing and Communication through Grades 9/10.

**WRITING PROCESSES**

Students should learn that good writing is most often the result of a process that takes place over time. Good writers invent, compose, draft, revise, and copy edit their texts over time, in successive trials to promote greater understanding and to effectively communicate.

| COMPONENT   | EVIDENCE OF LEARNING  |
|---|---|
| 2.1 Analyze and select effective strategies for generating ideas and planning writing. [See Writing GLE 1.1.1]                                | <ul style="list-style-type: none"> <li>■ Use discovery/exploratory techniques to generate ideas.</li> <li>■ Frequently ground ideas in required course readings.</li> <li>■ Write brief summaries of concepts discovered in the reading.</li> <li>■ Select a topic and conceptualize the purpose and audience.</li> <li>■ Understand that over-reliance on pre-existing modes or genres can limit success in writing.</li> </ul>  |
| 2.2 Compose, revise, and edit text. [See Writing GLEs 1.2.1, 1.3.1, 1.4.1, 1.6.3]   | <ul style="list-style-type: none"> <li>■ Compose a draft guided by an evolving purpose with a specific audience in mind.</li> <li>■ Using self-assessment and feedback from readers, create a revision plan.</li> <li>■ Demonstrate the difference between revising and editing.</li> <li>■ Use revision strategies to add or remove material.</li> <li>■ Proofread final draft for errors, editing with a critical eye and using appropriate resources as needed (e.g., dictionary, writing/style guide, electronic spelling check, self-initiated checklist or editing guide, peer reviewer).</li> <li>■ Adjust time for prewriting, drafting, revising, and editing, depending on nature of the task.</li> </ul> |
| 2.3 Use collaborative skills to adapt writing process. [See Writing GLE 1.6.2]  | <ul style="list-style-type: none"> <li>■ Participate in shared decision-making to assign responsibilities for completing complex writing tasks.</li> <li>■ Make organizing, revision, layout, and publishing/presenting decisions collaboratively, synthesizing and choosing among alternate strategies.</li> </ul>   |
| 2.4 Apply understanding of multiple and varied audiences to write effectively. [See Writing GLE 2.1.1]  | <ul style="list-style-type: none"> <li>■ Identify and analyze the audiences' expectations and needs, and write to address them.</li> <li>■ Adjust voice to discourse communities, including academic audiences.</li> </ul>  |
| 2.5 Make conscious rhetorical choices that respect the cultural backgrounds of potential audiences [See Communication GLE 2.3.1]              | <ul style="list-style-type: none"> <li>■ Anticipate and address readers' questions or arguments in a way that is sensitive to historical and social stereotypes.</li> <li>■ Understand one's own position in a particular discourse community.</li> </ul>   |
| 2.6 Distinguish among a variety of forms of writing, and select forms appropriate to the writing task. [See Writing GLEs 1.5.1, 2.2.1, 2.3.1] | <ul style="list-style-type: none"> <li>■ Justify choice of form/genre, understanding that form is driven by purpose, occasion, situation, audience and other contextual concerns.</li> <li>■ Analyze and evaluate others' use of forms and genre.</li> <li>■ Write technical and non-technical documents for career audiences, taking into consideration technical formats.</li> <li>■ Select and synthesize information from technical and career documents for inclusion in writing.</li> <li>■ Write for academic audiences.</li> </ul>  |

**DEFINITION 2**

**WRITING PROCESSES**

Students should learn that good writing is most often the result of a process that takes place over time. Good writers invent, compose, draft, revise, and copy edit their texts over time, in successive trials to promote greater understanding and to effectively communicate.

| COMPONENT   | EVIDENCE OF LEARNING   |
|---|--|
| 2.7 Analyze, select or develop effective organizational structures. [See Writing GLE 3.1.2]   | <ul style="list-style-type: none"> <li>■ Make context-appropriate structural choices knowing that the organization of information is dependent on discipline and workplace expectations</li> <li>■ Write a paper of considerable length with citations and references, logically organized and mostly free of grammatical and spelling errors.</li> </ul>  |
| 2.8 Adapt voice, style, sentence patterns, and word choice to content, context, purpose, and audience. [See Writing GLEs 3.2.1, 3.2.2, 3.2.3]   | <ul style="list-style-type: none"> <li>■ Understand that style, voice, and other matters of rhetoric have culturally determined values.</li> <li>■ Use sentence elements cohesively to express sophisticated and complex thoughts.</li> <li>■ Create complex sentences that clearly express sophisticated thoughts; knows when to limit complex sentences to remain both concise and cohesive.</li> <li>■ Writes clearly and logically, knowing when to use sentences of varying lengths.</li> </ul> |
| 2.9 Use writing conventions for editing as part of a writing process. [See Writing GLEs 1.4.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8] | <ul style="list-style-type: none"> <li>■ Employ grammar, usage, conventions and intentional breaches of conventions to support purpose and increase readability.</li> <li>■ Understand that college culture privileges some written conventions over others</li> <li>■ Develop and use a personal editing list to improve communication.</li> <li>■ Understand that college requires continuous editing for accuracy in grammar, usage, conventions and spelling.</li> </ul>                         |
|   |  |

**DEFINITION 3**

RHETORIC, ANALYSIS AND ARGUMENT

NOTE: This definition assumes the student is already proficient with the concepts and procedures described in the Washington State Grade Level Expectations for Writing and Communication through Grades 9/10.

To effectively communicate in the college setting, speakers and writers should develop a basic understanding of rhetoric. They should be able to go beyond summarizing information to discussing how forms, literary devices, text design, and other physical features of text affect meaning.

| COMPONENT   | EVIDENCE OF LEARNING   |
|---|--|
| <p>3.1 Analyze ideas, develop an arguable thesis, and choose specific, relevant details that support the arguable thesis. [See Writing GLE 3.1.1, 4.1.2, 4.2.1]</p> | <ul style="list-style-type: none"> <li>▪ Articulate an arguable thesis/claim.</li> <li>▪ Use appropriate, reliable and credible evidence and reasoning (determined by audience and purpose) to support a thesis.</li> <li>▪ Identify claims in writing that require outside support or verification.</li> <li>▪ Distinguish among facts and opinions, evidence and inferences.</li> <li>▪ Understand that cultural privilege is associated with academic discourse in a college setting.</li> </ul>  |
| <p>3.2 Apply skills to plan and organize effective communication. [See Communication GLEs 1.2.1, 2.1.1, 3.1.1, 3.3.1]</p>   | <ul style="list-style-type: none"> <li>▪ Use various forms of formal and informal logical argument (for example deductive reasoning, inductive reasoning, and analogies).</li> <li>▪ Use techniques to enhance the message (e.g., irony and dialogue to achieve clarity, force and aesthetic effect; technical language).</li> <li>▪ Use logical, ethical and emotional appeals to support a purpose.</li> <li>▪ Identify major point of argument/presentation.</li> <li>▪ Preview and review major points to enhance the audience's comprehension and convey those points clearly to an audience.</li> <li>▪ Use clear and effective graphics—including symbols, elements, principles of design, correct techniques and processes—to support an arguable position.</li> <li>▪ Consider audience and format to determine when information is best presented visually.</li> </ul> |
| <p>3.3 Evaluate the effect of persuasive techniques and bias in different forms of communication. [See Communication GLE 1.2.2]</p>                                 | <ul style="list-style-type: none"> <li>▪ Critique and evaluate varying media portrayals of race, gender, religion, sexuality, class and culture on society and its more and less privileged groups.</li> <li>▪ Critique and evaluate varying accounts of the same event and make inferences about the impact each account would have on the audiences.</li> <li>▪ Recognize there is an academic discourse community and within that community there is a variety of expectations for conventions, points of view and standards for evidence and form.</li> </ul>  |

**DEFINITION 4**

**BUSINESS READING AND WRITING**

NOTE: This definition assumes the student is already proficient with the concepts and procedures described in the Washington State Grade Level Expectations for Writing and Communication through Grades 9/10.

Many college pathways lead to the workplace. Those that do, most likely will require the following communication considerations in addition to (or as complementary to) the other definitions.

| COMPONENT   | EVIDENCE OF LEARNING   |
|---|--|
| <p>4.1 Analyze and apply information gained from reading to perform a specific task. [See Reading GLE 3.2.1, 2.2.1]</p> | <ul style="list-style-type: none"> <li>▪ Interpret information in technical manuals and instructional manuals (e.g., software manuals, hardware and peripheral manuals, and accounting manuals, college financial aid materials and other college resources).</li> </ul>   |
| <p>4.2 Use word processing software and basic computer hardware and printers to produce document.</p>                   | <ul style="list-style-type: none"> <li>▪ Use appropriate fonts, margins and formats based on industry or academic standards.</li> </ul>  |
| <p>4.3 Produce documents used in a career setting. [See Writing GLE 2.4.1, 3.2.1]</p>                                   | <ul style="list-style-type: none"> <li>▪ Follow industry standards and conventions in producing documents for the workplace setting (e.g., emails and letters).</li> <li>▪ Match standard reference style to the audience and context of the document (e.g. follow a company style guide).</li> <li>▪ Write technical and non-technical documents for career audiences, taking into consideration technical formats.</li> <li>▪ Select and synthesize information from technical and career documents for inclusion in writing.</li> </ul> |



Higher Education Coordinating Board  
SCIENCE COLLEGE READINESS DEFINITIONS

September 28, 2006

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| COMPONENT                                 | EVIDENCE of LEARNING   |
|---|--|
| 0.1 Demonstrate intellectual engagement.  | <ul style="list-style-type: none"> <li>• Perceive that every discipline is a way of understanding and not just a sequence or compilation of discrete information.</li> <li>• Develop intellectual curiosity: actively explore new ideas, posing questions about meaning, significance, and implications by <b>designing and conducting scientific investigations and engaging in scientific inquiry.</b></li> <li>• Recognize one's own assumptions, take risks and be challenged as part of the learning process.</li> <li>• Recognize and interpret patterns – as well as variation from previously learned or observed patterns – in data, diagrams, symbols, and words.</li> <li>• Question, integrate, synthesize and connect new ideas to previously learned concepts.</li> <li>• Actively seek to use the resources, tools, <b>technologies</b> and strategies necessary to accomplish tasks.</li> </ul>  |
| 0.2 Take responsibility for own learning. | <ul style="list-style-type: none"> <li>• Engage in self reflection and self evaluation (i.e. examine and learn from errors, seek help when needed and understand that failure is part of the learning process).</li> <li>• Participate in class sessions and when absent, seek ways to learn the material covered in class.</li> <li>• Take advantage of available resources - class time, notes, textbook, assignments, tutoring services, supplemental materials, instructor, peers, equipment and electronic resources.</li> <li>• Conscientiously prepare work assigned for class (for example on time, neatly presented, taken seriously).</li> <li>• Seek help addressing issues outside the classroom that may interfere with the learning process.</li> <li>• Devote the time necessary to be successful and plan ahead to meet deadlines.</li> <li>• Contribute to and benefit from group problem-solving activities.</li> <li>• Use effective strategies to learn independently.</li> <li>• <b>Seek and readily accept constructive comments.</b></li> </ul> |

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| COMPONENT   | EVIDENCE of LEARNING  |
|---|---|
| 0.3 Persevere through the learning process.   | <ul style="list-style-type: none"> <li>• Persist at tasks for which simply replicating an example will not work.</li> <li>• Successfully complete tasks that require organizing and applying multiple steps, concepts or techniques, and which may be time-consuming.</li> <li>• Recognize when an approach is unproductive and make logical modifications and/or switch to another approach.</li> <li>• Understand that sustained effort is an important component of successful learning.</li> <li>• Accept ambiguity as part of the learning process.</li> <li>• Recognize the value of performing multiple trials of an experiment to obtain reliable data.</li> </ul>  |
| 0.3 Persevere through the learning process.   | <ul style="list-style-type: none"> <li>• Is willing to work on problems that require time and thought and demonstrate original critical thinking.</li> </ul>  |
| 0.4 Pay attention to detail.  | <ul style="list-style-type: none"> <li>• Correctly and independently follow all parts of oral and written directions.</li> <li>• Use conventions appropriate to the discipline.</li> <li>• Work toward precision in the use of the discipline-specific language.</li> <li>• Take time to review or edit work prior to submission.</li> <li>• Check to be sure that answers make sense.</li> </ul>   |
| 0.5 Demonstrate ethical behavior.   | <ul style="list-style-type: none"> <li>• Treat others with respect.</li> <li>• Follow established guidelines for academic honesty, such as the WAC (Washington Administrative Code) for student code of conduct. Refrain from academically dishonest behaviors, such as copying another's assignment, copying and pasting from the internet, using sources without attribution.</li> <li>• Take into account personal and societal implications of decisions.</li> <li>• Is aware of and respects different cultural perspectives.</li> <li>• Understand/Recognize that plagiarism is dishonest and unethical; respect the intellectual and creative work of others.</li> <li>• Refuse to plagiarize in order to honor and protect the intellectual and creative work of others.</li> </ul> |
| 0.6 Communicate effectively across a variety of audiences and purposes.<br><br>0.7 Effectively read, parse, and organize information presented in questions/problems in order to formulate solutions. | <ul style="list-style-type: none"> <li>• Choose language appropriate to the academic, social and cultural conventions of the particular audience.</li> <li>• Contribute relevant ideas, clear illustrations and clarifying examples.</li> <li>• Express disagreement in ways that permit continued dialogue.</li> <li>• Identify the key components of a question and determine what is being asked.</li> <li>• Apply discipline-specific knowledge in new situations or contexts</li> <li>• Identify possible approaches to unfamiliar problems; recognize similar problems that are presented differently.</li> <li>• Develop a solution to a comprehensive problem that combines multiple concepts.</li> <li>• Employ reading strategies appropriate to scientific texts.</li> </ul>     |

**DEFINITION 1** INVESTIGATING SYSTEMS AND THE NATURE OF SCIENCE

NOTE: This definition assumes the student is already proficient with the concepts and procedures described in the Washington State Grade Level Expectations for Science through Grades 9/10. The student makes hypotheses, gathers data, and draws conclusions using scientific concepts and procedures.

| COMPONENT  | EVIDENCE of LEARNING  |
|--|---|
| 1.1 Demonstrate understanding of the differences between observation, hypothesis, theory and law.  | <ul style="list-style-type: none"> <li>• Distinguish between testable and non-testable questions.</li> <li>• Make an hypothesis (or multiple hypotheses) based on an observation that includes a prediction with a cause-effect reason.</li> <li>• Demonstrate creativity in formulating and interpreting hypotheses.</li> <li>• Understand the difference between the scientific definition of theory and the commonly accepted definition.</li> <li>• Understand that a theory does not turn into a law.</li> </ul> |
| 1.2 Understand how to plan and conduct scientific investigations using proper data collection and observation methods. [See GLE 2.1.2]   | <ul style="list-style-type: none"> <li>• Distinguish between inference and observation and understand their roles in scientific investigation.</li> <li>• Accurately and thoroughly make and record observations.</li> </ul>  |
| 1.3 Synthesize a scientific explanation using evidence and data and defend it with logic, and if necessary revise the explanation to account for new evidence. [See GLE 2.1.3] | <ul style="list-style-type: none"> <li>• Suggest alternative hypotheses to data and conclusions.</li> <li>• Accept unexpected or ambiguous results as part of the experimentation process.</li> </ul>   |
| 1.4 Use physical, conceptual and mathematical models to represent and investigate objects, events, systems and processes. [See GLE 2.1.4]                                      | <ul style="list-style-type: none"> <li>• Create physical, conceptual, and/or mathematical models to represent and/or investigate objects, events, systems, and processes.</li> <li>• Evaluate how well a model describes or predicts the behavior of an object, event, system or process.</li> </ul>  |
| 1.5 Using both verbal and written skills, present and produce reports on scientific investigations, explanations of objects, events, systems, and processes. [See GLE 2.1.5]   | <ul style="list-style-type: none"> <li>• Summarize an investigation and discuss how the conclusions support or refute current science concepts and principles.</li> <li>• Effectively represent and interpret data in graphical forms.</li> <li>• Identify and use technology appropriate for effective communication.</li> <li>• Identify and use presentation skills required to deliver effective presentations.</li> </ul>  |

**DEFINITION 1** INVESTIGATING SYSTEMS AND THE NATURE OF SCIENCE

The student makes hypotheses, gathers data, and draws conclusions using scientific concepts and procedures.

| COMPONENT   | EVIDENCE of LEARNING  |
|---|---|
| <p>1.6 Analyze scientific theories, methods and conclusions for validity and reliability. [See GLEs 2.2.1, 2.2.2 and 2.2.4]</p> | <ul style="list-style-type: none"> <li>• Identify an additional experiment that could be performed to enhance or evaluate experimental data or conclusions.</li> <li>• Recognize the value of performing multiple trials to obtain reliable results.</li> <li>• Understand that skepticism constructive criticism about scientific investigations is useful and necessary.</li> <li>• Demonstrate curiosity, honesty, cooperation and skepticism in scientific investigations</li> <li>• Is able to recognize science and pseudoscience and explain why a given concept is or is not scientific.</li> <li>• Understand the limitations of experimental measurements and their impact on the validity of conclusions.</li> </ul> |
| <p>1.7 Understand how scientific knowledge constantly increases and sometimes changes. [See GLE 2.2.5]</p>                      | <ul style="list-style-type: none"> <li>• Know that science involves testing, revising, introducing new and occasionally discarding theories.</li> <li>• Understand that the goal of scientific inquiry and investigation is to lead to a better understanding of the natural world and not to absolute truth.</li> </ul>  |

**DEFINITION 2** QUANTITATIVE ANALYSIS

NOTE: This definition assumes the student is already proficient with the concepts and procedures described in the Washington State Grade Level Expectations for Science through Grades 9/10.

The student uses the correct mathematical concepts and procedures in scientific investigations.

| COMPONENT  | EVIDENCE of LEARNING   |
|--|--|
| 2.1 Apply concepts and procedures from algebra to analyze data. [see TMP Standard 7]   | <ul style="list-style-type: none"> <li>• Know when it is possible to simplify, solve, substitute in or evaluate equations and expressions and when it is not. For example, expand the expression <math>(x + 1)(x + 4)</math>; substitute <math>a = 2</math>, <math>b = 4</math> into the formula <math>a^2 + b^2 = c^2</math>; solve the equation <math>0 = (x + 3)(x + 1)</math>; and evaluate the function <math>f(x) = (x + 1)(x + 4)</math> at <math>x = -1</math>.</li> <li>• Know ways that variables can be used (e.g., as a placeholder for an unknown, such as <math>x + 2 = 9</math>, or to represent a range of values, such as <math>-3m - 8</math>).</li> <li>• Understand various types of functions (e.g., direct and inverse variation, polynomial, radical, step and sinusoidal), and have an understanding of exponential and logarithmic functions.</li> <li>• Know the equivalence of common exponential numbers, i.e. <math>1,000,000 = 10^6 = 1</math> million.</li> </ul> |
| 2.2 Apply concepts and procedures from analytic geometry to analyze data.  | <ul style="list-style-type: none"> <li>• Understand vectors and how they can be used to represent force, velocity, and other physical measurements.</li> <li>• Use vector analysis, vector addition and scalar multiplication to solve problems.</li> <li>• Understand that a curve drawn in a certain location is fully equivalent to a set of algebraic equations.</li> </ul>  |
| 2.3 Use mathematical knowledge and logical reasoning to define and solve problems. [See TMP, Standard 1].                                  | <ul style="list-style-type: none"> <li>• Represent functions, patterns and mathematical relationships using a variety of models (e.g., statements, formulas, and graphs).</li> <li>• <i>Use various strategies to approach problem-solving situations and to revise solution processes. OR How is this different from the component itself, or what needs to happen to make it different?</i></li> </ul>   |
| 2.4 Use symbols, diagrams and graphs to clearly communicate mathematical ideas, reasoning and their implications. (see TMP 2.2)            | <ul style="list-style-type: none"> <li>• Understand and use data represented in various ways (e.g., charts, tables, plots and graphs).</li> <li>• Interpolate between data points in a table or graph.</li> </ul>  |
| 2.5 Accurately apply concepts and procedures from measuring, estimating, probability and statistics to analyze data. [see TMP, Standard 6] | <ul style="list-style-type: none"> <li>• Know how to make estimates and approximations and when to use those approaches to solve problems.</li> <li>• Consider the possible sources of measurement errors and their effects on calculations.</li> <li>• Know the difference between accuracy and precision, as well as how to use significant digits appropriately.</li> <li>• Understand the differences between the metric and the traditional U.S. measurement system and-convert between the two systems.</li> <li>• Select and use appropriate units to express measurements for real-world problems.</li> <li>• Understand descriptive statistics (e.g., mean, median, mode and standard deviation).</li> </ul>  |
| 2.6 Accurately apply concepts and procedures from proportional reasoning to analyze data.  | <ul style="list-style-type: none"> <li>• Use proportional reasoning to solve problems (e.g., equivalent fractions, equal ratios, constant rate of change, proportions and percents).</li> <li>• Understand ratios, proportions and percents and how each is related to the other.</li> <li>• Understand that predictions based on sample data are inferential.</li> <li>• Determine how changing the value of one variable affects the value of a second variable in an equation (direct or inverse proportionality).</li> </ul>   |

**DEFINITION 3** SCIENCE and SOCIETY

NOTE: This definition assumes the student is already proficient with the concepts and procedures described in the Washington State Grade Level Expectations for Science through Grades 9/10.

The student extends scientific knowledge and solutions to other disciplines and real life situations.

| COMPONENT   | EVIDENCE of LEARNING  |
|---|---|
| <p>3.1 Analyze local, regional, national, and global problems or challenges in which scientific design can be or has been used to develop a solution. [see GLE 3.1.1]</p>           | <ul style="list-style-type: none"> <li>• Critically analyze scientific information in current events to make personal or public-policy decisions.</li> <li>• Recognize when more information is needed and demonstrate the skills to acquire such information.</li> </ul>   |
| <p>3.2 Recognize that scientific knowledge and technological advances are discovered and developed by individuals and communities in all cultures of the world. [see GLE 3.2.1]</p> | <ul style="list-style-type: none"> <li>• Explain how our modern way of life is a product of scientific knowledge and technological advances from a variety of peoples.</li> <li>• Analyze how scientific knowledge and technological advances contribute to changes in societies.</li> </ul>  |
| <p>3.3 Analyze how the scientific enterprise and technological advances have had both positive and negative impacts on society and Earth. [see GLE 3.2.2]</p>                       | <ul style="list-style-type: none"> <li>• Describe potential unintended consequences of scientific enterprises on the natural world; investigate and describe specific examples.</li> </ul>  |
| <p>3.4 Analyze the effects human activities have on Earth's capacity to sustain biological diversity. [see GLE 3.2.4]</p>   | <ul style="list-style-type: none"> <li>• Explain how human activities affect Earth's capacity to sustain biological diversity (e.g.. global warming, introduced species, poaching, pollution, habitat destruction, etc.).</li> <li>• Describe and analyze the global impacts created by the predicted exponential growth of human populations and develop possible solutions.</li> <li>• Explain how the use of renewable and nonrenewable natural resources affects the sustainability of an ecosystem.</li> </ul> |

**DEFINITION 4** TECHNOLOGY

NOTE: This definition assumes the student is already proficient with the concepts and procedures described in the Washington State Grade Level Expectations for Science through Grades 9/10.

The student appropriately applies technology in conducting scientific investigations, data analysis and in the communication of scientific results.

| COMPONENT   | EVIDENCE of LEARNING   |
|---|--|
| 4.1 Use technology in scientific literature research (information literacy).                              | <ul style="list-style-type: none"> <li>• Locate varied, sufficient and reputable sources of information, using available library, electronic, and human resources.</li> <li>• Understand what kinds of source material can be accessed with databases and search engines and use these tools to find sources relevant to their topic.</li> <li>• Critically evaluate information from electronic and other sources.</li> </ul> |
| 4.2 Use technology in conducting scientific investigations, and analyzing and presenting scientific data. | <ul style="list-style-type: none"> <li>• Correctly and safely use available equipment to conduct a scientific investigation.</li> <li>• Uses technology/software to accurately collect, analyze and display data. [see OR PASS Standards]</li> </ul>   |

**DEFINITION 5** COMMUNICATION

NOTE: This definition assumes the student is already proficient with the concepts and procedures described in the Washington State Grade Level Expectations for Science through Grades 9/10.

The student can interpret and communicate scientific knowledge and results both orally and in writing using both scientific and non-scientific language. [Adapted from TMP Standard 2]

| COMPONENT   | EVIDENCE of LEARNING   |
|---|--|
| 5.1 Use appropriate terminology and technology to communicate scientific knowledge.   | <ul style="list-style-type: none"> <li>• Communicate results using pictures, tables, charts, diagrams, and graphic displays that are clear, neat, accurate, and informative. [PASS &amp; Benchmarks for Scientific Literacy]</li> <li>• Accurately use terminology, symbols, notations, and formulas to report results, identify patterns in data, and propose explanations. [PASS]</li> </ul>   |
| 5.2 Communicate scientific information and defend a scientific arguments both orally and in writing. [National Science Education Standards] | <ul style="list-style-type: none"> <li>• Clearly and completely restate scientific claims or arguments presented. [PASS].</li> <li>• Translate knowledge of scientific writings and terminology into non-scientific language. [KSUS]</li> <li>• Use scientific evidence (as opposed to, for example anecdotal) to support scientific arguments.</li> <li>• Clearly communicate questions, hypotheses, methods, results, and conclusions</li> </ul> |



## College Readiness: English & Science

Defining college readiness is central to improving student transitions from high school to post-secondary education, and reducing the level of remedial coursework currently required by students entering college.

### *The Problem*

In 2003, 54 percent of Washington high school students who enrolled in 2-year colleges in the fall of 2004 required remedial mathematics or English. About eleven percent of 2003 graduates who enrolled in 4-year colleges in 2004 took remedial math or English. This means students take, and pay for, non-credit bearing coursework.

### *The Solution*

Section 8 of Washington state’s 2004 *Strategic Master Plan for Higher Education* calls for defining college readiness in mathematics, science, English, world languages, social studies, and the arts.

Current K-12 state education reform policies require that students pass 10<sup>th</sup> grade WASL tests in reading, writing, and mathematics. Passing a science test will be added as a graduation requirement beginning in 2010. However, it is increasingly acknowledged that passing 10<sup>th</sup>-grade tests is not an indicator of college readiness. Therefore, it is imperative that the state continue to determine, for teachers and learners, what is necessary for students to successfully complete entry level college coursework.

### *Estimated Cost: \$1.52 million*

| FY 2008   | FY 2009   | Total   |
|-----------|-----------|---------|
| \$760,000 | \$760,000 | \$1.52m |

This has been submitted as part of the HECB’s 2007-09 agency budget request.

### *Phase I*

In 2005, the state Legislature and Governor appropriated \$600,000 for the HECB to develop college readiness definitions in English and science. The HECB is scheduled to approve preliminary definitions in December 2006, anticipating a Phase II will begin in July 2007.

### *Phase II*

Two pilot implementation teams—one in English and one for science—will be identified to field test application of the college readiness definitions developed in Phase I. The teams will consider three critical areas—subject matter/curriculum, student learning, and teaching practice.

### *Key responsibilities of pilot implementation teams:*

- Align the college readiness definitions with the state’s K-12 educational reform requirements, i.e., WASL, Grade Level Expectations, Certificate of Mastery;
- Align the college readiness definitions with college placement tests (English);
- Align high school curricula with college-level academic rigor and expectations;
- Utilize student works to assess application of college readiness definitions to high school coursework;
- Develop model curricula, instructional models and scoring guides;
- Develop model assessment portfolios.

### *Private Funding*

The HECB intends to seek private funds to supplement state funding for Phase II of the English and science college readiness project. Additional funding would enable 12 college readiness pilot implementation teams, compared to two teams when limited to state funds (see above). Private funds also would make possible important research and professional development activities (Phase III).