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# Delaware Department of Education

## Specifications for Select High School Courses and End-of-Course Assessments



***Updated November 2011***

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Document No. 95-01/11/11/02

This document supersedes previous version updated in March 2011, Document No. 95-01/11/05/03.

# Specifications for Select High School Courses and End-of-Course Assessments

## TABLE OF CONTENTS

<b>INTRODUCTION TO THE SPECIFICATIONS FOR SELECT HIGH SCHOOL COURSES AND END-OF-COURSE ASSESSMENTS (UPDATED MARCH 2011)</b> .....	<b>1</b>
<b>ENGLISH II SPECIFICATIONS</b> .....	<b>2</b>
<b>I.</b> Introduction: Definition of the Task .....	3
<b>II.</b> The Process .....	3
<b>III.</b> The Assessment Design .....	5
<b>IV.</b> Suggestions and Cautions .....	6
<b>V.</b> Summary .....	6
<b>APPENDIX A: COURSE SPECIFICATION MATRICES FOR ENGLISH II</b> .....	<b>7</b>
<b>APPENDIX B: ENGLISH II PRIORITIZED STANDARDS AND ASSESSED PERFORMANCE INDICATORS</b> .....	<b>28</b>
<b>BIOLOGY END-OF-COURSE SPECIFICATIONS</b> .....	<b>34</b>
<b>I.</b> Introduction.....	35
<b>II.</b> Process Used .....	35
<b>III.</b> Learner/Assessment Expectations .....	36
<b>IV.</b> Suggestions and Caution.....	40
<b>V.</b> Summary .....	41
<b>VI.</b> Biology End-of-Course Expectations .....	41
<b>END-OF-COURSE ASSESSMENT RECOMMENDATIONS FOR ALGEBRA I AND INTEGRATED MATHEMATICS I</b> .....	<b>80</b>
<b>I.</b> Introduction: Definition of the Task .....	81
<b>II.</b> The Process .....	81
<b>III.</b> Recommendation for the Assessment Design.....	82
<b>IV.</b> Suggestions and Cautions .....	83
<b>V.</b> Summary .....	83
<b>APPENDIX A: DELAWARE’S ASSESSMENT EXPECTATIONS</b> .....	<b>85</b>
<b>APPENDIX B: DELAWARE’S ASSESSMENT CONTENT STRAND CONFIGURATION</b> .....	<b>89</b>
<b>APPENDIX C: SAMPLE ITEMS</b> .....	<b>91</b>
<b>END-OF-COURSE RECOMMENDATIONS FOR ALGEBRA II AND INTEGRATED MATHEMATICS III</b> .....	<b>120</b>
<b>I.</b> Introduction: Definition of the Task .....	121
<b>II.</b> The Process .....	121

<b>III.</b> Recommendation for the Assessment Design.....	123
<b>IV.</b> Suggestions and Cautions .....	123
<b>V.</b> Summary .....	124
<b>APPENDIX A: DELAWARE’S COURSE STANDARDS SPECIFICATIONS .....</b>	<b>125</b>
<b>APPENDIX B DELAWARE’S ALGEBRA II/INTEGRATED MATH III CONTENT STRAND     CONFIGURATION .....</b>	<b>137</b>
<b>END-OF-COURSE SPECIFICATIONS FOR U.S. HISTORY .....</b>	<b>139</b>
<b>I.</b> Introduction: Definition of the Task .....	140
<b>II.</b> The Process .....	140
<b>III.</b> Recommendations for the Assessment Design .....	141
<b>IV.</b> Suggestions and Cautions .....	143
<b>V.</b> Summary .....	145
<b>APPENDIX A: DELAWARE SOCIAL STUDIES BENCHMARKS ASSESSED ON THE U.S. HISTORY     EOC TEST AND SAMPLE ITEMS .....</b>	<b>147</b>
<b>APPENDIX B: U.S. HISTORY SAMPLE COURSE OUTLINE.....</b>	<b>156</b>

## **Introduction to the Specifications for Select High School Courses and End-of-Course Assessments (Updated March 2011)**

In addition to providing the specifications for select high school courses, this update incorporates the Delaware Prioritized Curriculum Standards coding and clarifies the Delaware Comprehensive Assessment System (DCAS) specifications for the end-of-course (EOC) assessments. The Prioritized Curriculum coding identifies standards, performance indicators, and grade-level expectations (GLEs) as *essential*, *important*, or *compact*. This coding informs educators as to the areas of instruction that should be emphasized to ensure students' academic growth.

EOC assessment update:

- EOC assessments will be introduced for use as part of the DCAS beginning in the 2011–2012 school year.
- EOC assessments will be offered at the end of the fall and spring semesters. Schools on block schedules will administer the EOC assessments in January as well as May of each year; schools on semester schedules will administer the EOC assessments in May of each year.
- The EOC assessments will be an online, immediately scored, fixed-form test. Multiple choice and other machine-scored item types will be utilized to provide immediate online scores.
- Prior to the first operational assessment there will be a separate field test. It will be administered during the 2010–2011 school year.
- The DDOE will determine, pending state legislation and subsequent policy decision, whether the EOC assessments will be a requirement for graduation and/or factor in course grades.

A major influence on the course and EOC assessment specifications should be acknowledged here. The Common Core State Standards (CCSS) were adopted by Delaware in 2010. The adoption of CCSS warrants consideration for both the EOC course and assessment specifications. With that in mind, it is important to note that the DDOE continues its dialogue with districts and charter schools around the implementation of the CCSS, including the important steps of teacher training and course mapping. Delaware is an active member of Implementing the Common Core System (ICCS) and State Collaboratives on Assessment and Student Standard (SCASS), both of which are sponsored by the Council of Chief State School Officers (CCSSO). Updates on DCAS can be found on the DCAS portal at <http://de.portal.airast.org/>

Michael W. Stetter, D.Ed., Director  
Accountability Resources Workgroup  
March 2011

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# ENGLISH II SPECIFICATIONS

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## I. INTRODUCTION: DEFINITION OF THE TASK

Delaware’s Secretary of Education, Lillian Lowery, in consultation with the Delaware Chief School Officers, approved the development of a high school end-of-course exam for grade 10 English language arts (ELA). An ELA design team task force formulated course specifications and links to the Delaware Content Standards/Grade-Level Expectations in ELA for a single designated course intended to serve as the basis for the No Child Left Behind Act (NCLB) accountability requirement for an end-of-course assessment in high school.

For assessment purposes, the high school end-of-course exam for ELA is called English II as it equates to a student’s second year of English in high school.

## II. THE PROCESS

The 2009 ELA design team task force consisted of four high school ELA and reading teachers and specialists representing each of the three counties in Delaware, one curriculum education associate from the Delaware Department of Education, and one ELA specialist from the University of Delaware:

Cary Brandenberger-Riches	NCCVT School District	New Castle County
Patricia Masten	Milford School District	Kent County
Aleta Thompson	Cape Henlopen School District	Sussex County
Ann Lewis	Laurel School District	Sussex County
Bonnie Albertson	University of Delaware	New Castle County
Juley Harper	Curriculum Workgroup	Delaware DOE

The team began the development process by reviewing the ELA performance indicators and grade-level expectations (GLEs) to identify the expectations that comprise “big ideas” and should be assessed in the English II course. The appropriate performance indicators and GLEs were then mapped to the big ideas and cross-referenced by discourse category for writing and cognitive level for reading and research, creating an English II course specifications matrix, which is located in Appendix A.

Once the critical performance indicators and GLEs were identified, the ELA design team task force reviewed other state and national standards in search of “gaps” or differences that Delaware’s standards may have. The following reflects the documents reviewed:

- National Council of Teachers of English (NCTE) ELA standards
- National Assessment of Educational Progress (NAEP) grade 12 Benchmarks for reading and writing
- American Diploma Project (ADP) Ready or Not ELA Benchmarks
- International Reading Association Standards
- ADP English Benchmarks
- Grade 9–11 Delaware GLEs for Standards 1–4
- ELA Core Content Standards for College and Career Readiness

- Missouri, North Carolina, Louisiana, Florida, Texas, and West Virginia Content Standards

The ELA design team task force concluded that the core principles in Delaware’s ELA content standards were a close match to the state and national standards that were reviewed. Based on the identified commonalities, the following factors should be considered when developing the EOC course and assessment.

The standards:

- Consider the needs of teachers and students by providing guidance while encouraging local characteristics and needs to be taken into account.
- Include skills that can be measured easily.
- Spell out core standards, concepts, and principles in ELA in fundamental terms.
- Offer sample texts for ELA but do not dictate a canonized list.
- Place a large emphasis on literacy skills for literary, non-literary, and media texts.
- Are written in teacher-friendly language, do not provide an overly rigid guide to ELA teachers, and are not prescriptive.
- Are supported with scientifically based reading research and evidence.
- Encourage students to think and write critically about a variety of texts—an essential skill for both college and the workforce.

The next step for the ELA design team task force was to review released items from state assessments that could serve as sample items for the identified English II course and end-of-course assessment. The following list represents the assessment documents that were reviewed for appropriate released items:

- Delaware Item Samplers
- Delaware State Testing Program (DSTP) Performance Level Descriptors and GLEs for grade 10
- Reading Framework for the 2009 National Assessment of Educational Progress
- Grade 10 ELA DSTP Stances and Standards for reading and writing
- Achieve ADP English and Communication Benchmarks grades 9–10  
<http://www.achieve.org/node/941>
- ELA Core Content Standards for College and Career Readiness
- Missouri End-of-Course Assessment Items <http://dese.mo.gov/divimprove/assess/>
- North Carolina End-of-Course Assessment Items  
<http://www.dpi.state.nc.us/accountability/testing/eoc/sampleitems/1a>
- Florida Comprehensive Assessment Test Assessment Items
- California High School Exit Exam Assessment Items
- Idaho End-of-Course Assessment Items
- Indiana Graduation Qualifying Exam Assessment Items
- Louisiana Graduation Exit Exam for the 21st Century Assessment Items
- Maryland High School Assessment Items  
[http://hsaexam.org/img/CD%20Content/samples\\_2007/PR07\\_English.pdf](http://hsaexam.org/img/CD%20Content/samples_2007/PR07_English.pdf)

- Massachusetts End-of-Course Assessment Items
- Minnesota End-of-Course Assessment Items
- Mississippi Subject Area Testing Program Assessment Items
- Nevada End-of-Course Assessment Items
- New York Regents Comprehensive Examination Assessment Items
- Ohio Graduation Test Assessment Items
- Oklahoma English II Assessment Items
- South Carolina End-of-Course Assessment Items
- Virginia Standards of Learning Assessment Items
- Washington Assessment of Student Learning Exit Exam Assessment Items
- College Board Sample Items
- Writing Framework for the 2011 NAEP Assessment  
<http://www.sde.idaho.gov/site/naep/docs/wr11/wr11-nagb-framework.pdf>

### **III. THE ASSESSMENT DESIGN**

#### **Underlying Assumption**

The English II EOC assessment is based on the Delaware ELA prioritized standards, performance indicators, and grade-level expectations, and therefore the test is a transfer task assessment rather than an assessment based on specific course content.

The ELA framework assumes:

- Language is at the heart of all human interaction.
- Schools must use students’ home and early social experiences as the foundation for ELA development.
- Students’ linguistic diversity must be recognized, respected, and built upon.
- The language arts are important tools for acquiring concepts and knowledge in all content areas.
- Students need to develop language and communication skills that will allow them to function in a complex society and in a variety of workplaces.
- An effective 21<sup>st</sup> century ELA program emphasizes a wide range of literacy skills and expands the definition of “text” beyond the literary.

#### **Test Structure**

The EOC reading test will be an online, 60-item, fixed-form test. The passages for the EOC assessment will include both literary and informational texts with the goal of 30% literary and 70% informational. Every attempt will be made to identify authentic text with appropriate text complexity. The Lexile<sup>®</sup> range of 1080–1305 recommended by the CCSS will be utilized.

Multiple choice and innovative machine-scored items will be used in order to provide immediate feedback.

Items will be evaluated using Norm Webb’s Depth of Knowledge (DOK) criteria.

- **Level 1 – Recall of Information:** Requires students to receive or recite facts or to use simple skills or abilities.
- **Level 2 – Basic Reasoning:** Includes the engagement of some mental processing beyond recalling or reproducing a response; it requires both comprehension and subsequent processing of text or portions of text.
- **Level 3 – Complex Reasoning:** Requires students to go beyond the text; however, they are still required to show understanding of the ideas in the text. May require students to explain, generalize, connect ideas, or make inferences across an entire passage.

For an in-depth explanation refer to <http://wat.wceruw.org/index.aspxsee>.

These three cognitive levels closely align to the cognitive stances used on the Delaware Student Testing Program (DSTP).

The percentages to be used for the EOC cognitive targets reflect the percentages used for the National Assessment of Educational Progress (NAEP) reading assessment.

	<b>Recall of Information</b>	<b>Basic Reasoning</b>	<b>Complex Reasoning</b>
<b>English II</b>	20%	45%	35%

The performance indicators that are currently identified to be assessed on the English II EOC assessment are located in Appendix B.

#### **IV. SUGGESTIONS AND CAUTIONS**

Not all standards, performance indicators, and GLEs will be assessed on the EOC assessment; however, it is the expectation that all standards, performance indicators, and GLEs will be taught. For example, while a writing component is not currently part of the assessment design, writing instruction is an integral part of Delaware’s Prioritized Curriculum and the CCSS. It is the expectation that districts and teachers will continue to keep writing at the core of their English II program. The ELA prioritized standards are not isolated skills but interrelated communications tools. Good instruction builds on these connections which enhances student learning.

An English II practice test is scheduled to be available on the DCAS portal as of August 9, 2011—<http://de.portal.airast.org/>.

#### **V. SUMMARY**

The 2009 ELA design team task force recommended that the ELA high school end-of-course be referred to as English II. The course specifications are based on Delaware’s content standards, performance indicators, and GLEs. Therefore, the assessment is a transfer task rather than an assessment based on course content. The assessment is an online, 60-item, fixed-form test that yields immediate scores. It is the expectation that all standards, performance indicators, and GLEs be taught even if not assessed by the EOC exam.

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**APPENDIX A:  
COURSE SPECIFICATION MATRICES FOR  
ENGLISH II**

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## 1. Matrix for English II – Standard 1 Writing

**Standard 1:** Use written and oral English appropriate for various purposes and audiences.

**Written Communication:** Writing is a flexible, recursive process that encompasses identifying purposes and audiences, prewriting, drafting, revising, editing, and publishing. The use of a variety of technologies will facilitate this process.

**Notes:**

1. Items that are underlined represent content that is new to English II.
2. The Big Ideas for Standard 1 correspond to the categories in the state writing rubric.
3. Prioritized coding is indicated in red. The indicators are E = Essential, I = Important, and C = Compact.

Big Ideas (Key Concepts)	Modes of Discourse		
	Persuasive	Informative	Expressive
<b>Purpose</b>	<p>Students understand that persuasive writing...</p> <ul style="list-style-type: none"> <li>• is audience-centered, the intended audience is the most important consideration <b>E</b></li> <li>• takes a position on debatable issue to convince the audience <b>E</b></li> </ul>	<p>Students understand that informative writing...</p> <ul style="list-style-type: none"> <li>• is subject-centered; the need to communicate information is the most important consideration <b>E</b></li> </ul>	<p>Students understand that expressive writing...</p> <ul style="list-style-type: none"> <li>• is author-centered; the writer's intent to tell story, make meaning of experience, achieve personal goals, or create literary pieces is the most important consideration <b>E</b></li> </ul>
<b>Audience</b>	<p>The student writer ...</p> <ul style="list-style-type: none"> <li>• demonstrates an awareness of the audience <b>I</b></li> <li>• communicates necessary background information and /or definitions for a given audience <b>I</b></li> <li>• acknowledges reader's positions/beliefs about ideas/issues; understands implications for the writer and <u>adjusts content accordingly</u> <b>I</b></li> <li>• writes to audiences that can be increasingly distant and <u>abstract</u> in addition to more familiar audiences <b>I</b></li> </ul>		
<b>Form</b>	<ul style="list-style-type: none"> <li>• Letters to appropriate individuals/organizations (e.g., editor, boards, business, personnel) <b>I</b></li> <li>• Persuasive essays <b>E</b></li> <li>• Advertisements <b>I</b></li> <li>• Editorials <b>I</b></li> <li>• Reviews <b>E</b></li> <li>• Proposals <b>I</b></li> <li>• Debate briefs <b>E</b></li> <li>• Position papers <b>E</b></li> <li>• <u>Legislative/legal documents</u> <b>C</b></li> </ul>	<ul style="list-style-type: none"> <li>• Letters to appropriate individuals/organizations (e.g., editor, boards, businesses, personnel) <b>C</b></li> <li>• Summaries <b>E</b></li> <li>• Reports (e.g., book reports, research reports) <b>E</b></li> <li>• Essays (e.g., expository—pro-con, cause/effect, definition, etc,—descriptive) <b>E</b></li> <li>• Articles(feature and/or specialized) <b>I</b></li> <li>• Messages/memos and notices <b>I</b></li> <li>• Biography and autobiography <b>I</b></li> <li>• Reviews/<u>literary criticism</u> <b>E</b></li> <li>• Proposals <b>E</b></li> <li>• Character analyses <b>E</b></li> </ul>	<ul style="list-style-type: none"> <li>• Stories <b>C</b></li> <li>• Journals <b>I</b></li> <li>• Poems <b>I</b></li> <li>• Memoirs <b>I</b></li> <li>• Personal statement essays <b>C</b></li> </ul>

	Modes of Discourse		
Big Ideas (Key Concepts)	Persuasive	Informative	Expressive
<b>Development</b>	<ul style="list-style-type: none"> <li>• Present a clear defensible position that supports, opposes, or <u>qualifies the issue/question</u> <b>E</b></li> <li>• Support position with reasons that could include relevant facts, statistics, credible personal and expert opinions, examples, and/or insightful commentary <b>E</b></li> <li>• Acknowledge and evaluate readers' anticipated position(s) on the issue and/or anticipated opposition (e.g., recognize alternative view points, propose solutions, make concessions, present a rebuttal) <b>E</b></li> <li>• <u>Acknowledge assumptions within arguments and recognize unstated assumptions in opposition</u> <b>E</b></li> <li>• Write an original (e.g., beyond the obvious) and effective title, when appropriate <b>C</b></li> <li>• Avoid unsupported reasons/logical fallacies (e.g., begging, "it's not fair," circular reasoning, partial truths, jumping to conclusions, jargon, <u>faulty cause/effect statements, inadequately warranted claims</u>) <b>I</b></li> <li>• Use (when appropriate) persuasive and propaganda techniques (e.g., appeal to emotion, name calling, exaggeration/hyperbole, bandwagon, transfer, testimonial, <u>parallelism, analogy</u>) when appropriate <b>I</b></li> <li>• Identify and use primary and secondary sources when appropriate, avoiding plagiarism <b>E</b></li> <li>• Combine information from text and prior knowledge to elaborate upon ideas in writing (text-to-self, text-to-text, text-to-world connections) that reveal to the reader the writer's depth of understanding of the issue <b>E</b></li> </ul>	<ul style="list-style-type: none"> <li>• Select an interesting, manageable and <u>thought-provoking subject or focus</u> for writing and one that meets the requirements of the assignment <b>E</b></li> <li>• Write an effective title, when appropriate <b>C</b></li> <li>• Provide relevant information, reasons, and/or details to elaborate or clarify the subject (e.g., personal opinion based on experience/ observation, verifiable facts, examples, explanations, definitions) <b>E</b></li> <li>• Analyze and use information from multiple primary and secondary sources to support <u>generalizations</u> and theses, and to generate new ideas and/or perspectives, avoiding plagiarism <b>E</b></li> <li>• Combine information from text and prior knowledge to elaborate upon ideas in writing (text-to-self, text-to-text, text-to-world connections) that reveal to the reader the writer's depth of understanding of the topic <b>E</b></li> </ul>	<ul style="list-style-type: none"> <li>• Develop increasingly more abstract and interesting ideas for writing that are fresh and original <b>I</b></li> <li>• Create a title that reflects the subject and engages the reader <b>C</b></li> <li>• Use dialogue, description, and narration when appropriate <b>I</b></li> <li>• Use vivid sensory images, figurative language, monologue, and/or allusion to elaborate details that will convey feelings and/or illustrate events and characters <b>E</b></li> <li>• Use rhetorical devices (e.g., rhetorical question, repetition, direct address) when appropriate <b>E</b></li> <li>• Use strategies such as humor, non-literal language (e.g., puns, double-meanings, <u>purposeful use of ambiguity</u>), alternative narrative techniques (e.g., <u>stream-of-consciousness</u>) to engage the reader <b>I</b></li> <li>• Combine information from text and prior knowledge, to elaborate upon ideas in writing (text-to-self, text-to-text, text-to-world connections) that reveal to the reader the writer's depth of understanding of the topic <b>E</b></li> </ul>

	Modes of Discourse		
Big Ideas (Key Concepts)	Persuasive	Informative	Expressive
<b>Organization</b>	<ul style="list-style-type: none"> <li>• Present reasons in a logical order (e.g., weakest to strongest argument, strongest to weakest argument, inductive or deductive reasoning)  </li> <li>• Organize writing by selecting text structures that strengthen the argument  </li> <li>• Develop an introduction that presents a thesis and <ul style="list-style-type: none"> <li>▪ takes a clear position and establishes self as authority  </li> <li>▪ clarifies the issue in a way that clearly establishes a need for solution/action  </li> <li>▪ provides necessary background  </li> <li>▪ commands readers' attention (e.g., invokes or appeals to reader) when appropriate  </li> <li>▪ provides criteria for evaluation of opposition  </li> </ul> </li> <li>• Use subtle transition words/phrases that show increasingly more abstract relationships and make connections (e.g., controlling the pace, tracing development of the perspective and/or <u>logic of the argument</u>)  </li> <li>• Develop a conclusion that moves beyond summary (e.g., "call to action" or "next step," answers the "so what?" question about the significance of the issue, raises related issues or consequence of non-action, provides perspective) E</li> </ul>	<ul style="list-style-type: none"> <li>• Plan how to present information in a logical order (e.g., most important to least important information, general to specific, <u>inductive or deductive reasoning</u>)  </li> <li>• Organize writing by selecting text structures that clarify or explain the subject  </li> <li>• Develop an introduction/hook that presents a thesis that goes beyond the obvious and provides necessary background  </li> <li>• Organize writing to engage the reader (e.g., use by using other forms and genres  </li> <li>• Use subtle transition words/phrases that show increasingly more abstract relationships and make connections  </li> <li>• Use paragraphs to transition between ideas and control and enhance message  </li> <li>• Develop a conclusion that moves beyond summary (e.g., reinforcing the importance of the information, raising related issues, and/or generating a new hypothesis) E</li> </ul>	<ul style="list-style-type: none"> <li>• Organize writing to engage the reader (e.g., use by using other forms and genres  </li> <li>• Use paragraphs to transition between ideas and control and enhance message  </li> <li>• Develop an introduction that hooks the reader and establishes the mood and tone  </li> <li>• Use transition words/phrases that show increasingly more complex relationships and make connections  </li> <li>• Use order other than chronological (e.g., flashback, foreshadow, flash-forward)  </li> <li>• Develop a conclusion that moves beyond summary (e.g., provide resolution/closure, pose purposeful questions to the reader to keep the reader thinking, refer back to the introduction/hook for circular endings) E</li> </ul>
<b>Sentence Structure</b>	<p>In order to capture the audience's attention and establish a distinctive style, tone, and voice</p> <ul style="list-style-type: none"> <li>• use complete sentences to express thoughts  </li> <li>• vary sentence structure (e.g., simple, compound, complex, compound-complex sentences)  </li> <li>• vary kinds of sentences (declarative, explanatory, interrogative, imperative)  </li> <li>• vary sentence lengths  </li> <li>• vary sentence beginnings (experiment with placement of phrases and clauses in sentences)  </li> <li>• write sentences that create purpose-specific rhythm and flow naturally  </li> </ul>		

Big Ideas (Key Concepts)	Modes of Discourse		
	Persuasive	Informative	Expressive
<b>Word Choice</b>	<p>Use vivid and precise words with the audience's needs and writer's purpose, style and voice in mind:</p> <ul style="list-style-type: none"> <li>• <u>use specific</u>, concrete language and phrasing <b>E</b></li> <li>• use adjectives and adverbs to describe, illustrate, and modify (clarify meaning) <b>I</b></li> <li>• use action verbs when possible <b>I</b></li> <li>• use words that convey appropriate voice (e.g., attitude, emotion, point of view, commitment) and add depth to writing <b>I</b></li> <li>• use a variety of accurate words and phrases that avoid repetition <b>I</b></li> <li>• use a purposeful range of formal/informal language depending on the audience <b>I</b></li> <li>• use non-literal language (e.g., idioms, slang, figurative language, dialect, pun) <b>I</b></li> <li>• use words that have denotations or connotations appropriate for the writing purpose <b>I</b></li> <li>• use words that create consistent style and tone for the writing occasion <b>I</b></li> <li>• purposely use active and passive voice <b>I</b></li> </ul>		
<b>Conventions</b>	<p>Use Standard Written English (SWE) conventions (and when appropriate, variations thereof) to achieve purpose and create effective style and voice. Deviations from SWE (e.g., dialect, slang) should have a specific rhetorical function <b>E</b></p> <p>Use standard punctuation (commas, colons, hyphens, dashes, italics, and <u>ellipses</u>) correctly <b>I</b></p> <p>In addition to standard punctuation</p> <ul style="list-style-type: none"> <li>• use punctuation to show increasingly abstract relationships (e.g., comma for clarity such as to set off phrases, clauses, appositives; semi-colon; colon to show relationships, parentheses) <b>I</b></li> <li>• use punctuation for rhetorical effect (e.g., dash, <u>colon</u>, <u>ellipses</u>) <b>I</b></li> </ul> <p><u>Demonstrate control of grammar in sophisticated sentence structures (compound, complex, compound-complex)</u></p> <ul style="list-style-type: none"> <li>• <u>agreement of subject/verb, pronoun/antecedent</u> <b>I</b></li> <li>• <u>verb use (tense)</u> <b>I</b></li> <li>• <u>pronoun use (number, gender)</u> <b>I</b></li> <li>• <u>use active and passive voice appropriately and consistently</u> <b>I</b></li> <li>• <u>use purposeful parallel structure</u> <b>I</b></li> </ul>		

Please refer to the Standard 1 GLEs for definitions. [http://www.doe.k12.de.us/infosuites/staff/ci/content\\_areas/ela\\_standards\\_gle.shtml](http://www.doe.k12.de.us/infosuites/staff/ci/content_areas/ela_standards_gle.shtml)

## 2. Matrix for English II – Standard 1 Oral Communication

**Standard 1:** Use written and oral English appropriate for various purposes and audiences.

**Oral Communication:** Speakers draw upon the language of their home, community, and culture—as well as the public language of the larger culture—to communicate effectively with a variety of audiences.

**Note:** Prioritized coding is indicated in red. The indicators are E = Essential, I = Important, and C = Compact.

Performance Indicators	Grade-Level Expectations
<p><b>1.4</b> Orally communicate information, opinions, and ideas effectively to different audiences for a variety of purposes.</p>	<ul style="list-style-type: none"> <li>• Choose words and use voice appropriate to audience and purpose (e.g., inform, persuade, entertain) <b>E</b></li> <li>• Speak and listen for a variety of audiences (e.g., classroom, real-life) and purposes (e.g., awareness, enjoyment, information, problem solving) <b>E</b></li> <li>• Identify and discuss criteria for effective oral presentations (e.g., eye contact, projection, tone, volume, rate, articulation)</li> <li>• Use visual techniques appropriately <b>E</b></li> <li>• Share impromptu remarks about topics of interest to oneself and others <b>I</b></li> <li>• Speaking from notes or an outline, relate an experience in descriptive detail, with a sense of timing and etiquette appropriate to the occasion <b>I</b></li> <li>• Perform expressive oral readings of prose, poetry, and drama <b>C</b></li> <li>• Prepare and conduct interviews <b>C</b></li> <li>• Present a coherent, comprehensive report on differing viewpoints on an issue, evaluating the content of the material presented, and organizing the presentation in a manner appropriate to the audience <b>I</b></li> <li>• Differentiate between formal and informal contexts and employ an appropriate style of speaking, adjusting language, gestures, rate, and volume according to audience and purpose <b>I</b></li> </ul>
<p><b>1.5</b> Listen to and comprehend oral communication</p>	<ul style="list-style-type: none"> <li>• Follow basic directions <b>I</b></li> <li>• Listen attentively by making eye contact, facing the speaker, asking questions, and paraphrasing what is said <b>E</b></li> <li>• Ask and respond to questions from teachers and other group members <b>I</b></li> <li>• Summarize and explain information conveyed in an oral communication accounting for key ideas, structure and relationship of parts to the whole <b>E</b></li> <li>• Distinguish among purposes for listening (e.g., gaining information, being entertained) and take notes as appropriate <b>E</b></li> <li>• Recall significant details and sequence accurately <b>I</b></li> <li>• Follow a speaker's argument and represent it in notes <b>I</b></li> <li>• Evaluate the reliability of information in oral communication using criteria based on:               <ul style="list-style-type: none"> <li>▪ The topic <b>I</b></li> <li>▪ The context <b>I</b></li> <li>▪ Analysis of logic, evidence, propaganda devices (e.g., bandwagon, double speak, name-calling) <b>I</b></li> <li>▪ Style <b>I</b></li> </ul> </li> </ul>

Performance Indicators	Grade-Level Expectations
<p><b>1.6</b> Develop vocabulary and the ability to use words, phrases, idioms, and various grammatical structures as a means of improving communication.</p>	<ul style="list-style-type: none"> <li>• Use words that reflect a growing range of interests and knowledge <b>I</b></li> <li>• Clarify and explain words and ideas <b>I</b></li> <li>• Give and follow oral directions <b>I</b></li> <li>• Use complex sentence structure <b>I</b></li> <li>• Use appropriate noun/verb agreement, very tense, pronouns, prefixes and suffixes <b>E</b></li> <li>• Consult dictionaries and thesauruses, and other resources to find and compare definitions, choose among synonyms, and spell words correctly <b>I</b></li> <li>• Use knowledge of roots, prefixes, and suffixes to interpret and convey the meaning of words <b>I</b></li> <li>• Identify common figures of speech(e.g., similes, metaphors, personification, hyperbole, allusion) and describe how writers use them to achieve specific effects and use them effectively <b>E</b></li> <li>• Use punctuation marks that distinguish statements, questions, exclamations, and commands <b>C</b></li> </ul>
<p><b>1.7</b> Participate effectively in a discussion</p>	<ul style="list-style-type: none"> <li>• Initiate conversations with peers and adults <b>I</b></li> <li>• Participate in a variety of roles in group discussions (e.g., active listener, contributor, discussion leader) <b>E</b></li> <li>• Listen attentively, demonstrating respect for the opinion of others <b>I</b></li> <li>• Respond responsibly and courteously to other's remarks <b>E</b></li> <li>• Explain opinions by citing evidence and referring to sources <b>E</b></li> <li>• Evaluate the stated ideas and opinions of others, seeking clarification through questions <b>E</b></li> <li>• Invite ideas and opinions of others into the discussion <b>E</b></li> <li>• Accept and use helpful criticism <b>E</b></li> <li>• Summarize the main points of a discussion orally, and in writing, specifying areas of agreement and disagreement <b>E</b></li> <li>• Participate in discussion without dominating <b>I</b></li> </ul>

### 3. Matrix for English II – Standards 2 and 4 Reading

**Standard 2:** Construct, examine, and extend the meaning of literary, informative, and technical texts through listening, reading, and viewing.

**Standard 4:** Use literary knowledge accessed through print and visual media to connect self to society and culture.

**Note:** Prioritized coding is indicated in red. The indicators are E = Essential, I = Important, and C = Compact.

#### Both LITERARY and NON-LITERARY Text

Big Ideas for Reading (Key Concepts)	Performance Indicators	Grade-Level Expectations
<b>VS</b> – Vocabulary <b>CS</b> – Comprehension Strategies (Effective use of reading process) <b>AP/A</b> – Author’s Purpose and Audience <b>A/C/C</b> – Author Craft & Choices <b>L</b> – Language use (e.g., figurative language, diction) <b>CAT</b> – Critical Analysis of Text <b>LC/M</b> – Literary Connections/ Merit	<b>Personal Connection</b>	
	<b>2.4k</b> demonstrate an overall understanding of printed texts by relating the content of the text to real-life situations. <b>CS, LC/M</b>	<ul style="list-style-type: none"> <li>Draw on prior knowledge and experiences to connect personally to text (text-to-self connections) <b>E</b></li> <li>Draw on prior knowledge of the world (other books, television, movies) to make text-to-world connections <b>E</b></li> <li>Employ reading strategies (e.g., skimming, scanning) to locate and apply information in varied print and non-print (e.g., computers, electronic, media, interviews) sources for inquiry projects and other authentic tasks <b>I</b></li> <li>Analyze how connections (text-to-self and text-to-world) are contributing to their understanding of text <b>E</b></li> </ul>
	<b>Recall of Information</b>	
	<b>2.1</b> select and apply efficient effective decoding skills and other word recognition strategies to comprehend printed texts. <b>CS</b>	<ul style="list-style-type: none"> <li>Apply and use the meanings of high frequency Greek and Latin derived roots and affixes to determine meaning of unknown words (e.g., bio, derm, anti, graph, tele) <b>I</b></li> <li>Read orally from familiar text at an appropriate rate, with accuracy and prosody <b>C</b></li> </ul>
	<b>2.3a</b> self-monitor comprehension while reading by generating a purpose for reading. <b>CS</b>	<ul style="list-style-type: none"> <li>Assimilate prior knowledge <b>E</b></li> <li>Generate and answer questions <b>E</b></li> <li>Summarize <b>E</b></li> <li>Reread to clarify information <b>E</b></li> <li>Make and revise predictions <b>E</b></li> <li>Adjust reading rate <b>I</b></li> <li>Infer information <b>I</b></li> <li>Use mental imagery <b>I</b></li> <li>Seek the meaning of unknown vocabulary <b>I</b></li> <li>Analyze story/literary elements and text structure <b>I</b></li> </ul>
<b>2.4d</b> demonstrate an overall understanding of printed texts by retelling a story or restating an informative text through speaking and/or writing. <b>CS</b>	<ul style="list-style-type: none"> <li>Summarize a literary text, identifying the main and supporting characters, setting, events, and problem/solution <b>I</b></li> <li>Summarize the strongly implied reasons why or how events happen in a literary text <b>E</b></li> <li>Summarize the main ideas and supporting details in an informative/technical text <b>E</b></li> <li>Retell/restate in order the important events in a text <b>C</b></li> <li>Restate in order the steps of a task in an informative/technical text <b>I</b></li> </ul>	

Big Ideas for Reading (Key Concepts)	Performance Indicators	Grade-Level Expectations
	<p><b>Basic Reasoning</b></p> <p><b>2.2a</b> develop an increasingly extensive vocabulary and actively seek the meaning of unknown words as an important fact of comprehending texts and messages by using context clues to determine meanings of words. <b>VS, CS</b></p> <p><b>2.3c</b> self-monitor comprehension while reading by taking appropriate actions (e.g., rereading to make sense, adjusting rate of reading, seeking the meaning of unknown vocabulary) to enhance understanding of oral and written text. <b>CS</b></p> <p><b>2.4a</b> demonstrate an overall understanding of printed texts by making...predictions as needed. <b>CS</b></p> <p><b>2.4c</b> demonstrate an overall understanding of printed texts by recognizing and interpreting figurative language and literary devices (e.g., simile, metaphor, allusion) and differentiating between literal and non-literal meanings. <b>L</b></p> <p><b>2.4e</b> demonstrate an overall understanding of printed texts by organizing the important points of the text via summaries, outlines, and /or graphic organizers. <b>CS</b></p>	<ul style="list-style-type: none"> <li>• Use prior knowledge in conjunction with the following strategies to determine the meaning of unknown words by: <ul style="list-style-type: none"> <li>▪ Reading and rereading other sentences in the text to identify and use words that help unlock the meaning of unknown words <b>I</b></li> <li>▪ Analyzing illustrations to clarify meanings of abstract words and concepts <b>I</b></li> <li>▪ Looking for and using context clues provided by synonyms and antonyms <b>I</b></li> <li>▪ Using knowledge of homonyms and homographs to avoid reading confusion <b>C</b></li> <li>▪ Using word cues (e.g., metaphors, similes) <b>I</b></li> <li>▪ Using appositives <b>C</b></li> <li>▪ Selecting the correct definition of words that have multiple meanings <b>E</b></li> </ul> </li> <li>• Use illustrations to construct meaning from text <b>I</b></li> <li>• Reread difficult parts slowly and carefully <b>C</b></li> <li>• Make, confirm, adjust predictions <b>I</b></li> <li>• Visualize what was read for deeper understanding <b>E</b></li> <li>• Skim text to search for connections between and among ideas <b>I</b></li> <li>• Use graphic organizer or other note-taking technique to record important ideas or information <b>E</b></li> <li>• Explain personal connections to the topics or information in text(s) <b>E</b></li> <li>• Restate in own words the main events in the text <b>I</b></li> <li>• Frequently summarize while reading <b>E</b></li> <li>• Frequently paraphrase important ideas or information <b>E</b></li> <li>• Predict likely outcomes based on clues in text, knowledge of text structure, and knowledge of a variety of genres <b>E</b></li> <li>• Adjust previous predictions based on new information in a text <b>I</b></li> <li>• Identify logical, additional, and/or complementary information (e.g., “next” chapter or section) for a text <b>I</b></li> <li>• Identify and interpret figurative language and literary devices (e.g., alliteration, repetition, rhythm, dialogue, rhyme, idioms, similes, metaphors, personification, exaggeration or hyperbole, humor, double meanings, symbols, imagery, mood, allusion, puns, and irony, and tone) <b>E</b></li> <li>• Analyze how figurative language and literary devices extend meaning <b>E</b></li> <li>• Differentiate between literal and non-literal meaning <b>E</b></li> <li>• Create graphic organizers to assist in comprehension of a text <b>E</b></li> <li>• Use an appropriate organizer based on text structure (e.g., sequence/chronological order, classification, definition, process, description, comparison, problem/solution, cause/effect) <b>E</b></li> <li>• Create an outline <b>I</b></li> <li>• Summarize text capturing most important parts of the original piece <b>E</b></li> </ul>

Big Ideas for Reading (Key Concepts)	Performance Indicators	Grade-Level Expectations
	<p><b>2.4f</b> demonstrate and overall understanding of printed texts by indentifying the author's purpose. <b>APA</b></p>	<ul style="list-style-type: none"> <li>• Analyze the author's overall purpose(s) for writing (e.g., persuade, entertain, inform, describe, explain how) a text <b>I</b></li> <li>• Identify the intended messages of advertisements, entertainment programs, and news sources <b>I</b></li> <li>• Analyze how the author's purposes shape the content <b>E</b></li> <li>• Analyze the difference between a stated purpose and an underlying reason in TV commercials and advertisements <b>I</b></li> <li>• Create meaning from a variety of media <b>I</b></li> </ul>
	<p><b>2.4g</b> demonstrate an overall understanding of printed texts by comparing information between and within texts. <b>CAT</b></p>	<ul style="list-style-type: none"> <li>• Compare subtle but relevant similarities and/or differences in ideas, viewpoints, or characters within a single text <b>E</b></li> <li>• Compare subtle but relevant similarities and/or difference in ideas, viewpoints, purposes, plots, settings, or characters presented in two or more texts <b>E</b></li> <li>• Analyze subtle changes in characters (e.g., changes in attitude, situation) <b>E</b></li> </ul>
	<p><b>2.4h</b> demonstrate an overall understanding of printed texts by discriminating between fact and opinion. <b>RS</b></p>	<ul style="list-style-type: none"> <li>• Discriminate between facts and/or subtle opinions in text(s) <b>E</b></li> <li>• Identify facts in a text and determine their relevance to the issue <b>C</b></li> <li>• Identify implied opinions in a text and determine their relevance to the issue <b>E</b></li> <li>• Use word clues (e.g., believe, feel, think, worst, best, least , most, never, always) to determine that a statement is an opinion <b>C</b></li> <li>• Question information in a text to determine if it is factual <b>I</b></li> </ul>

Big Ideas for Reading (Key Concepts)	Performance Indicators	Grade-Level Expectations
	<b>Complex Reasoning</b>	
	<b>2.5a</b> Critically analyze and evaluate information and messages presented through print by connecting and synthesizing information from many sources. <b>CAT</b>	<ul style="list-style-type: none"> <li>• Connect and synthesize information from increasingly different sources to generate new information/ideas or expand prior knowledge (text-to-text and text-to-self connections) <b>E</b></li> <li>• Synthesize information by comparing, eliminating, and merging disparate pieces into one coherent whole <b>E</b></li> </ul>
	<b>2.5b</b> critically analyze and evaluate information and messages presented through print by formulating and expressing opinions. <b>CAT</b>	<ul style="list-style-type: none"> <li>• Synthesize experience and knowledge of the world (text-to-world connections) to make, support and apply judgments (that may not be dichotomous) based on the evaluation of complex issues in:</li> <li>• Literary text (e.g., character’s actions, morals of narratives or poems) <b>E</b></li> <li>• Nonfiction <b>E</b></li> <li>• Analyze information in a text to develop logical opinions <b>I</b></li> </ul>
	<b>2.5d</b> Critically analyze and evaluate information and messages presented through print using critical and divergent thinking, and assimilating prior knowledge to draw conclusions. <b>CAT</b>	<ul style="list-style-type: none"> <li>• Use prior knowledge of a concept along with information in a text to: <ul style="list-style-type: none"> <li>▪ Draw conclusion(including implied main ideas) that require analysis and/or evaluation <b>E</b></li> <li>▪ Evaluate the author’s viewpoint or attitude toward a topic or idea <b>E</b></li> <li>▪ Evaluate the effect of an author’s use of formatting and design techniques (e.g., paragraphing, headings/subheadings, pictures/illustrations, column, font styles [bold, underline, italics, caps], punctuation choices) <b>E</b></li> </ul> </li> </ul>
	<b>2.5e</b> Critically analyze and evaluate information and messages presented through print by recognizing the impact of non-literal expressions in informative and technical texts and interpret the effect of literary devices. <b>CAT</b>	<ul style="list-style-type: none"> <li>• Evaluate the impact of specific figurative and non-literal (idiomatic) expressions on the meaning of text <b>E</b></li> <li>• Evaluate an author’s decision to use specific figurative an non-literal (idiomatic) expressions in a text <b>E</b></li> <li>• Evaluate how an author’s use of literary devices (figurative language, dialogue, and description) and non-literal expressions (idioms, double meanings, puns, irony) in a text effects readers <b>E</b></li> </ul>
	<b>2.5f</b> critically analyze and evaluate information and messages presented through print by evaluating text and media presentation for bias and misinformation, by evaluating texts for their completeness, accuracy, and clarity of communication (e.g., overcome problems of ambiguity), and by evaluating how the content, techniques, and form of texts and media affect them. <b>APA</b>	<ul style="list-style-type: none"> <li>• Evaluate the fairness and trustworthiness of author’s message (author’s bias) <b>E</b></li> <li>• Evaluate how persuasive techniques and author’s choices (e.g., word choices) shape readers’ understandings <b>E</b></li> <li>• Evaluate the strengths and weaknesses of multiple text(s), sources, format, and argument <b>E</b></li> <li>• Analyze the completeness, accuracy, and/or clarity of the information in a complex text <b>E</b></li> <li>• Identify and evaluate information that needs to be checked for accuracy (e.g., data, statistics, sources) and evaluate the credibility of sources <b>E</b></li> <li>• Evaluate the credibility of messages (e.g., thoroughness, depth, breadth, balance, use of fact and opinion, inclusion of logical and/or emotional arguments) <b>E</b></li> <li>• Analyze ambiguous information in complex texts <b>E</b></li> </ul>

Big Ideas for Reading (Key Concepts)	Performance Indicators	Grade-Level Expectations
	<p><b>2.5g</b> Critically analyze and evaluate information and messages presented through print, speech, and mass media by acknowledging the possibility of a variety of interpretations of the same text; proposing other interpretations as valid if supported by the text. <b>CAT</b></p>	<ul style="list-style-type: none"> <li>Analyze texts by reading and reacting to passages from a piece of text and critical interpretations of that same work <b>E</b></li> <li>Listen to and critique opposing interpretations of the same reading and consider how these opinions were formed through classroom dialogue and independent writing <b>E</b></li> <li>Synthesize diverse interpretations of the same reading and consider how these opinions were formed through classroom dialogue and independent writing <b>E</b></li> <li>Practice critical thinking defending the validity of an assigned point of view even if it opposes their personal interpretation of the reading <b>E</b></li> </ul>
	<p><b>2.5i</b> critically analyze and evaluate information and messages presented through print, speech, and mass media by evaluating the literary merit of various texts and media presentations recognizing literary merit. <b>CAT, LCM</b></p>	<ul style="list-style-type: none"> <li>Read a variety of texts and evaluate them using these criteria to determine their literary merit: <ul style="list-style-type: none"> <li>Has a unique writing style that is appropriate <b>I</b></li> <li>Has details <b>I</b></li> <li>Has purpose <b>I</b></li> <li>Has clear, distinctive characters <b>I</b></li> <li>Is understandable <b>I</b></li> <li>Has an expressive vocabulary <b>I</b></li> <li>Has an unpredictable plot that is developed <b>I</b></li> <li>Has a variety of episodes/action <b>I</b></li> <li>Interpretation of the theme or concept <b>I</b></li> <li>Presentation of information including accuracy, clarity, and organization <b>I</b></li> <li>Delineation of setting <b>I</b></li> </ul> </li> </ul>
	<p><b>2.6a</b> critically analyze and evaluate information and messages presented through speech and mass media and extend meaning by offering a personal response to texts. <b>CAT</b></p>	<ul style="list-style-type: none"> <li>Revisit text to search for connections between and among ideas <b>E</b></li> <li>Find and explain personal connections to the topics, events, characters, actions, ideas or information in text(s) <b>E</b></li> </ul>
	<p><b>2.7b</b> critically analyze and evaluate information and messages presented through print, speech, and mass media by identifying the underlying purposes of media messages (e.g., profit vs. nonprofit, humanitarianism, support of artistry). <b>CAT</b></p>	<ul style="list-style-type: none"> <li>Identify underlying purposes (e.g., profit vs. nonprofit, humanitarianism, support of artistry) of media messages <b>C</b></li> <li>Analyze the difference between a stated purpose and an underlying reason in media messages (e.g., TV commercials, radio, Internet, video games, advertisements) <b>E</b></li> </ul>

### Specific to NON-LITERARY Text Only

Big Ideas for Reading (Key Concepts)	Performance Indicators	Grade-Level Expectations
<b>RS</b> – Rhetorical Strategies  <b>TS/F</b> – Text Structure & Features  <b>AB/P</b> – Author Bias & Perspective  <b>CAT</b> – Critical Analysis of Text	<b>Basic Reasoning</b>	
	2.4bI/T demonstrate an overall understanding of technical and informative texts by indentifying text features and text structures. <b>TS/F</b>	<ul style="list-style-type: none"> <li>• Apply essential information from text features (e.g., title, author, cover, pictures, table of contents, maps, captions, chapter headings, information from charts and graphs, illustrations, glossaries, indices) to enhance understanding of text <b>I</b></li> <li>• Analyze the unique features of various informative texts (e.g., newspapers, magazines, product information, consumer materials, manuals, editorials) to enhance understanding of text <b>E</b></li> <li>• Analyze text structures in informative/technical texts (sequence or chronological order, classification, definition, process, description, comparison, problem/solution, cause/effect) to make meaning of text <b>E</b></li> </ul>
	2.4i demonstrate an overall understanding of informative and technical printed texts by making inferences. <b>CAT</b>	<ul style="list-style-type: none"> <li>• Make strongly implied inferences about content and concrete ideas in a text and identify appropriate text support <b>E</b></li> <li>• Explain inferences about author’s decisions (e.g., paragraphing, quotations, organization of text, formatting devices, mode of development used) <b>E</b></li> <li>• Make reasonable predictions as they read <b>E</b></li> <li>• Test and revise predictions as they read further <b>I</b></li> <li>• Use the combination of background knowledge and explicitly stated information from the text to answer questions they have as they read <b>E</b></li> <li>• Make connections between conclusions they draw and other beliefs or knowledge <b>E</b></li> <li>• Analyze texts to make generalizations <b>E</b></li> <li>• Create interpretations of text that are adapted as they continue to read and after they read <b>E</b></li> </ul>
	<b>Complex Reasoning</b>	
2.4j demonstrate and overall understanding of printed texts by accepting or rejecting the validity of the information and giving supporting evidence. <b>RS</b>	<ul style="list-style-type: none"> <li>• Use criteria to evaluate the validity (reliability) of primary and secondary sources of information <b>E</b></li> <li>• Use criteria to evaluate the author’s credibility in order to determine validity and reliability of a source <b>E</b></li> <li>• Use criteria to evaluate author’s perspective in order to determine validity and reliability of a source <b>E</b></li> <li>• Use date of publication to evaluate the validity and reliability of a source <b>E</b></li> <li>• Use criteria to evaluate the author’s use of               <ul style="list-style-type: none"> <li>▪ Logic <b>I</b></li> <li>▪ Propaganda <b>I</b></li> <li>▪ Bias <b>I</b></li> <li>▪ Language <b>I</b></li> <li>▪ Motives <b>I</b></li> </ul> </li> </ul> <p style="margin-left: 20px;">in order to determine validity and reliability of a source</p>	

Big Ideas for Reading (Key Concepts)	Performance Indicators	Grade-Level Expectations
	<p><b>2.5i</b> critically analyze and evaluate information and messages presented through print, speech, and mass media by recognizing a variety of persuasive and propaganda techniques and how they are used in a variety of forms (advertising, campaigns, news formats, etc.). <b>AB/P</b></p>	<ul style="list-style-type: none"> <li>• Identify and describe propaganda techniques (e.g., name calling, exaggeration/hyperbole, bandwagon, testimonial, broad generalization, red herring, circular thinking, parallelism) <b>E</b></li> <li>• Identify persuasive techniques (e.g., appeal to emotion, appeal to authority, cause/effect, repetition, rhetorical question) <b>I</b></li> <li>• Recognize and identify how propaganda and persuasive techniques are used in a variety of forms (e.g., television, commercials, movies, advertisements, newspapers, billboards, magazines, catalogues and packaging) to enhance the meaning of a text <b>E</b></li> </ul>

### Specific to LITERARY Text Only

Big Ideas for Reading (Key Concepts)	Performance Indicators	Grade-Level Expectations
<b>G</b> – Genre Characteristics <b>LD</b> – Literary Devices (figurative, language, tone, mood, irony) <b>O</b> – Organization (e.g., Story structure, Genre specific conventions) <b>LE</b> – Literary Elements (e.g., point of view, character, setting) <b>S</b> – Style <b>T</b> – Theme <b>LC/M</b> – Literary Connections/ Merit <b>CAT</b> – Critical Analysis of Text	<b>Personal Connections</b>	
	<b>4.1a</b> connect their own experience to those of literary characters by explaining the reasons for a character’s actions, identifying with characters based on a clear understanding of motivation and situation <b>LE, LC/M</b>	<ul style="list-style-type: none"> <li>Evaluate a character’s actions in a literary text, critically analyzing the text <b>E</b></li> <li>Make and support insightful connections between the reader’s personal situations and motivations of characters in a text <b>I</b></li> </ul>
	<b>4.1b</b> responding to the sensory, intellectual, and emotional elements of literature <b>LE, LC/M</b>	<ul style="list-style-type: none"> <li>Evaluate the effect of the author’s use of imagery and figurative language on a reader <b>E</b></li> <li>Use ideas from the text to evaluate personal responses to literature (text-to-self connections) <b>E</b></li> </ul>
	<b>4.1c</b> relating to the feelings of characters of varying ages, genders, nationalities, races, cultures, religions, and disabilities. <b>LE, LC/M</b>	<ul style="list-style-type: none"> <li>Read and analyze stories from different cultures and eras to broaden cultural awareness <b>E</b></li> <li>Demonstrate an understanding of the experiences and feelings of fictional characters (e.g., show empathy for, disagree with, compare to personal or other familiar experiences) based on age, gender, nationalities, races, cultures, and/or disabilities <b>E</b></li> </ul>
	<b>4.1e</b> connect their own experiences to those of literary characters by (e) (seeking other literary texts and media as the result of literary experience. <b>LC/M</b>	<ul style="list-style-type: none"> <li>As a result of reading a literary text, students will connect to other texts using the following as guides for connections:               <ul style="list-style-type: none"> <li>What does this remind me of in another book I’ve read? <b>I</b></li> <li>How is this text similar to other things I’ve read? <b>I</b></li> <li>How is this different to other books I’ve read? <b>I</b></li> <li>Have I read about something like this before? <b>I</b></li> <li>Seek other texts and media with similar themes and connections <b>I</b></li> </ul> </li> </ul>
	<b>4.3a</b> respond to literary texts and media representing the diversity of American cultural heritage inclusive of ages, genders, nationalities, races, religions, and disabilities (b) responding to literary text and media. <b>LC</b>	<ul style="list-style-type: none"> <li>Read and evaluate complex stories from different cultures and eras to broaden cultural awareness <b>E</b></li> <li>Empathize with experiences and feelings of fictional characters based on age, gender, nationalities, races, cultures, and/or disabilities <b>E</b></li> </ul>
	<b>4.4a</b> connect their own experiences to those literary characters by (a) using literature as a resource for shaping decisions. <b>LE, LC/M, T</b>	<ul style="list-style-type: none"> <li>Read stories and relate characters’ experiences to shape own decisions by asking questions such as:               <ul style="list-style-type: none"> <li>I felt like that character when... <b>E</b></li> <li>If that happened to me, I would... <b>E</b></li> <li>I can relate to that character because one time... <b>E</b></li> </ul> </li> </ul>
	<b>Recall of Information</b>	
	<b>2.4bL</b> demonstrate an overall understanding of literary texts by (b) indentifying the story elements (e.g., characters, setting, and plot), features	<ul style="list-style-type: none"> <li>Identify character(s) in a literary text or speaker(s) in a poem <b>I</b></li> <li>Describe the roles (e.g., protagonist/hero, antagonist/villain) characters play in a literary text <b>I</b></li> <li>Describe the changes in setting (flashback, foreshadowing) <b>I</b></li> <li>Identify various types of conflict (man vs. man, man vs. nature, man vs. self, man vs. society) <b>E</b></li> </ul>

Big Ideas for Reading (Key Concepts)	Performance Indicators	Grade-Level Expectations
	(e.g., flash foreshadowing, flashback, foreword), and story structures (conflict, resolution, cause/effect). <b>LD, O, T</b>	<ul style="list-style-type: none"> <li>• Identify conflict(s) climax(s)/turning point(s) and resolutions(s) <b>C</b></li> <li>• Identify significant details related to the plot to analyze the pattern of organization (compare/contrast, problem/solution, sequence, cause/effect) <b>I</b></li> <li>• Distinguish between main plot and multiple subplots <b>E</b></li> <li>• Identify point of view (first person, third person limited, third person objective, omniscient) <b>E</b></li> <li>• Identify the story structure or organizational pattern in a literary text (e.g., time order, geographic order, order of importance, cause/effect, classification) <b>E</b></li> </ul>
<b>Basic Reasoning</b>		
	<b>4.2a</b> respond to literary text by making inferences about content events, characters, setting, and author’s decisions. <b>LE, LC/M, T</b>	<ul style="list-style-type: none"> <li>• Make strongly implied inferences about content, abstract ideas, events, characters, setting, mood, <u>theme and tone</u> in a text and identify appropriate text support <b>E</b></li> <li>• Make inferences about author’s choices (e.g., paragraphing, dialogue, organization of text, formatting devices, mode of development, <u>notes to readers</u>) and <u>rhetorical strategies (e.g., persuasive words, anecdotes, figurative language, emotional words, humor, questions, repetition, irony)</u> and identify appropriate support from the text <b>E</b></li> <li>• Make reasonable predictions as they read <b>E</b></li> <li>• Test and revise predictions as they read further-I</li> <li>• Use the combination of background knowledge and explicitly stated information from the text to answer questions they have as they read <b>I</b></li> <li>• Make connections between conclusions they draw and other beliefs or knowledge <b>E</b></li> <li>• Make critical or analytical judgments about what they read <b>E</b></li> <li>• Create self-motivated interpretations of text that are adapted as they continue to read and after they read <b>I</b></li> <li>• Analyze texts to make generalizations <b>I</b></li> <li>• Analyze connections between self and literary things <b>E</b></li> <li>• Draw conclusions about characters and events in a text <b>E</b></li> </ul>
	<b>4.2b</b> understand the differences between genres. <b>G, T</b>	<ul style="list-style-type: none"> <li>• Use knowledge of distinctive characteristics of various genres including but not limited to: <ul style="list-style-type: none"> <li>▪ Fiction (e.g., short story, poetry, folk tale, mystery, tall tale, fairy tales, novels, fable, myth, fantasy, science fiction, historic fiction, and realistic fiction) <b>E</b></li> <li>▪ Literary nonfiction (e.g., letter, biography, speeches, autobiography) <b>E</b></li> <li>▪ Drama (e.g., classic and/or contemporary multi-act plays) <b>E</b></li> </ul> </li> </ul> <p>to analyze the meaning of the text</p>
<b>Complex Reasoning</b>		
	<b>4.4b</b> apply knowledge gained from literature as basis for understanding self and society by (b) using literature as a resource for understanding social and political issues. <b>CAT, LE, LC/M, T</b>	<ul style="list-style-type: none"> <li>• Compare works of literature from the same historical period written by authors from different cultural, generational, and gender perspectives <b>E</b></li> <li>• Analyze an author’s viewpoint and message in relation to the historical and cultural context of the author’s work <b>E</b></li> </ul>

Big Ideas for Reading (Key Concepts)	Performance Indicators	Grade-Level Expectations
	<p><b>4.2c</b> Interpret the impact of author's decisions such as word choice, style, content, and literary elements; understand the author's intent in choosing particular genre. <b>LE, CAT</b></p>	<ul style="list-style-type: none"> <li>• Evaluate the effect of author's choices (word and content) on the reader <b>E</b></li> <li>• Analyze how the author's writing style influences the reader <b>E</b></li> <li>• Evaluate the effectiveness of an author's choice of words with specific connotations to create mode <b>E</b></li> <li>• Compare styles among text to determine effects of author's choices <b>E</b></li> <li>• Compare characteristics and elements of various literary forms including short stories, poetry, essays, plays, speeches, and novels <b>E</b></li> <li>• Evaluate an author's decision to use a particular genre in a given situation <b>E</b></li> </ul>
	<p><b>4.2f</b> Identify the effect of point of view. <b>LE, CAT</b></p>	<ul style="list-style-type: none"> <li>• Analyze how point of view effects a literary text (e.g., how a story would be different if told from a different point of view) <b>E</b></li> <li>• Analyze how point of view impacts a reader <b>E</b></li> <li>• Evaluate the effect of the author's use of point of view such as: first versus third, limited versus omniscient, and subjective versus objective <b>E</b></li> </ul>

## 4. Matrix for English II – Standard 3 Research

**Standard 3:** Access, organize, and evaluate information gained through listening, reading, and viewing.

**Note:** Prioritized coding is indicated in red. The indicators are E = Essential, I = Important, and C = Compact.

Big Ideas (Key Concepts)	Recall of Information	Basic Reasoning	Complex Reasoning
<p><b>3.1a1</b> - Identify and locate a variety of sources including printed materials, personal interview, oral reporting forums, and technological forms of information</p>	<ul style="list-style-type: none"> <li>Locate information using appropriate sources and strategies <b>I</b></li> <li>Determine valid resources for researching a topic, including primary and secondary sources <b>E</b></li> </ul>	<ul style="list-style-type: none"> <li>Use multiple sources of information (books, television, videos/DVDs, resource people, cassettes, dictionaries, recordings, encyclopedias, and available databases) <b>I</b></li> <li>Select essential sources (e.g., dictionaries, encyclopedias, interviews, observations, electronic media, computer databases) appropriate to topic <b>I</b></li> <li>Use text features (e.g., guide words, indices, glossaries, key words, table of contents, cross references, appendices) to access information <b>C</b></li> <li>Use traditional and electronic search tools <b>E</b></li> <li>Use teacher-selected Internet sites and data bases to access information <b>I</b></li> </ul>	<ul style="list-style-type: none"> <li>Evaluate the importance and quality of sources <b>E</b></li> </ul>
<p><b>3.1a2</b> - Develop and use procedures to gather information—developing and following a process for research</p>	<ul style="list-style-type: none"> <li>Determine a clear purpose, topic and audience for research <b>E</b></li> <li>Gather information from more than one source <b>I</b></li> <li>Locate information using appropriate sources and strategies <b>I</b></li> </ul>	<ul style="list-style-type: none"> <li>Read, view, listen or interact with information and decide what is valuable for research <b>I</b></li> <li>Extract information (e.g., take notes, make copies) <b>I</b></li> <li>Organize and interpret gathered information using various graphic organizers (e.g., outlining, webbing) <b>I</b></li> <li>Record sources in a standard bibliographic format <b>I</b></li> <li>Relay facts from research <b>I</b></li> </ul>	<ul style="list-style-type: none"> <li>Formulate a research question or thesis statement <b>E</b></li> <li>Summarize ways in which the research process and product can be improved <b>I</b></li> </ul>

Big Ideas (Key Concepts)	Recall of Information	Basic Reasoning	Complex Reasoning
<b>3.1b</b> – Independently extract information relevant to achieve a specific purpose	<ul style="list-style-type: none"> <li>• Use various technologies (e.g., appropriate word processing functions, photocopier, audiovisual equipment, scanner) to extract needed information <b>C</b></li> <li>• Determine the most appropriate form of technology for the task of extracting needed information <b>C</b></li> </ul>	<ul style="list-style-type: none"> <li>• Decide what information is valuable for a particular situation <b>I</b></li> <li>• Select and use various methods (e.g., web, chart) to manage information <b>I</b></li> </ul>	<ul style="list-style-type: none"> <li>• Create own system for organizing information <b>E</b></li> </ul>
<b>3.2a</b> – Use technology to synthesize information into a meaningful format to express ideas and experiences	<ul style="list-style-type: none"> <li>• Use various forms of technology <ul style="list-style-type: none"> <li>▪ word processing <b>E</b></li> <li>▪ presentation programs <b>I</b></li> <li>▪ digital cameras <b>C</b></li> <li>▪ scanners <b>I</b></li> <li>▪ multimedia <b>I</b></li> </ul> </li> </ul> <p>to formulate writing and/or communicate knowledge of products</p>		<ul style="list-style-type: none"> <li>• Use technology to synthesize information by <ul style="list-style-type: none"> <li>▪ making a graphic organizer <b>I</b></li> <li>▪ making an outline <b>I</b></li> <li>▪ using a meaningful format (text, drawings, graphs, diagrams, and graphics) to express ideas <b>I</b></li> <li>▪ producing a video production <b>C</b></li> </ul> </li> </ul>
<b>3.2b</b> – Independently present information which is sufficient in quantity and depth to achieve a specific purpose, avoiding plagiarism	<ul style="list-style-type: none"> <li>• Decide how the information fits together <b>I</b></li> <li>• Decide how the information would best be presented <b>I</b></li> <li>• Recognize the need to put information from sources in their own words <b>E</b></li> </ul>	<ul style="list-style-type: none"> <li>• List sources of information in bibliographic form that follows a designated format (MLA, APA) <b>E</b></li> </ul>	<ul style="list-style-type: none"> <li>• Present gathered information in an oral or written format, which <ul style="list-style-type: none"> <li>▪ Uses sentences organized in paragraph form to tell about a designated topic <b>C</b></li> <li>▪ Incorporates information from more than one source <b>I</b></li> <li>▪ Includes information relevant to topic and purpose <b>I</b></li> <li>▪ Identifies source of information <b>I</b></li> <li>▪ Fulfills the identified purpose as clearly indicated in the thesis statement <b>E</b></li> <li>▪ Utilizes an organizational plan for combining paragraphs to address a designated purpose and topic <b>I</b></li> <li>▪ Incorporates information from multiple sources <b>E</b></li> <li>▪ Summarizes and/or paraphrases information from sources <b>E</b></li> </ul> </li> </ul>

Big Ideas (Key Concepts)	Recall of Information	Basic Reasoning	Complex Reasoning
<p><b>3.3a2</b> – Establish criteria by which sources and information can be analyzed for accuracy, bias, stereotype, and validity</p>	<ul style="list-style-type: none"> <li>Use technology to facilitate evaluation <b>C</b></li> </ul>	<ul style="list-style-type: none"> <li>Differentiate between primary and secondary sources <b>C</b></li> <li>Independently select sources which are authoritative including UD Lib Search <b>I</b></li> <li>Formulate conclusions based upon information relevant to a specific purpose <b>I</b></li> <li>Use information to express ideas relevant to specific purpose <b>I</b></li> <li>Demonstrate how information retrieved does or does not address original problem <b>I</b></li> </ul>	<ul style="list-style-type: none"> <li>Independently analyze source and information for accuracy, bias, stereotypes, and validity <b>I</b></li> <li>Evaluate information in terms of credibility, accuracy, and social, economic, political, legal and ethical issues that may impact it <b>E</b></li> </ul>
<p><b>3.3b1</b> – Independently interpret information as appropriate to a specific purpose</p>		<ul style="list-style-type: none"> <li>Use retrieved information to accomplish a specific purpose <b>I</b></li> <li>Prioritize sources based on relevance <b>I</b></li> <li>Consider whether they have uncovered any worthwhile information that might take their research in a different direction <b>I</b></li> <li>Consider whether they have uncovered any worthwhile information that has caused them to see their topic from a new perspective <b>I</b></li> <li>Consider whether research needs to be redirected in any way based on material uncovered based on relevance <b>I</b></li> </ul>	<ul style="list-style-type: none"> <li>Reevaluate their position on the topic and your research strategy <b>I</b></li> </ul>
<p><b>3.3b2</b> – Independently draw/ formulate conclusions based upon information relevant to a purpose</p>			<p>Use prior knowledge of a concept along with information in a text to:</p> <ul style="list-style-type: none"> <li>Draw conclusions (including implied main ideas) that require analysis and/or evaluation <b>E</b></li> <li>Evaluate the author's viewpoint or attitude toward a topic or idea when strongly implied <b>E</b></li> <li>Evaluate the effect of an author's use of basic formatting and design techniques (e.g., paragraphing,</li> </ul>

Big Ideas (Key Concepts)	Recall of Information	Basic Reasoning	Complex Reasoning
			headings/subheadings, pictures/ illustrations, columns, font styles [bold, underline, italics, caps], punctuation choices) E

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**APPENDIX B:  
ENGLISH II PRIORITIZED STANDARDS AND  
ASSESSED PERFORMANCE INDICATORS**

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## English II

### ELA Prioritized Standards and Assessed Performance Indicators

*\*Note that not all standards, performance indicators, and GLEs will be assessed by the end-of-course assessment. They should, however, be taught in the English II course. The ELA prioritized standards are not isolated skills but interrelated communications tools. Good instruction builds on these connections which enhances student learning.*

DCAS Assessed	Performance Indicators	Standard 1 Writing (Written Communication)
		Use written and oral English appropriate for various purposes and audiences.
	1.1	<p>Writers will produce texts that exhibit the following text features, all of which are consistent with the genre and purpose of the writing: development, organization, style, and word choice.</p> <ul style="list-style-type: none"> <li>• Development – The topic, theme, stand/perspective, argument, or character is fully developed.</li> <li>• Organization – The text exhibits a discernible progression of ideas.</li> <li>• Style – The writer demonstrates a quality of imagination, individuality, and a distinctive voice.</li> <li>• Word Choice – The words are precise, vivid, and economical.</li> </ul>
	1.2	<p>Writers will produce texts that exhibit the following language conventions at all grade levels: sentence formation, conventions.</p> <ul style="list-style-type: none"> <li>• Sentence Formation – Sentences are complete and varied in length and structure.</li> <li>• Conventions – Appropriate grammar, mechanics, spelling, and usage enhance the meaning and readability of the text.</li> <li>• Formal English conventions are to be followed unless otherwise called for by the purpose of the writing.</li> </ul>
	1.3	<p>Writers will produce examples that illustrate the following discourse classifications: by the completion of the grade, writers will be able to write persuasive, informative, and expressive pieces.</p> <ul style="list-style-type: none"> <li>• Expressive (author-oriented) texts, both personal and literary.</li> <li>• Informative (subject-oriented) texts.</li> <li>• Persuasive (audience-oriented) texts.</li> </ul>

DCAS Assessed	Performance Indicators	Standard 1 Oral Communication
		Speakers draw upon the language of their home, community, and culture—as well as the public language of the larger culture—to communicate effectively with a variety of audiences.
	1.4	Orally communicate information, opinions, and ideas effectively to different audiences for a variety of purposes.
	1.5	Listen to and comprehend oral communications.
	1.6	Develop vocabulary and the ability to use words, phrases, idioms, and various grammatical structures as a means of improving communication.
	1.7	Participate effectively in a discussion

DCAS Assessed	Performance Indicators	<b>Standard 2 Reading</b> Construct, examine, and extend the meaning of literary, informative, and technical texts through listening, reading, and viewing.
	2.1	Using appropriate texts, students will be able to select and apply efficient, effective decoding skills and other word recognition strategies to comprehend printed texts.
✓	2.2a	Students will be able to develop an increasingly extensive vocabulary and actively <b>seek the meaning of unknown words</b> as an important facet of comprehending texts and messages <b>by using context clues</b> to determine the meanings of words.
	2.3a	Students will be able to self-monitor comprehension while reading by <b>(a) generating a purpose for reading</b> .
	2.3c	Using appropriate texts, students will be able to self-monitor comprehension while reading by <b>(c) taking appropriate actions</b> (e.g., rereading to make sense, adjusting rate of reading, seeking the meaning of unknown vocabulary) to enhance understanding of oral and written text.
✓	2.4a	Students will be able to demonstrate an overall understanding of printed texts by <b>(a) making ... predictions</b> as needed.
✓	2.4bI/T	Students will be able to demonstrate an overall understanding of technical and informative texts by <b>(b) identifying text features and text structures</b> .
✓	2.4bL	Students will be able to demonstrate an overall understanding of literary texts by <b>(b) identifying the story elements</b> (e.g., characters, setting, and plot), <b>features</b> (e.g., foreshadowing, flashback, flash-foreword), and <b>story structures</b> (conflict, resolution, cause/effect).
✓	2.4c	Students will be able to demonstrate an overall understanding of printed texts by <b>(c) recognizing and interpreting figurative language and literary devices</b> (e.g., simile, metaphor, allusion) and <b>(e) differentiating between literal and non-literal meanings</b> .
✓	2.4d	Students will be able to demonstrate an overall understanding of printed texts by <b>(d) retelling</b> a story or <b>restating</b> an informative text through speaking and/or writing.
✓	2.4e	Students will be able to demonstrate an overall understanding of printed texts by <b>(e) organizing the important points</b> of the text via <b>summaries, outlines, and/or graphic organizers</b> .
✓	2.4f	Students will be able to demonstrate an overall understanding of printed texts by <b>(f) identifying the author's purpose</b> .
✓	2.4g	Students will be able to demonstrate an overall understanding of printed texts by (g) comparing information between and within texts.
✓	2.4h	Students will demonstrate an overall understanding of printed texts by (h) discriminating between fact and opinion.
✓	2.4i	Students will be able to demonstrate an overall of informative and technical printed text s by (i) making inferences.
✓	2.4j	Students will be able to demonstrate an overall understanding of printed texts by (j) accepting or rejecting the validity of the information and giving supporting evidence.
✓	2.4k	Students will be to demonstrate an overall understanding of printed texts by (k) relating the content of the text to real-life situations.
✓	2.5a	Students will be able to critically analyze and evaluate information and messages presented through print by a) connecting and synthesizing information from many sources.
✓	2.5b	Students will be able to critically analyze and evaluate information and messages presented through print by (b) formulating and expressing opinions.

DCAS Assessed	Performance Indicators	Standard 2 Reading Construct, examine, and extend the meaning of literary, informative, and technical texts through listening, reading, and viewing.
✓	2.5d	Students will be able to critically analyze and evaluate information and messages presented through print using critical and divergent thinking, and assimilating prior knowledge to draw conclusions.
✓	2.5e	Students will be able to critically analyze and evaluate information and messages presented through print and by (e) recognizing the impact of non-literal expressions in informative and technical texts and interpret the effect of literary devices.
✓	2.5f	Students will be able to critically analyze and evaluate information and messages presented through print by (i) evaluating texts and media presentations for bias and misinformation, by (k) evaluating texts for their completeness, accuracy, and clarity of communication (e.g., overcome problems of ambiguity), and by (a) evaluating how the content, techniques, and form of texts and media affect them.
	2.5g	Using appropriate texts, students will be able to critically analyze and evaluate information and messages presented through print, speech, and mass media by (g) acknowledging the possibility of a variety of interpretations of the same text; proposing other interpretations as valid if supported by text.
✓	2.5i	Using appropriate texts, students will be able to critically analyze and evaluate information and messages presented through print, speech, and mass media by (l) recognizing a variety of persuasive and propaganda techniques and how they are used in a variety of forms (advertising, campaigns, new formats, etc.)
	2.5l	Using appropriate texts, students will be able to critically analyze and evaluate information and messages presented through print, speech and mass media by (l) evaluating the literary merit of various texts and media presentations (d) recognizing literary merit.
	2.6a	Using appropriate texts, students will be able to critically analyze and evaluate information and messages presented through print, speech, and mass media and extended meaning by (a) offering a personal response to texts.
	2.7b	Using appropriate texts, students will be able to critically analyze and evaluate information and messages, presented through print, speech, and mass media by (b) identifying the underlying purposes of media messages (e.g., profit vs. nonprofit, humanitarianism, support of artistry).

DCAS Assessed	Performance Indicators	Standard 3 Research Access, organize, and evaluate information gained through listening, reading, and viewing.
	3.1a1	By the completion of the grade, students will be able to identify, locate, and select sources of information relevant to a defined need by <b>identifying and locating a variety of sources including printed materials, personal interviews, oral reporting, forums, and technological forms of information.</b>
	3.1a2	By the completion of the grade, students will be able to identify, locate, and select sources of information relevant to a defined need by <b>developing and using procedures to gather information and ideas; developing and following a process for research completion.</b>
	3.1b	By the completion of the grade, students will be able to identify, locate, and select sources of information relevant to a defined need by <b>independently extracting information to achieve a specific purpose</b> ; extracting information relevant to a <b>specific</b> purpose.
	3.2a	By the completion of the grade, students will be able to organize, manipulate, and express the information and ideas relevant to a defined need by <b>using technology to synthesize information into a meaningful format to express ideas and experiences, and to create text, drawings, graphs, diagrams, photographs, videos, and graphics.</b>

DCAS Assessed	Performance Indicators	Standard 3 Research
		Access, organize, and evaluate information gained through listening, reading, and viewing.
	3.2b	By the completion of the grade, students will be able to organize, manipulate, and express the information and ideas relevant to a defined need by <b>independently presenting information which is sufficient in quantity and depth to achieve a specific purpose, avoiding plagiarism.</b>
	3.3a2	By the completion of the grade, students will be able to organize, manipulate, and express the information and ideas relevant to a defined need by: <b>establishing criteria by which sources and information can be analyzed for accuracy, bias, stereotypes, validity, and authority.</b>
	3.3b1	By the completion of the grade, students will be able to organize, manipulate, and express the information and ideas relevant to a defined need by: <b>independently interpreting information as appropriate to a specific purpose.</b>
	3.3b2	By the completion of the grade, students will be able to organize, manipulate, and express the information and ideas relevant to a defined need by: <b>independently drawing conclusions based upon information relevant to a specific purpose; independently formulate logical conclusions based upon information relevant to a specific purpose.</b>

DCAS Assessed	Performance Indicators	Standard 4 Reading
		Use literary knowledge accessed through print and visual media to connect self to society and culture.
✓	4.1a	Using literature appropriate for age, stage, and interests, students will be able to respond to <b>connect their own experience to those of literary characters</b> by: (a) explaining the reasons for a character's actions, (d) identifying with characters based on a clear understanding of motivation and situation.
	4.1b	Using literature appropriate for age, stage, and interests, students will be able to respond to <b>connect their own experience to those of literary characters</b> by (b) <b>responding to the sensory, intellectual, and emotional elements</b> of literature
	4.1c	Using literature appropriate for age, stage, and interests, students will be able to respond to <b>connect their own experience to those of literary characters</b> by (c) <b>relating to the feelings of characters of varying ages, genders, nationalities, races, cultures, religions and disabilities.</b>
	4.1e	Using appropriate texts, students will be able to connect their own experiences to those of literary characters by (e) (g) <b>seeking other literary texts and media as the result of literary experience.</b>
✓	4.2a	Using literature appropriate for age, stage, and interests, students will be able to respond to <b>literary text</b> and media using interpretive, critical, and evaluative processes by (a) <b>making inferences</b> about <b>content, events, characters, setting, and author's decisions.</b>
✓	4.2b	Using literature appropriate for age, stage, and interests, students will be able to respond to literary text and media using interpretive, critical, and evaluative processes by (e1) <b>understanding the differences between genres [...].</b>
✓	4.2c	Using literature appropriate for age, stage, and interests, students will be able to respond to literary text using interpretive, critical, and evaluative processes by (c) interpreting the <b>impact of author's decisions such as word choice, style, content,</b> and literary elements, (e2) understanding [...] <b>the author's intent in choosing a particular genre.</b>
✓	4.2f	Using literature appropriate for age, stage, and interests, students will be able to respond to literary text using interpretive, critical, and evaluative processes by (f) <b>identifying the effect of point of view.</b>

DCAS Assessed	Performance Indicators	Standard 4 Reading Use literary knowledge accessed through print and visual media to connect self to society and culture.
	4.3a	Using appropriate texts, students will be able to respond to demonstrate an appreciation for a broad range of culturally diverse literary texts and media created by historical, modern, and contemporary authors through <b>(a) responding to literary texts and media representing the diversity of American cultural heritage inclusive of ages, genders, nationalities, races, religions, and disabilities, (b) responding to literary text and media representative of various nations and cultures.</b>
	4.4a	Using appropriate texts, students will be able to connect their own experiences to those of literary characters by <b>(a) using literature as a resource for shaping decisions.</b>
✓	4.4b	Using literature appropriate for age, stage, and interests, students will be able to apply knowledge gained from literature as a basis for understanding self and society by <b>(b) using literature as a resource for understanding social and political issues.</b>

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**BIOLOGY END-OF-COURSE  
SPECIFICATIONS**

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## I. INTRODUCTION

Delaware has redesigned the student testing program to require specific end of course tests aligned to the content standards. The No Child Left Behind (NCLB) Act, 20 U.S.C.A. § 6311 (b)(1)(C), requires assessments in science. Biology was chosen as the science end-of-course assessment as student records indicate that more students take biology than any other science in high school and all Delaware high schools offer biology as a course.

This committee was charged with developing course-level expectations for the end-of-course high school biology assessment that measure the Delaware content standards. The assessment will be criterion-referenced and standards-based and will be designed to measure the knowledge and skills a student should have mastered by the end of biology. The purpose of this document is to ensure that the Biology end-of-course (EOC) assessment is aligned with the expectations of the Delaware Science Content Standards for 10<sup>th</sup> grade. The expectations clarify the Delaware Science Content Standards in multiple ways.

1. The expectations provide further clarification as to the depth and breadth of each standard and grade-level expectation, as written by the standards developers.
2. The expectations provide information as to the expected level(s) of cognition for each standard (see cognitive levels on page 53).
3. The expectations specify the emphasis placed upon each standard (essential, important, compact) which informs the test developer as to the number of items for each standard. More items on the test will be from essential standards than from important or compact standards. Likewise, more items will be from important standards than from compact standards. The compacted standards will not be represented on the test.

## II. PROCESS USED

The Biology EOC assessment expectations were specified by the joint groups of Delaware Department of Education’s Accountability Resources and Curriculum, Instruction and Professional Development Workgroups, who worked in conjunction with the Learning-Focused prioritized curriculum maps and district science teachers and administrators. The Delaware Department of Education thanks all teachers and administrators who worked on prioritizing the curriculum and specifying the end-of-course expectations.

Michael Buoni	Southern Delaware PD Center	Sussex County
Catherine Houghton	Christina School District	New Castle County
Kelli Martin	Curriculum	Delaware DOE
April McCrae	Curriculum	Delaware DOE
Edward McGrath	Red Clay School District	New Castle County
Ellen Mingione	Assessment	Delaware DOE
John Moyer	Curriculum	Delaware DOE

In order to determine course-level expectations, the committee analyzed many documents. The committee reviewed other states’ course-level expectations and compiled a matrix of courses being assessed at high schools nationwide. At the national level, the National Assessment of Educational Progress (NAEP) frameworks were reviewed along with the National Science Education standards and the American Association for the Advancement of Science (AAAS) atlas maps. At the state level, the committee analyzed the Delaware Science Content Standards, grade-level expectations, and standard clarification documents.

Priority was given to the work completed by the Learning-Focus teams. Note that not all standards are assessed by this test. Some standards do not apply and are not taught in biology (i.e., Standard 4: Earth in Space). Some standards which are part of biology cannot be easily assessed by this method and therefore are not listed in this document. Other standards, while important, do not represent the essential understandings all students should know or do at the end of this course and are therefore not a part of this document.

### **III. LEARNER/ASSESSMENT EXPECTATIONS**

It is the intent of the Biology EOC assessment specifications to represent essential understandings and skills (what all students should know and be able to do), not individual discrete facts. Further, the test is intended to equitably assess knowledge and skills of all students with respect to the Delaware Science Content Standards. The test will assess students on knowledge and skills found only within the Delaware Science Content Standards. The developers of this document recognize that many high school biology courses include knowledge and skills which are not part of the Delaware Science Content Standards; however, the instructors of these courses must also recognize that the end-of-course test will focus solely on the standards. For students to perform at high levels, the high school course must be aligned with the standards.

The Delaware Science Content Standards that will be assessed include:

- Standard One: The Nature and Application of Science and Technology. This standard specifies how science is to be taught and learned in an inquiry-based approach using technology, tools, and materials appropriate to the content. This standard is the foundation of for all learning and assessment.
- Standard Two: Materials and their Properties, conservation of matter and chemical reactions
- Standard Three: Energy and Its Effects, forms and sources of energy, and the transformation and conservation of energy.
- Standard Six: Life Processes, structure/function relationships, matter and energy transformations, regulation and behavior, and technology applications.
- Standards Seven: Diversity and Continuity of Living Things, reproduction, heredity and development, diversity and evolution, and technology applications.

This document can be used by the biology teacher in multiple ways to align teaching and learning with test expectations.

It is recommended that the teacher:

- Align instruction to focus on the standards indicated in this document.
- Provide greater instructional time and emphasis on essential standards, less emphasis on important standards, and even less emphasis on compact standards.
- Use the cognitive level examples as a guide for student learning and classroom assessment.

## **Cognitive Framework**

A four-level framework has been used to specify the cognitive levels expected within each standard. This cognitive framework is that of Norm Webb’s Depth of Knowledge levels (“Depth of Knowledge Levels for Four Content Areas,” March 28, 2002).

[www.asccc.org/events/Curriculum/.../NormanWebbs4levels.pdf](http://www.asccc.org/events/Curriculum/.../NormanWebbs4levels.pdf)

### ***Level 1: Recall and Reproduction of Simple Procedures or Processes:***

This includes facts, terms, definitions, simple procedures, or processes. Level 1 items will have verbs such as recall, identify, state, define, use, calculate, and measure. Some level 1 items may also use verbs such as explain or describe depending upon what is being explained or described.

### ***Level 2: Skills and Concepts:***

This includes knowledge and skills beyond level 1 that require additional thought. Level 2 items will have verbs such as classify/sort items into meaningful categories, organize, estimate, organize data, give an example, cause/effect, significance of, impact upon, and compare/contrast data. Other verbs may be explained, describe, and interpret, depending upon the complexity of the concept or skill.

### ***Level 3: Strategic Thinking:***

Level 3 items are complex and advanced and students must justify the “how” and “why” through evidence. Students may be asked to explain concepts, draw conclusions from observations, cite evidence, design investigations, describe a model, use concepts to solve a problem, analyze similarities and differences, evaluate solutions, recognize misconceptions, explain a big idea, or form conclusions.

### ***Level 4: Extended Thinking:***

Level 4 items are complex and require a high cognitive demand. Students may be asked to make connections within the biology content or between biology and other content areas, state relationships between or among several pieces of data, synthesize information from multiple sources, explain alternate evidence, make predictions given several pieces of evidence, and transfer ideas to new situations.

## **Interpreting the Standards**

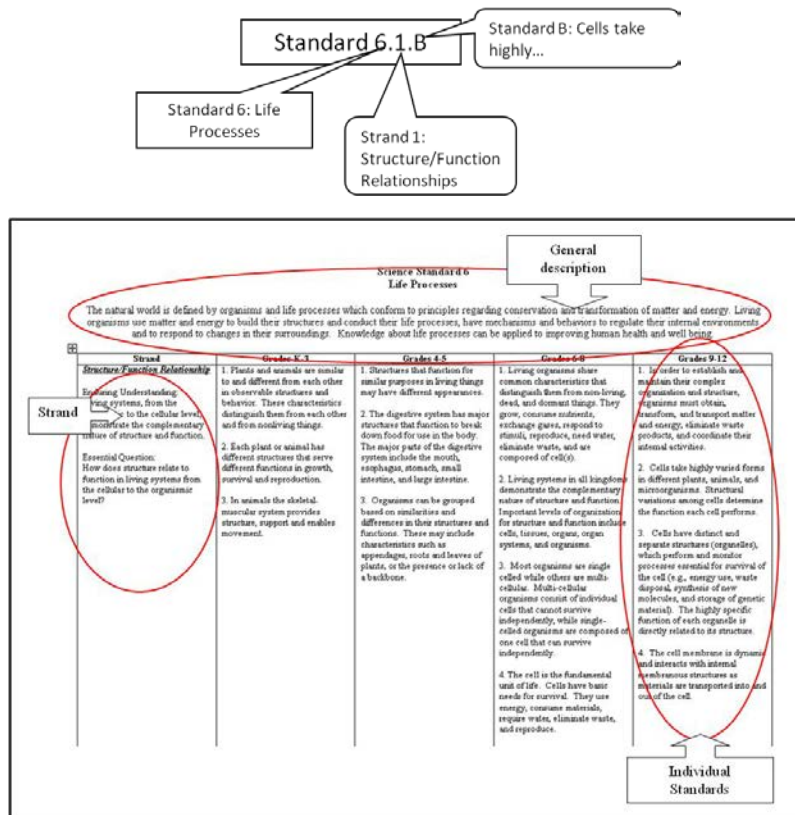
There are eight science standards in Delaware. Each standard is divided into strands which focus on major concepts that increase in depth with grade level. All eight science standards are listed below. However, the end-of-course Biology assessment will measure only specified standards and strands. The purpose of this section is to provide clarification on how the Delaware Science Content standards are organized.

- Standard 1: Nature and Application of Science and Technology:
  - The understandings and abilities of scientific inquiry
  - Science, technology and society
  - The history and context of science
- Standard 2: Materials and Their Properties:
  - Properties and Structure of materials
  - Mixtures and solutions
  - Conservation of matter
  - Chemical reactions
  - Material technology
- Standard 3: Energy and Its Effects:
  - Forms and sources of energy
  - Forces and the transfer of energy
  - Energy interacting with materials; the transformation and conservation of energy
  - The production, consumption, and application of energy:
- Standard 4: Earth in Space:
  - The Earth/Moon, Sun System
  - The Solar System
  - Stars and Galaxies
  - Technology and applications
- Standard 5: Earth’s Dynamic Systems:
  - Components of earth
  - Interactions throughout Earth’s systems
  - Technology and applications
- Standard 6: Life Processes:
  - Structure/function relationship
  - Matter and energy transformations
  - Regulation and behavior
  - Life processes and technology application
- Standard 7: Diversity and Continuity of Life:
  - Reproduction, heredity and development
  - Diversity and evolution
  - Technology applications
- Standard 8: Ecology:
  - Interactions within the environment
  - Energy flow and materials cycles in the environment
  - Human impact

Below is a page from Standard 6: ***Life Processes***. The standard is indicated at the top of the page. Below the standard number is a general description of the standard. The general description is not the standard but is intended to provide an overarching description of the entire standard.

To the left of the document is the strand. Each standard is divided into strands as listed above. On this page, the strand is “Structure/Function Relationships.” Below the strand is the enduring understanding and essential questions of that strand. The enduring understanding is the “big idea” that guides this strand at all grade levels and increases in depth and breadth with grade level.

On the right of the page listed under “grades 9–12” are the individual standard statements. These are the standards which will be used to guide test item development. When referring to a standard, this document uses numbers such as 6.1.2. The first number refers to the standard which is “6”. The second number refers to the strand which is “1” or the first strand in this standard. The third number refers to the individual standard under that strand.



The Grade-Level Expectations are located at the end of each standard. These expectations are a guide and provide clarity to teachers as to the types the inquiry-based experiences in which students should engage and what students should be able to do to meet the standard.

<b>Standard 6: Life Processes, Grade Level Expectations Grades 9-12</b>	
<p>Essential Question: How does structure relate to function in living systems from the organismic to the cellular level?</p> <p>Essential Question: How is matter transferred and energy transferred/transformed in living systems?</p> <p>Essential Question: How do responses to internal and external cues aid in an organism's survival?</p> <p>Essential Question: What can we do to benefit the health of humans and other organisms?</p>	
<p>Enduring Understanding: Living systems, from the organismic to the cellular level, demonstrate the complementary nature of structure and function.</p> <p>Enduring Understanding: All organisms transfer matter and convert energy from one form to another. Both matter and energy are necessary to build and maintain structures within the organism.</p> <p>Enduring Understanding: Organisms respond to internal and external cues, which allow them to survive.</p> <p>Enduring Understanding: The health of humans and other organisms is affected by their interactions with each other and their environment, and may be altered by human manipulation.</p>	
<p>Building upon the K-9 expectations, all students in <b>Grade 10</b> will be able to:</p>	
<p><b>Enduring Understanding: Living systems, from the organismic to the cellular level, demonstrate the complementary nature of structure and function.</b></p>	
<p>Use microscopes to identify similarities and differences among a variety of cells (e.g., muscle, nerve, epithelial, blood, adipose), and explain how structural variations relate to the function that each of the cells performs.</p>	
<p>Differentiate between prokaryotic cells and eukaryotic cells in terms of their general structures (cell membrane &amp; genetic material) and degree of complexity. Give examples of prokaryotic organisms and organisms with eukaryotic cells.</p>	
<p>Explain how organelles of single-celled organisms function as a system to perform the same basic life processes as are performed in multi-cellular organisms (e.g., acquisition of energy, elimination of waste, reproduction, gas exchange, growth, repair, and protein synthesis).</p>	
<p>Use fluid mosaic models of the plasma membrane to explain how its structure regulates the movement of materials across the membrane.</p>	
<p>Show how water moves in and out of cells down a concentration gradient. Recognize that this process, known as osmosis, requires no input of energy.</p>	
<p>Explain the role of cell membranes as highly selective barriers (e.g., diffusion, osmosis, active transport).</p>	
<p>Distinguish between active and passive transport. Recognize that active transport requires energy input to move molecules from an area of low concentration to an area of high concentration (against the concentration gradient).</p>	
<p>Design a controlled experiment to investigate the capacity of the cell membrane to regulate how materials enter and leave the cell.</p>	
<p>Construct cell models (e.g., phenolphthalein-agar cubes, potato-iodine cubes) to investigate the relationship among cell size, surface area to volume ratio and the rates of diffusion into and out of the cell. Explain why large organisms have developed from many cells rather than one large cell.</p>	
<p>Recognize that as a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable despite changes in the outside environment.</p>	
<p>Explain how the cells of a multi-cellular organisms work together for the benefit of the colonial or singular organism.</p>	

To the left of the document is the strand. Each standard is divided into strands as listed above. On this page, the strand is “Structure/Function Relationships.” Below the strand is the enduring understanding and essential questions of that strand. The enduring understanding is the “big idea” that guides this strand at all grade levels and increases in depth and breadth with grade level.

On the right of the page listed under “grades 9–12” are the individual standard statements. These are the standards which will be used to guide test item development. When referring to a standard, this document uses numbers and letters, such as 6.1.B. The first number refers to the standard which is “6.” The second number refers to the strand which is “1” or the first strand in this standard. The letter refers to the individual standard under that strand.

#### **IV. SUGGESTIONS AND CAUTION**

Particular attention needs to be given to the standards and strands listed in this document. Guidance on the emphasis of each standard is delineated by the terms essential, important, and compact.

Classroom learning often goes beyond the standards. In an inquiry-based classroom, learning encompasses a wider range of learning opportunities. While the end-of-course exam focuses on a specific set of standards in a given administration, student success in the classroom is determined by many factors. A student could score well on the end-of-course assessment, while not showing the same level of success in the classroom.

## **Format of Test Expectations**

The expectations are formatted in the following ways.

1. Categorically – Each table indicates the standard and strand assessed.
2. Depth of Knowledge – Clarifications within each table indicate the depth of knowledge or skill intended within the standard.
3. Cognitive Range – Each table indicates the expected span of knowledge intended for assessment.
4. Test Representation of Standard – Each table indicates whether the standard is essential, important, or compact. The greatest number of DCAS items will come from essential standards, with less from important standards and no DCAS items will be compact standards.

## **V. SUMMARY**

The course-level expectations are focused on the standards and the level of priority assigned to each standard. The majority of test items will be taken directly from standards that are essential with a smaller percentage of items written to the important standards. No compact standards will be tested in large-scale assessment. The cognitive levels are a guide to provide clarification to the test vendor as to the depth and breadth of the standard. Most standards give a range of possibilities within the various cognitive levels.

## **VI. BIOLOGY END-OF-COURSE EXPECTATIONS**

The Delaware Content Standards for Science is a comprehensive document containing eight standards with corresponding grade-level expectations (GLEs). The Biology EOC Expectations provide a guide to indicate the level of emphasis to be placed on the standards and GLEs. By coding standards and GLEs taught in the Biology course, it enables teachers to distinguish between the essential, important, and compact elements of the curriculum. As a result, students receive similar instruction based on a common course.

Essential standards are those that emphasize the key knowledge and skills that students should understand at great depth and on which most instructional time is spent. Important standards comprise a lesser extent of the curriculum and lead to understanding essential knowledge and skills. Compact standards are not included on the DCAS assessment.

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.1	Structure and Function
Content Standard Statement	6.1.A In order to establish and maintain their complex organization and structure, organisms must obtain, transform, and transport matter and energy, eliminate waste products, and coordinate their internal activities. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain how organelles of single-celled organisms function as a system to perform the same basic life processes as are performed in multi-cellular organisms (e.g., acquisition of energy, elimination of waste, reproduction, gas exchange, growth, repair, and protein synthesis).</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard that creates a foundation for later biological concepts. Items for this standard should focus on how parts coordinate functions as a system. The specific functioning of each organelle is <u>not</u> a focus.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Should focus on identifying requirements of all living things.</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.1	Structure and Function
Content Standard Statement	6.1.B Cells take highly varied forms in different plants, animals, and microorganisms. Structural variations among cells determine the function each cell performs. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Identify similarities and differences among a variety of cells (e.g., muscle, nerve, epithelial, blood, leaf, root). Explain how structural variations relate to the function that each of the cells performs.</li> <li>▪ Differentiate between prokaryotic cells and eukaryotic cells in terms of their general structures (cell membrane and genetic material) and degree of complexity. Give examples of prokaryotic organisms and organisms with eukaryotic cells.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p>Items for this standard should emphasize structure/function relationships.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: May ask students to recall the function of cell structures.</p> <p>Level 2 Items: May ask students to compare/contrast structures of different cells.</p> <p>Level 3 Items: May ask students to draw conclusions about cell function based on structures observed.</p>

Standard Title	6 Life Processes
Strand 6.1	Structure and Function
Content Standard Statement	6.1.C Cells have distinct and separate structures (organelles), which perform and monitor processes essential for survival of the cell (e.g., energy use, waste disposal, synthesis of new molecules, and storage of genetic material). The highly specific function of each organelle is directly related to its structure. Priority: Important
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Differentiate between prokaryotic cells and eukaryotic cells in terms of their general structures (cell membrane &amp; genetic material) and degree of complexity. Give examples of prokaryotic organisms and organisms with eukaryotic cells.</li> <li>▪ Explain how organelles of single-celled organisms function as a system to perform the same basic life processes as are performed in multi-cellular organisms (e.g., acquisition of energy, elimination of waste, reproduction, gas exchange, growth, repair, and protein synthesis). <i>(Note: This refers to the idea that single-celled organisms are self-sufficient, while multi-cellular organisms depend on a division of labor among cells.)</i></li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards. Items for this standard should focus on how parts coordinate functions as a system. The specific functioning of each organelle is not a focus.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: May focus on recall of general structures that all students should know that include the cell membrane, cell wall, nucleus, mitochondria, chloroplasts, and cytoplasm.</p> <p>Level 2 Items: May ask students to classify organisms according to the kingdom level only, e.g., bacteria, fungi, plants, animals and protists. Specific names of organisms are not the focus.</p>

Standard Title	6 Life Processes
Strand 6.1	Structure and Function
Content Standard Statement	6.1.D The cell membrane is dynamic and interacts with internal membranous structures as materials are transported into and out of the cell. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Use models or diagrams to explain how the structure of the cell membrane regulates the movement of materials across the membrane.</li> <li>▪ Show how water moves in and out of cells down a concentration gradient. Recognize that this process, known as osmosis, requires no input of energy.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><i>Note: Students should be able to explain if water will enter or leave a cell based on solute concentration. They will not be accountable for vocabulary such as <u>hypo/hyper/isotonic</u> or <u>osmotic pressure</u>.</i></p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Define osmosis; describe the primary function of the cell membrane.</p> <p>Level 3 Items: Interpret the relative concentration of a solution based on the shape (shriveled or swollen) of the cell suspended in the solution.</p> <p>Level 4 Items: Predict whether a cell will shrink or swell based on concentration of the environment compared to the concentration of cell contents.</p>

Standard Title	6 Life Processes
Strand 6.1	Structure and Function
Content Standard Statement	6.1.E The transportation of materials across the membrane can be passive (does not require the expenditure of cellular energy) or active (requires the expenditure of cellular energy) depending upon membrane structure and concentration gradients. Priority: Important
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Distinguish between active and passive transport. Recognize that active transport requires energy input to move molecules from an area of low concentration to an area of high concentration (against the concentration gradient).</li> <li>▪ Interpret data from a controlled experiment to investigate the capacity of the cell membrane to regulate how materials enter and leave the cell.</li> <li>▪ Interpret data from cell models (e.g., phenolphthalein-agar cubes, potato-iodine cubes) to explain the relationship among cell size, surface area to volume ratio and the rates of diffusion into and out of the cell. Explain why large organisms have developed from many cells rather than one large cell.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards.</p> <p><i>(Note: this may include a diagram of an experiment involving solutes crossing dialysis tubing).</i></p> <p><i>(Note: students should understand how surface area/volume ratios affect cell processes, but they will not be expected to calculate surface area/volume ratios.)</i></p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: May ask for a definition of passive or active transport.</p> <p>Level 2 Items: Given a “before and after” picture of a cell in a solution, students will describe how materials cross the membrane (e.g., by passive or active transport) based upon information about the concentration gradient.</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.1	Structure and Function
Content Standard Statement	6.1.F Cells store and use information to guide their functions. DNA molecules in each cell carry coded instructions for synthesizing protein molecules. The protein molecules have important structural and regulatory functions. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Define a gene as a section of DNA that directs the synthesis of a specific protein. A protein has a specific regulatory or structural role.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Describe gene, codon, protein, and nucleic acid</p> <p>Level 2 Items: Describe the cause and effect relationship between mutations and protein structure/function.</p> <p>Level 3 Items: Predict consequences of a mutation on a protein and, therefore, on cell function.</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.1	Structure and Function
Content Standard Statement	6.1.G Humans have a nervous system composed of a brain and specialized cells that conduct signals rapidly through the long cell extensions that make up nerves. The nerve cells communicate with each other by secreting specific molecules (neurotransmitters). Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Recognize that as a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable despite changes in the outside environment.</li> <li>▪ Explain how the cells of a multi-cellular organisms work together for the benefit of the colonial or singular organism.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard, a definition by nature. It is intended as foundational content and therefore is not recommended for large-scale assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Identify parts of the nervous system or differentiate between parts/ structures of the nervous system and those that are not.</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.1	Structure and Function
Content Standard Statement	6.1.H In multi-cellular organisms, cells perform specialized functions as parts of sub-systems (e.g., tissues, organs, and organ systems), <u>which work together to maintain optimum conditions for the benefit of the whole organism</u> Priority: Important
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain how the cells of a multi-cellular organisms work together for the benefit of the colonial or singular organism.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Choose from a list of terms that range from least to most complex (i.e., cell, tissue, organ, organ system, organism).</p> <p>Level 2 Items: Classify the levels of cellular organization by complexity.</p> <p>Level 3 Items: Explain why cells from a multi-cellular organism cannot live independently.</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.1	Structure and Function
Content Standard Statement	6.1.I The endocrine system consists of glands which secrete chemical messengers (hormones) that are transported via the circulatory system and act on other body structures. Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Recognize that as a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable despite changes in the outside environment.</li> <li>▪ Explain how the cells of a multi-cellular organisms work together for the benefit of the colonial or singular organism.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Recognize that cells in a multi-cellular are interdependent or identify the purpose of the endocrine system (definitional).</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.1	Structure and Function
Content Standard Statement	6.1.J The immune system consists of cells, organs, and secretions that protect the organism from toxins, irritants, and pathogens. Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Recognize that as a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable despite changes in the outside environment.</li> <li>▪ Explain how the cells of a multi-cellular organisms work together for the benefit of the colonial or singular organism.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Defines or identifies a function as being the responsibility of the immune system.</p> <p>Level 2 Items: May ask the student to describe why increased blood flow to an injury may be helpful in the healing process of an organism.</p> <p>Level 3 Items: May provide data and ask students to provide evidence that the immune system has protected the organism.</p>

Standard Title	6 Life Processes
Strand 6.2	Matter and Energy Transformation
Content Standard Statement	<p>6.2.A Cells carry out a variety of chemical transformations (i.e., cellular respiration, photosynthesis, and digestion) which allow conversion of energy from one form to another, the breakdown of molecules into smaller units, and the building of larger molecules from smaller ones. Most of these transformations are made possible by protein catalysts called enzymes.</p> <p>Priority: Essential</p>
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain that physically breaking down food into smaller pieces by mechanical digestion helps facilitate breakdown (by increasing surface area) into chemical components and that digestive enzymes are necessary for the breakdown of food into those chemical components (e.g., starch to glucose, lipids and glycerol to fatty acids, proteins to amino acids).</li> <li>▪ Observe and recognize that unicellular organisms take in food from their environment and chemically digest it (if needed) within their cell body.</li> <li>▪ Understand that nutrients are transported to cells where they serve as building blocks for the synthesis of body structures and as reactants for cellular respiration.</li> <li>▪ Describe the process by which water is removed from sugar molecules (dehydration synthesis) to form carbohydrates and is added to break them down (hydrolysis).</li> <li>▪ Recognize that during cellular respiration, chemical bonds between food molecules are broken (hydrolysis), and energy is transferred to ADP to create ATP (the energy storage molecule that fuels cellular processes). Acknowledge that all organisms must break the high energy chemical bonds in food molecules during cellular respiration to obtain the energy needed for life processes.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment. This is an overarching standard, and specific details will be associated with other standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Identify the purpose of food in a cell (provide energy and matter for growth and repair).</p>

Standard Title	6 Life Processes
Strand 6.2	Matter and Energy Transformation:
Content Standard Statement	<p>6.2.B Plant cells contain chloroplasts, which convert light energy into chemical energy through the process of photosynthesis. This chemical energy is used by the plants to convert carbon dioxide and water into glucose molecules, that may be used for energy or to form plant structures. Photosynthesis adds oxygen to the atmosphere and removes carbon dioxide.</p> <p>Priority: Essential</p>
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain the processes used by autotrophs to transform light energy into chemical energy in the form of simple sugars. Give examples of how these compounds are used by living things as sources of matter and energy.</li> <li>▪ Describe photosynthesis as an energy storing process and explain how environmental factors such as temperature, light intensity, and the amount of water available can affect photosynthesis.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Identify the organelle where photosynthesis takes place. Describe how the products of photosynthesis are used by a plant.</p> <p>Level 2 Items: Classify the reactants and products of the photosynthesis equation.</p> <p>Level 3 Items: Explain how photosynthesis causes a plant to increase in mass. <i>(Note: we are not asking students to understand the Calvin Cycle or its steps—just to identify CO<sub>2</sub> as a source of matter.)</i></p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.2	Matter and Energy Transformation:
Content Standard Statement	6.2.C All organisms, including plants, use the process of cellular respiration to transform stored energy in food molecules into usable energy. The energy produced is stored in the form of ATP and is used by organisms to conduct their life processes. Cellular respiration may require oxygen and adds carbon dioxide to the atmosphere. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>Recognize that during photosynthesis, plants use energy from the sun and elements from the atmosphere and the soil to make specific compounds. Recognize that these compounds are used by living things as sources of matter and energy.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Identify the organelle where respiration takes place. Describe how the products of respiration are used by a plant or animal.</p> <p>Level 2 Items: Classify the reactants and products of the respiration equation.</p> <p>Level 3 Items: Explain why a plant releases CO<sub>2</sub> at night. Explain how trees are able to survive in the winter after they have lost their leaves.</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.2	Matter and Energy Transformation:
Content Standard Statement	6.2.D Photosynthesis and cellular respiration are complementary processes resulting in the flow of energy and the cycling of matter in ecosystems. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>Investigate and describe the complementary relationship (cycling of matter and the flow of energy) between photosynthesis and cellular respiration.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 2 Items: Describe the complementary relationship (cycling of matter and the flow of energy) between photosynthesis and cellular respiration.</p> <p>Level 3 Items: Explain why photosynthesis does not deplete the total level of CO<sub>2</sub> in the atmosphere.</p> <p>Level 4 Items: May ask students to view a graph that illustrates CO<sub>2</sub> levels in a closed system and, based on knowledge of what is IN that system, explain why the data reads as it does.</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.3	Regulation and Behavior
Content Standard Statement	6.3.A The endocrine, nervous, and immune systems coordinate and help maintain homeostasis in humans and other organisms. Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Recognize that as a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable despite changes in the outside environment.</li> <li>▪ Illustrate how nerve cells communicate with each other to transmit information from the internal and external environment often resulting in physiological or behavioral responses.</li> <li>▪ Draw a schematic to illustrate a positive and negative feedback mechanism that regulates body systems in order to help maintain homeostasis.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p><i>(Do not have student list the component parts of these three systems. The focus of this standard is on homeostasis.)</i> This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: State the function of the immune system.</p> <p>Level 2 Items: Compare/contrast nervous system to endocrine system in terms of rate of response. Match the system with the response that is invoked to maintain homeostasis in a given situation.</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.3	Regulation and Behavior
Content Standard Statement	6.3.B Multi-cellular animals have nervous systems that generate behavioral responses. These responses result from interactions between organisms of the same species, organisms of different species, and from environmental changes. Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Recognize that as a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable despite changes in the outside environment.</li> <li>▪ Recognize that in order to help maintain the health of an organism, the immune system works in nonspecific ways (e.g., skin, mucous, membranes) and specific ways (e.g., antibody-antigen interactions.)</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Levels 2-3 Items: Identify something as being or not being evidence of a stimulus/response behavior.</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.4	Life Processes and Technology
Content Standard Statement	6.4.A Certain chemicals, pathogens, and high energy radiation seriously impair normal cell functions and the health of the organism. Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Describe how environmental factors (e.g., UV light or the presence of carcinogens or pathogens) alter cellular functions.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: State the function of the immune system or define homeostasis.</p> <p>Level 2 Items: Identify situations or items that can seriously impair cellular function.</p> <p>Level 3 Items: Explain how interruptions to normal cell function can alter the health of an organism.</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.4	Life Processes and Technology
Content Standard Statement	6.4.B The scientific investigation of cellular chemistry enables the biotechnology industry to produce medicines, foods, and other products for the benefit of society. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Investigate how scientists use biotechnology to produce more nutritious food, more effective medicine, and new ways to mitigate pollution.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 2 Items: Describe how knowing what sorts of things damage specific bacterial structures is beneficial to the medical profession.</p> <p>Level 3 Items: Describe how people protect themselves from high-energy radiation (i.e., using sun block).</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.4	Life Processes and Technology
Content Standard Statement	6.4.C Many drugs exert their effects by mimicking or increasing the production or destruction of neurotransmitters. Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Investigate how drugs can affect neurotransmission.</li> <li>▪ Explain how antibiotics (e.g., penicillin, tetracycline) kill bacterial cells without harming human cells due to differences between prokaryotic and eukaryotic cell structure.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 3 Items: Describe the effect of introducing a stimulant, depressant, or hallucinogenic drug into the human system. (This is more of a health standard than a specific 10<sup>th</sup> grade biology standard, but the content listed in this depth of knowledge question is valid given the students' exposure to the information in health classes.)</p>

<b>Standard Title</b>	<b>6 Life Processes</b>
Strand 6.4	Life Processes and Technology
Content Standard Statement	6.4.D Biotechnology is a growing international field of research and industry. Many scientists conduct cutting-edge research in biotechnology. Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Investigate how scientists use biotechnology to produce more nutritious food, more effective medicine, and new ways to mitigate pollution.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 2 Items: State examples of how biotechnology affects society, i.e., genetically modified foods.</p>

Standard Title	7 Diversity and Continuity of Living Things
Strand 7.1	Reproduction, Heredity, and Development
Content Standard Statement	7.1.A. Hereditary/genetic information in chromosomes is contained in molecules of DNA. Genes are sections of DNA that direct syntheses of specific proteins associated with traits in organisms. These consist of various combinations of four different nucleotides that encode this information through their sequences. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Describe the relationship between DNA, genes, chromosomes and proteins.</li> <li>▪ Explain that a gene is a section of DNA that directs the synthesis of a specific protein associated with a specific trait in an organism.</li> <li>▪ Trace how a DNA sequence, through transcription and translation, results in a sequence of amino acids.</li> <li>▪ Demonstrate that when DNA replicates, the complementary strands separate and the old strands serve as a template for the new complementary strands. Recognize that this results in two identical strands of DNA that are exact copies of the original.</li> <li>▪ Illustrate how a sequence of DNA nucleotides codes for a specific sequence of amino acids.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Define terms DNA, gene, protein, nucleotide.</p> <p>Level 2 Items: Describe the hierarchy of DNA base, gene, DNA molecule, chromosome, and nucleus (possibly as an analogy with letter, word, sentence).</p> <p>Level 3 Items: Describe how DNA structure determines amino acid sequence of a protein.</p>

Standard Title	7 Diversity and Continuity of Living Things
Strand 7.1	Reproduction, Heredity, and Development
Content Standard Statement	7.1.B Known patterns of inheritance can be used to make predictions about genetic variation. Priority: Important
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Use Punnett squares, including dihybrid crosses, and pedigree charts to determine probabilities and patterns of inheritance (i.e., dominant/recessive, co-dominance, sex-linkage, multi-allele inheritance).</li> <li>▪ Analyze a karyotype to determine chromosome numbers and pairs. Compare and contrast normal and abnormal karyotypes.</li> <li>▪ Explain how crossing over and Mendel’s Laws of Segregation and Independent Assortment contribute to genetic variation in sexually reproducing organisms.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 2 Items: Distinguish among dominance, recessiveness, and co-dominance.</p> <p>Level 3 Items: Use a Punnett square to interpret the results of a mating involving a sex linked gene and make predictions about characteristics of the offspring.</p> <p>Level 4 Items: Sample questions.</p> <div style="text-align: center;"> </div> <p>a.) Are spotted noses the result of a dominant or recessive gene? How do you know?</p> <p>b.) What are the genotypes of individuals Lady and Spike?</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.1	Reproduction, Heredity, and Development
Content Standard Statement	7.1.C Mutations in DNA of organisms normally occur spontaneously at low rates, but can occur at higher rates (i.e., exposure to pathogens, radiation, and some chemicals). Most mutations have no effect on the organism, but some may be beneficial or harmful depending on the environment. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Describe how exposure to radiation, chemicals and pathogens can increase mutations.</li> <li>▪ Explain that mutations in the DNA sequence of a gene may or may not affect the expression of the gene. Recognize that mutations may be harmful, beneficial, or have no impact on the survival of the organism.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Given a short strand of DNA as the original, provide three or four "mutated" strands—have student identify that the most different strand from the original is the most likely to cause a mutation.</p> <p>Given short strand of DNA as the original, choose from amongst several that are not a mutation.</p> <p>Level 2 Items: Describe how accidental changes in genetic code might result in greater survival rates of a given species (or vice versa).</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.1	Reproduction, Heredity, and Development
Content Standard Statement	7.1.D Only random mutations in germ cells (gametes) can create the variation that is inherited by an organism’s offspring. Somatic mutations are not inherited, but may lead to cell death, uncontrolled cell growth, or cancer. Priority: Important
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain that mutations in the DNA sequence of a gene may or may not affect the expression of the gene. Recognize that mutations may be harmful, beneficial, or have no impact on the survival of the organism.</li> <li>▪ Explain how the type of cell (gamete or somatic) in which a mutation occurs determines heritability of the mutation.</li> <li>▪ Predict the possible consequences of a somatic cell mutation.</li> <li>▪ Describe the cell cycle as an orderly process that results in new somatic cells that contain an exact copy of the DNA that make up the genes and chromosomes found in the parent somatic cells.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Define cancer.</p> <p>Level 2 Items: Compare/contrast somatic v. germ line mutations.</p> <p>Level 3 Items: Explain how a somatic cell mutation can cause overproduction of a cell substance. Explain how a mutation can alter a DNA sequence but not affect cell products.</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.1	Reproduction, Heredity, and Development
Content Standard Statement	7.1.E During the cell cycle, DNA of the parent cell replicates and the cell divides into two cells that are identical to the parent. This process is used for growth and repair of body tissues and for asexual reproduction. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain how the cell cycle contributes to reproduction and maintenance of the cell and/or organism.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment. Students will not be held accountable for the stages of mitosis.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Ask students to state the result of a cell undergoing mitosis.</p> <p>Level 2 Items: Describe the genetic makeup of two daughter cells that have recently resulted from a cell undergoing mitosis.</p> <p>Level 3 Items: Explain how a cut is able to "heal" and form new skin over time.</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.1	Reproduction, Heredity, and Development
Content Standard Statement	7.1.F Meiosis is the production of sex cells (gametes). The production and release of these gametes is controlled by hormones. In meiosis, the number of chromosomes is reduced by one-half and chromosomes may randomly exchange homologous parts to create new chromosomes with combinations not necessarily found in the parent cell. This may increase variation within the species. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Recognize that during the formation of gametes, or sex cells (meiosis), the number of chromosomes is reduced by one-half, so that when fertilization occurs the diploid number is restored.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment. Students will NOT be held accountable for naming the stages of meiosis.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Require students to know how many daughter cells result from meiosis.</p> <p>Level 2 Items: Compare number of chromosomes of parent cell to daughter cells -or- number of chromosomes of meiotic cell v. mitotic cell in an organism.</p> <p>Level 3 Items: Explain how the process of meiosis promotes diversity in a species.</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.1	Reproduction, Heredity, and Development
Content Standard Statement	7.1.G Upon fertilization, the fusion of the gametes restores the original chromosome number, and new gene combinations lead to increased genetic variation, which, in turn, increases the likelihood of survival of the species. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Compare and contrast the processes of growth (cell division) and development (differentiation).</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Ask students to know the number of chromosomes in the body cells of a parent organisms given the number of chromosomes in an egg cell or explain why meiosis ensures that humans always have 46 chromosomes in their somatic cells.</p> <p>Level 2 Items: Ask students to explain why meiosis is needed in sexual reproduction.</p> <p>Level 3 Items: Explain how sexual reproduction is essential to genetic variation.</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.1	Reproduction, Heredity, and Development
Content Standard Statement	7.1.H The sex chromosomes contain different genes, and therefore, certain traits will show patterns of inheritance based on gender. Priority: Important
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain why sex-linked traits are expressed more frequently in males.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Recognize what it means for a trait to be sex-linked.</p> <p>Level 2 Items: Describe how a genetic disorder could be more likely in the male population than in the female population.</p> <p>Level 3 Items: Show the pedigree of a sex-linked trait and ask students to identify possible/likely reasons for the patterns of inheritance.</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.1	Reproduction, Heredity, and Development
Content Standard Statement	7.1.I Embryological development in plants and animals involves a series of orderly changes in which cells divide and differentiate. Development is controlled by genes whose expression is influenced by internal factors (i.e., hormones) and may also be influenced by environmental factors (i.e., nutrition, alcohol, radiation, drugs, and pathogens). Alteration in this balance may interfere with normal growth and development. Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Recognize that any environmental factor that influences gene expression or alteration in hormonal balance may have an impact on development.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Recognize that environmental factors can affect cell growth.</p> <p>Level 3 Items: Explain why X-rays may cause more damage to a fetus than to an adult.</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.2	Diversity and Evolution
Content Standard Statement	7.2.A Evolution is a change in allelic frequencies of a population over time. The theory of evolution is supported by extensive biochemical, structural, embryological, and fossil evidence. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Recognize random mutation (changes in DNA) and recombination within gametes as the sources of heritable variations that give individuals within a species survival and reproductive advantage or disadvantage over others in the species.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Identify some sources of evidence for the theory of evolution.</p> <p>Level 2 Items: Describe how fossil evidence supports the theory of evolution; describe how pieces of evidence support the theory of evolution.</p> <p>Level 3 Items: Draw conclusions about evolutionary relationships if two specimens have DNA that is very similar in its code.</p>

Standard Title	7 Diversity and Continuity of Living Things
Strand 7.2	Diversity and Evolution
Content Standard Statement	<p>7.2.B The great diversity of organisms is the result of more than 3.5 billion years of evolution that has filled every available niche with life forms. The millions of different species of plants, animals, and microorganisms that live on Earth today are related by descent with modification from common ancestors.</p> <p>Priority: Essential</p>
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain how biochemical evidence, homologous structures, embryological development and fossil evidence support or refute prior hypotheses of common ancestry.</li> <li>▪ Explain how species evolve through descent with modification, thus allowing them to adapt to different environments.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p>This is a foundational standard that encompasses most other evolution standards. This standard is essential but may be tested in a very broad manner with more specific questions being identified with more specific standard statements.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Define evolution.</p> <p>Level 2 Items: Show several structures (e.g., homologous body structures or DNA fingerprints), some very similar, some very different, and ask students to identify two structures that appear to be closely related.</p> <p>Level 3 Items: Display a specific body structure and provide students with four or more “environments” in which they would expect to find that structure useful to an organism; or explain why biochemical evidence of evolutionary relationships may contradict evidence based on homologous structures or fossil evidence.</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.2	Diversity and Evolution
Content Standard Statement	7.2.C The process of natural selection occurs when some heritable variations that arise from random mutation and recombination give individuals within a species some survival advantages over others. These offspring with advantageous adaptations are more likely to survive and reproduce, thus increasing the proportion of individuals within a population with advantageous characteristics. When populations become isolated, these changes may accumulate and eventually result in new species. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Analyze natural selection simulations and use data generated from them to describe how environmentally-favored traits are perpetuated over generations resulting in species survival, while less favorable traits decrease in frequency or may lead to extinction.</li> <li>▪ Compare and contrast the role of sexual selection to the role of natural selection on the evolutionary process.</li> <li>▪ Relate a population’s survival to the reproductive success of adapted individuals in that population.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Define natural selection.</p> <p>Level 2 Items: Given an example of two “versions” of the same species, identify which is most likely to survive and procreate in a given environment (illustrating an understanding of selective pressures).</p> <p>Level 3 Items: Given an example of population data of a species over time, infer an evolutionary relationship between special characteristics and population fluctuations.</p>

Standard Title	7 Diversity and Continuity of Living Things
Strand 7.2	Diversity and Evolution
Content Standard Statement	7.2.D Evolution does not proceed at the same rate in all populations, nor does it progress in a linear or set direction. Environmental changes have a strong influence on the evolutionary process. Other factors that influence evolution include: sexual selection, mutation, genetic drift, and genetic modification. Priority: Important
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Describe that evolution involves changes in the genetic make-up of whole populations over time, not changes in the genes of an individual organism.</li> <li>▪ Discuss how environmental pressure, genetic drift, mutation and competition for resources influence the evolutionary process. Recognize that a change in a species over time does not follow a set pattern or timeline.</li> <li>▪ Explain the roles of geographical isolation and natural selection on the evolution of new species.</li> <li>▪ Predict possible evolutionary implications for a population due to environmental changes over time (e.g., volcanic eruptions, global climate change, and industrial pollution).</li> <li>▪ Explain why homogeneous populations may be more vulnerable to environmental changes than heterogeneous populations.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards. Note: the GLEs provide good examples of material that are testable.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: List of things that might cause evolution—they pick the item that is not a cause of evolution. Note: evolution is a result of variation and likelihood of that variation being transmitted to offspring. Asking about “things that cause evolution” may be misleading.</p> <p>Level 2 Items: Compare natural selection to genetic drift or kin selection as an evolutionary process.</p> <p>Level 3 Items: Given population data that illustrates a genetic drift or founder’s effect scenario, have students identify a reason for the proliferation of a gene within a population (e.g., tay sachs).</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.2	Diversity and Evolution
Content Standard Statement	7.2.E Organisms are classified into a hierarchy of groups and subgroups based on similarities in structure, comparisons in DNA and protein and evolutionary relationships. Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain how evolutionary relationships between species are used to group organisms together.</li> <li>▪ Explain how DNA evidence can be used to determine evolutionary relationships.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Relates percentage of DNA similarity to evolutionary relationship.</p> <p>Level 2 Items: Provide pictures of multiple organisms and have students choose the ones that should be grouped together. Ideally students would explain or be given multiple choice reasons for their decisions.</p> <p>Level 3 Items: Provide multiple strands of DNA nucleotide code and have students determine which two samples are most likely related evolutionarily—ideally they would explain or be given multiple choices to explain why their choice is correct.</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.2	Diversity and Evolution
Content Standard Statement	7.2.F Genetically diverse populations are more likely to survive changing environments. Priority: Essential
Grade-Level Expectation(s)	
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 3 Items: Make predictions on the survival of a population that is genetically diverse versus one that is genetically similar.</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.2	Diversity and Evolution
Content Standard Statement	7.2.G Biological evolution is the foundation for modern biology and is used to make predictions for medical, environmental, agricultural and other societal purposes. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain how antibiotic resistance populations evolve from common bacterial populations.</li> <li>▪ Research how invasive species have genetically altered an indigenous population.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Identify genetic modification as a tool used by humans to manipulate their world for their own purposes.</p> <p>Level 3 Items: Provide population data that suggests that an invasive species has caused a shift in genetic tendencies of another organism—have students choose the most valid reason for this shift in genetics; or explain why overuse of antibiotics may lead to emergence of resistant pathogens.</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.3	Technology Applications
Content Standard Statement	7.3.A The expanding ability to manipulate genetic material, reproductive processes, and embryological development creates choices that raise ethical, legal, social, and public policy questions. Priority: Compact
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Discuss examples of how genetic engineering technology can be applied in biology, agriculture and medicine in order to meet human wants and needs.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is a compact standard so it is expected that less emphasis will be placed upon this than essential or important standards.</p> <p><b>DOK (Depth of Knowledge)</b></p> <p>Level 1 Items: Give examples of how technology has been used to monitor or manipulate genetic, reproductive, or embryological processes (e.g., disease resistant plants, fertility treatment, fetal ultrasound monitoring)</p> <p>Level 3 Items: Provide students with a scenario of being able to choose the sex of your child “pre-conception”; provide four questions that relate to this scenario, and ask for the one that is most pertinent to public policy or ethics or legality, etc.; or explain opposing views of fetal stem cell research.</p>

Standard Title	7 Diversity and Continuity of Living Things
Strand 7.3	Technology Applications
Content Standard Statement	7.3.B Recombinant DNA technology, which is a form of genetic engineering, involves the insertion of DNA from one cell into a cell of a different organism where the inserted DNA is expressed. Genetic engineering is being applied in biology, agriculture, and medicine in order to meet human wants and needs. Priority: Important
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Investigate how the human ability to manipulate genetic material and reproductive processes can be applied to many areas of medicine, biology, and agriculture. Evaluate the risks and benefits of various ethical, social and legal scenarios that arise from this ability.</li> <li>▪ Explain the basic process of bacterial transformation and how it is applied in genetic engineering.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Define genetic engineering.</p> <p>Level 2 Items: Identify different organisms that would be good or bad candidates for genetic engineering and why.</p> <p>Level 3 Items: Have students identify a genetic modification suggestion for an area that needs an increase in plant production within a harsh environment (e.g., drought resistant crops).</p> <p>Level 4 Items: Ask students to explain how genetic engineering can be used to mass produce a human biological product (e.g., insulin, clotting factor).</p>

<b>Standard Title</b>	<b>7 Diversity and Continuity of Living Things</b>
Strand 7.3	Technology Applications
Content Standard Statement	7.3.C DNA is analyzed to determine evolutionary relationships, study populations, identify individuals, and diagnose genetic disorders. Priority: Important
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain how DNA evidence can be used to determine evolutionary relationships.</li> <li>▪ Explain how developments in technology (e.g., gel electrophoresis) have been used to identify individuals based on DNA as well as to improve the ability to diagnose genetic diseases.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 2 Items: Give reasons why DNA is a suitable chemical for identification of genetic and/or evolutionary relationships.</p> <p>Level 3 Items: Given a diagram of electrophoresis gels from a possible paternity test, determine the parentage of a test subject.</p>

<b>Standard Title</b>	<b>2 Materials and Their Properties</b>
Strand 2.1	Properties and Structures of Materials
Content Standard Statement	2.1.B Elements and compounds are pure substances. Elements cannot be decomposed into simpler materials by chemical reactions. Elements can react to form compounds. Elements and/or compounds may also be physically combined to form mixtures Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Observe formulas and diagrams of compounds found in food (fats, proteins, carbohydrates). Identify elements that comprise these compounds. (2.1.2)</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Determine the number of carbon atoms in <math>3C_6H_{12}O_6</math>. Identify elements important in biological molecules. Identify an element found in proteins not found in carbohydrates. Identify a structural diagram of glucose as a building block of complex carbohydrates. OR Describe how matter is conserved between the reactants and products of photosynthesis and/or cellular respiration</p> <p>Level 3 Items: Explain why carbon's bonding properties make it a good "backbone" for many biological molecules.</p> <p>Level 4 Items: Explain why a high protein diet over long periods of time may be dangerous for someone with kidney disease.</p>

<b>Standard Title</b>	<b>2 Materials and Their Properties</b>
Strand 2.3	Conservation of Matter
Standard Statement	2.3.A The total mass of the system remains the same regardless of how atoms and molecules in a closed system interact with one another, or how they combine or break apart. Priority: Essential
Grade Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Identify the reactants and the products in equations that represent photosynthesis and cellular respiration. Explain how the equations demonstrate the Law of Conservation of Matter and Energy in terms of balanced equations.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Describe how matter is conserved between the reactants and products of photosynthesis and/or cellular respiration.</p> <p>Level 3 Items: Explain why a plant becomes appears to lose mass when placed in salt water for several hours.</p>

<b>Standard Title</b>	<b>2 Materials and Their Properties</b>
Strand 2.4	Chemical Reactions
Content Standard Statement	2.4.C The rate of a chemical reaction depends on the properties and concentration of the reactants, temperature, and the presence or absence of a catalyst. Priority: Essential
Grade-Level Expectation(s)	
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment. <i>This will be tested in terms of enzyme reactivity.</i></p> <p><b>Depth of Knowledge Categories</b></p> <p>Examples of cognitive levels:</p> <p>Level 1 Items: Describe the effect of raising reaction temperature on reaction rate (assuming no enzyme denaturation).</p> <p>Level 2 Items: Provide students with a description of environmental conditions in which an enzyme is functioning; provide four possible rates of reaction graphs and ask for the one that best describes what would happen in this situation.</p> <p>Level 3 Items: Give students a procedure for determining rate of an enzymatic reaction (e.g. amylase/starch reaction, test with iodine). Ask students how to interpret results.</p>

<b>Standard Title</b>	<b>2 Materials and Their Properties</b>
Strand 2.4	Chemical Reactions
Content Standard Statement	2.4.D Energy is transformed in chemical reactions. Energy diagrams can illustrate this transformation. Exothermic reactions release energy. Endothermic reactions absorb energy. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Identify the reactants and the products in equations that represent photosynthesis and cellular respiration. Explain how the equations demonstrate the Law of Conservation of Matter and Energy in terms of balanced equations. (2.3.1) (2.4.1)</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1: Given an energy diagram that includes values for kcal, determine (from the graph) kcal of energy absorbed or released (in other words, students must find the difference in energy from the beginning of the reaction and the end).</p> <p>Level 2: Explain that breaking bonds requires energy but forming bonds releases energy. (NOTE: This is also found in standard 3.1.6.)</p> <p>Look at an energy diagram and decide if energy is required for the reaction or released by the reaction.</p>

<b>Standard Title</b>	<b>2 Materials and Their Properties</b>
Strand 2.4	Chemical Reactions
Content Standard Statement	2.4.E A catalyst lowers the activation energy of a chemical reaction. The catalyst remains unchanged and is not consumed in the overall reaction. Enzymes are protein molecules that catalyze chemical reactions in living systems. Priority: Important
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Explain how enzymes permit low temperature chemical reactions to occur in cells.</li> <li>▪ Investigate how various factors (temperature, pH, enzyme/substrate concentration) affect the rate of enzyme activity.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards.</p> <p>Emphasis should be on the role of enzymes in cellular metabolism and not digestion.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Define enzymes as biological catalysts or Identify enzymes as proteins.</p> <p>Level 2 Items: Identify catalytic characteristics of enzymes (e.g., specificity, reusability, susceptibility to conditions that disrupt protein structure) or explain why an enzyme is not included as a reactant or a product in a biochemical reaction.</p> <p>Show a chemical reaction on an energy diagram and ask students to identify the reaction as exothermic or endothermic.</p> <p>Level 3 Items: Explain why temperature and pH can affect an enzyme catalyzed reaction or explain why biological specimens (and/or food) are preserved by refrigeration in terms of enzyme activity.</p>

<b>Standard Title</b>	<b>2 Materials and Their Properties</b>
Strand 2.4	Chemical Reactions
Content Standard Statement	<p>2.4.F Certain small molecules (monomers) react with one another in repetitive fashion (polymerization) to form long chain macromolecules (polymers). The properties of the macromolecules depend on the properties of the molecules used in their formation and on the lengths and structure of the polymer chain. Polymers can be natural or synthetic.</p> <p>Priority: Compact</p>
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Expectation: Use molecular models to explain how carbon atoms uniquely bond to one another to form a large variety of molecules, including those necessary for life (e.g., polysaccharides, polypeptides). (2.4.6)</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an important standard so it is expected that less emphasis will be placed upon this standard in the assessment than is on essential standards.</p> <p>Students need to understand that large molecules (polymers) are made of smaller molecules (monomers) and should not be held accountable for the terms dehydration synthesis or hydrolysis.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Identify the monomers of a large polymer—i.e., protein is made from amino acids or items identify structural diagrams of monomers that are the building blocks of biological polymers.</p> <p>Level 2 Items: Show an equation for a biological reaction that begins with multiple monomers and results in a smaller number of polymer products. Ask students to identify the reactants and products and identify where the material came from to produce the polymer.</p> <p>Level 3 Items: Suggest reasons why the cell benefits by storing sugars as a polysaccharide.</p>

<b>Standard Title</b>	<b>3 Energy and Its Effects</b>
Strand 3.1	Forms and Sources of Energy
Content Standard Statement	3.1.F Chemical energy is derived from the making and breaking of chemical bonds. Priority: Essential
Grade-Level Expectation(s)	
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Define “biological energy” as a form of chemical energy.</p> <p>Level 2 Items: Explain that breaking bonds requires energy but forming bonds releases energy. Prepare an energy diagram of a biological reaction and ask students to identify the reaction as endothermic or exothermic.</p> <p>Level 3 Items: Relate a net gain or loss of energy from a biological reaction to the end result being achieved (i.e., photosynthesis and cell respiration as energy storing or energy releasing summative reactions). Explain how a series of biochemical reactions (a pathway) may release energy overall even if individual reactions require energy.</p>

<b>Standard Title</b>	<b>3 Energy and Its Effects</b>
Strand 3.3	The Transformation and Conservation of Energy
Content Standard Statement	3.3.A Energy cannot be created nor destroyed. Energy can be transferred from one object to another and can be transformed from one form to another, but the total amount of energy never changes. Recognizing that energy is conserved, the processes of energy transformation and energy transfer can be used to understand the changes that take place in physical systems. Priority: Essential
Grade-Level Expectation(s)	
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Identify types/examples of biological energy transformations (e.g., photosynthesis as solar to chemical).</p> <p>Level 2 Items: Provide energy-illustrating diagrams and ask students to identify the net gain (endothermic) of energy to the system or the net “loss” (exothermic) of energy from the system.</p> <p>Level 3 Items: Have students relate a net gain or loss of energy from a biological reaction to the end result being achieved (i.e., photosynthesis and cell respiration as energy storing or energy releasing summative reactions).</p>

<b>Standard Title</b>	<b>1 The Nature and Application of Science and Technology</b>
Strand 1.1	Understandings and Abilities of Scientific Inquiry
Content Standard Statement	1.1.A Understand that: Scientists conduct investigations for a variety of reasons including to explore new phenomena, to replicate other’s results, to test how well a theory predicts, to develop new products, and to compare theories. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>Be able to: identify and form questions that generate a specific testable hypothesis that guide the design and breadth of the scientific investigation.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Identify a question as scientifically testable or not.</p> <p>Level 3 Items: Compare two or more hypotheses on a related question and evaluate which is the best hypothesis.</p>

<b>Standard Title</b>	<b>1 The Nature and Application of Science and Technology</b>
Strand 1.1	Understandings and Abilities of Scientific Inquiry
Content Standard Statement	1.1.B Understand that: Science is distinguished from other ways of knowing by the use of empirical observations, experimental evidence, logical arguments, and healthy skepticism. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>Be able to: design and conduct valid scientific investigations to control all but the testable variable in order to test a specific hypothesis.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Identify variables and controls in an experiment scenario. Identify a statement as either an qualitative, quantitative observation, or an inference.</p> <p>Level 2 Items: Compare two experimental designs and identify the better design (add explanation to up to level 3).</p> <p>Level 3 Items: Evaluate a scientific procedure/process for validity; or select a scientific method to best address different types of scientific studies. Suggest using field or observational research, correlation studies, or cause/effect. Which method would be best to determine if humans that smoke develop lung cancer at a greater rate than nonsmokers? Which method would be best to determine the effect of a hormone on plant cell growth? How could you best determine the preferred food source for a species of bird?</p>

<b>Standard Title</b>	<b>1 The Nature and Application of Science and Technology</b>
Strand 1.1	Understandings and Abilities of Scientific Inquiry
Content Standard Statement	1.1.C Understand that: theories in science are well-established explanations of natural phenomena that are supported by many confirmed observations and verified hypotheses. The application of theories allows people to make reasonable predictions. Theories may be amended to become more complete with the introduction of new evidence. Priority: Essential
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Be able to: collect accurate and precise data through the selection and use of tools and technologies appropriate to the investigations. Display and organize data through the use of tables, diagrams, graphs, and other organizers that allow analysis and comparison with known information and allow for replication of results.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 1 Items: Define theory.</p> <p>Level 2 Items: Contrast the layperson’s definition and use of the word theory to a scientist’s definition and use of the word theory or distinguish a theory from a hypothesis, idea, or other scientific statement.</p> <p>Level 3 Items: Explain why theories may change over time.</p> <p>Level 4 Items: Compare data from two related experiments then evaluate if the data is confirming or contradictory (with explanations).</p>

<b>Standard Title</b>	<b>1 The Nature and Application of Science and Technology</b>
Strand 1.1	Understandings and Abilities of Scientific Inquiry
Content Standard Statement	<p>1.1.D Understand that: investigating most real-world problems requires building upon previous scientific findings and cooperation among individuals with knowledge and expertise from a variety of scientific fields. The results of scientific studies are considered valid when subjected to critical review where contradictions are resolved and the explanation is confirmed.</p> <p>Priority: Essential</p>
Grade-Level Expectation(s)	<ul style="list-style-type: none"> <li>▪ Be able to: Construct logical scientific explanations and present arguments which defend proposed explanations through the use of closely examined evidence.</li> </ul>
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 2 Items: Compare and contrast two sets of data regarding variables and controls used and quality of information obtained.</p> <p>Level 3 Items: Given background information and data from several researchers' experiments involving the effect of fertilizers on plant growth, reach a conclusion about the most effective fertilizer and give supporting evidence.</p> <p>Level 4 Items: Given data from the above experiments, select the most appropriate fertilizer in certain circumstances and considering specific parameters (e.g., cost, ease of use, environmental impact versus relative efficacy).</p>

<b>Standard Title</b>	<b>1 The Nature and Application of Science and Technology</b>
Strand 1.1	Understandings and Abilities of Scientific Inquiry
Content Standard Statement	<p>1.1.E. Understand that: in communicating and defending the results of scientific inquiry, arguments must be logical and demonstrate connections between natural phenomena, investigations, and the historical body of scientific knowledge. (American Association for the Advancement of Science, 2001)</p> <p>Priority: Essential</p>
Grade-Level Expectation(s)	Be able to: communicate and defend the results of scientific investigations using logical arguments and connections with the known body of scientific information.
Clarifications and Cognitive Level(s) Expected	<p>This is an essential standard so it is expected that this will be a focus on the assessment.</p> <p><b>Depth of Knowledge Categories</b></p> <p>Level 4 Items: Analyze data such as:</p> <ul style="list-style-type: none"> <li>▪ Maps with volcano and earthquake locations;</li> <li>▪ Fossil finds of similar animals on different continents; and</li> <li>▪ Patterns of antibiotic use and antibiotic resistant bacteria.</li> </ul> <p>Use data, historical knowledge, reading passages, Darwin excerpts, the theories of Plate Tectonics, and the Theory of Natural Selection to explain and relate these geologic and biologic patterns.</p>

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**END-OF-COURSE ASSESSMENT  
RECOMMENDATIONS FOR ALGEBRA I AND  
INTEGRATED MATHEMATICS I**

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## I. INTRODUCTION: DEFINITION OF THE TASK

Secretary Lowery in consultation with the Delaware Chief School Officers approved the development of high school end-of-course exams for Algebra I and Integrated Math I. The charge to the content team was to design the end-of-course assessment expectations and guidelines.

## II. THE PROCESS

The design team task force consisted of four, high school math teachers representing each of the three counties in Delaware, two curriculum education associates, and one assessment education associate from the Delaware Department of Education:

John Melidosian	Red Clay School District	New Castle County
Ellen Carr	Capital School District	Kent County
Jan Shetzler	Caesar Rodney School District	Kent County
Renee Parsley	Sussex Technical School District	Sussex County
Crystal Lancour	Curriculum	Delaware DOE
Diana Roscoe	Curriculum	Delaware DOE
Katia Foret	Assessment	Delaware DOE

The team began the development process by reviewing the Grade-Level Expectations (GLEs) to identify the expectations that comprise “big ideas” and need to be assessed.

Delaware educators worked with Learning-Focused school consultants in 2009 to prioritize the Delaware Standards and GLEs. Prioritizing of the curriculum is designed to focus instruction on standards and GLEs that lead to the greatest student achievement. The statewide “Power Curriculum” work was used to identify important GLEs, and the team mainly selected GLEs labeled as Essential and Important. This process of selecting GLEs took place for both Algebra I and Integrated Mathematics I. A core number of GLEs were part of both courses, and the team recommends that these be the items used in the state growth formulas for AYP. A listing of these GLEs can be found in Appendix A.

Once the critical GLEs were selected and sorted by course, a course Map Timeline was used to generate the assessment percentages for each standard —Algebra, Number, Geometry, and Probability/Statistics. The Content Strand Configuration can be found in Appendix B.

The final task of day one was to review other state and national organization end-of-course documents in search of “gaps” or differences that our design may have. The following reflects the documents reviewed:

- The College Board Algebra I course standards
- Achieve ADP Algebra I End-Of-Course Exam Content Standards
- Massachusetts Learning Standards for Algebra I
- South Carolina Academic Standards for Algebra I
- Washington State High School Mathematics Standards Organized by Courses
- Indiana Algebra I standards

- Achieve, Inc. High School Integrated Model course Sequence – Course I
- Georgia End-of-Course Test Content Descriptions – Mathematics I
- Indiana Integrated Mathematics I Standards

On day two, the team worked to address the “gaps” that were identified at the end of day one. The following commentary captures the topics the team analyzed:

- Quadratic Functions and Laws of Exponents may indeed be a part of district Algebra I or Integrated Mathematics I content; however, the team agreed to test these concepts in year two when both courses would have ample time to solidify these concepts.
- Some gaps reflected the fact that the concepts were addressed at other grade levels in Delaware. The College Board had statistical standards in Algebra I, more aligned to Delaware’s grade 12. Achieve included Triangle Congruence within the Integrated Mathematics I course sequence, yet it is not a part of the Delaware GLEs until year two.
- Another set of gaps were determined not to fall within a “big idea” that needed to be a part of the Delaware end-of-year one coursework. A traditional emphasis on adding and subtracting, multiplying and dividing polynomials and unit analysis are not a part of Delaware’s GLE “big ideas,” but may be included in district Algebra I, Algebra II, Pre-calculus, or Integrated 4 coursework.

The identified gaps were noted, but the team determined they did not need to be addressed at this time nor did they wish to alter the list of EOC assessment GLEs. The remaining part of day two was spent finding released items from assessments that could serve as sample items for the identified Delaware GLEs. The following list represents the assessment documents that were reviewed for appropriate released items:

- Delaware Item Samplers
- South Carolina Assessment Items
- Indiana Assessment Items
- Massachusetts Assessment Items
- Washington State Assessment Items
- Georgia Assessment Items
- College Board Sample Items
- Achieve ADP Algebra I Sample Items

Sample Items appear in Appendix C and include the appropriate content and process GLEs as well as a description of the intent of the item. This document contains sample items intended to serve as a starting point for future discussions on formative and summative assessment in mathematics. The content of this document may change in the future as a result of Delaware’s potential adoption of the National Common Core Mathematics Standards and as the final map of Essential, Important, and Compact Mathematics standards and GLEs emerges from the Prioritized Curriculum project now underway in our state.

### **III. RECOMMENDATION FOR THE ASSESSMENT DESIGN**

The GLEs from which items can be designed appears in Appendix A. Listed in the center are GLEs common to both assessments. The GLEs listed on the left side of the table will generate

additional items specific to the Algebra I End-of-Course Exam, and the GLEs listed on the right side of the table will generate additional items specific to the Integrated Mathematics I End-of-Course Exam.

The differences will be characterized by an emphasis on symbolic manipulation, the inclusion of inequalities, and the inclusion of systems of linear equations for Algebra I. Integrated Mathematics I includes additional geometry and probability GLEs. The major focus of both assessment designs is a comprehensive understanding of linear and exponential functions. Neither assessment design focused heavily on quadratic functions, abstract work without a context, and laws of exponents which will all need to be addressed in Algebra II or Integrated Mathematics II future state designs.

#### IV. SUGGESTIONS AND CAUTIONS

This document outlines an “assessment” end-of-course list of expectations. Under no circumstances does it serve as a “course” list of expectations. The beauty of assessing only a core list of big ideas is that it will give districts the flexibility to address the remaining grade-level expectations in a way that suits their district needs. The danger of assessing only a core list of big ideas is two-fold. Some districts may develop course work that only addresses the identified big ideas and then find that year two may need to include too many ideas. Other districts may find that students pass the state end-of-course exam but not their district coursework.

GLEs labeled “compact” in the Delaware high school standards may be embedded within certain assessment items if those concepts and skills have been required in previous grade levels. For example, in grade nine, two compact grade-level expectations that may be embedded within an assessment item are “compare relative sizes of real numbers” and “apply the order of operations.” Although not directly assessed, compact GLEs embody knowledge and skills that are part of the conceptual learning progression and help to define mathematical proficiency within this learning progression.

**Please note that, when limited to multiple choice items, the design team had great difficulty finding assessment items that reflect anything other than procedural fluency with some degree of reasoning** (refer to Appendix C, Sample Items). Mathematical proficiency characterized by the inclusion of complex thinking, adaptive reasoning, communication of ideas, and problem-solving skills (which are all 21<sup>st</sup> Century Skills) cannot be fully assessed within a multiple choice format. The design team recommends that districts develop a brief extended response portion administered at the conclusion of the coursework to be locally scored and included in the local classroom grade. **Course designs must include the entire Delaware 9<sup>th</sup> grade GLEs (refer to the tables at the end of the sample items) in addition to the assessment GLEs outlined in this document.**

#### V. SUMMARY

The Delaware Math design team developed a list of grade-level expectations to be assessed on the Algebra I and Integrated Mathematics I End-of-Course Assessments as well as identified the common core GLEs to be assessed by both exams. A Content Strand Configuration has been determined based on course timelines. In addition, an item sampler has been proposed in draft form to enhance teachers and test developers in their understanding of Delaware Assessment

GLEs. The format of the items allows for a strong assessment of procedural fluency but a weak assessment of problem solving skills and strategies. The Math End-of-Course Assessment Recommendations for Algebra I and Integrated Math I should serve as the basis for discussions with the DCAS summative assessment vendor and Delaware mathematics educators in the December 2009 to February 2010 timeframe with due consideration for their completeness and compatibility with the proposed National Common Core Mathematics College/Career Readiness Standards.

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**APPENDIX A:**  
**DELAWARE'S ASSESSMENT EXPECTATIONS**

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Algebra 1 (Additional)		Common to Both Algebra I and Integrated Mathematics I		Integrated Mathematics 1 (Additional)
		<b>Algebraic Reasoning</b>		
	9.2.1	Explain slope as a rate of change between dependent and independent variables		
	9.2.2	Understand and compare the graphs, tables, and equations within linear contexts that are proportional (y-intercept is the origin) and those that are not		
	9.2.3	Describe the effect of parameter changes on linear and exponential functions within a context, table, graph, and equation		
	9.2.4	Compare linear with exponential functions using, the context, table, graph, or equation		
	9.2.5	Demonstrate and apply recursive thinking to classify linear and exponential functions		
	9.2.6	Use a variety of strategies to write expressions that generate linear and exponential patterns		
	9.2.7	Model and solve real-world linear situations using tables, graphs, and symbols		
	9.2.8	Model and solve situations involving systems of equations with tables or graphs using technology		
	9.2.9	Analyze data sets using technology to find an appropriate linear and exponential mathematical model.		
	9.2.10	Demonstrate a conceptual understanding of correlation		
	9.2.12	Analyze the interrelationship among the table, graph and equation of both linear and exponential functions paying particular attention to the meaning of intercept and slope in the context of the problem		
	9.2.17	Create and solve single variable equations and inequalities algebraically and in a context		
Determine if a given value is a solution to a given equation or inequality	9.2.13			
Given a context, determine the equation of a line given combinations of point, slope, and intercept information	9.2.15			

<b>Algebra 1 (Additional)</b>		<b>Common to Both Algebra I and Integrated Mathematics I</b>		<b>Integrated Mathematics 1 (Additional)</b>
Convert between equivalent forms of linear functions	9.2.16			
Model and solve situations involving systems of equations and inequalities	10.2.6			
Solve systems of linear equations and inequalities both algebraically and using technology	10.2.11			
		<b>Numeric Reasoning</b>		
	9.1.8	Use <b>properties</b> of the <b>real number</b> system to simplify expressions (Associative, Commutative, Identity, Inverse, and Distributive)		
		<b>Geometric Reasoning</b>		
	9.3.1	Represent and verify parallel and perpendicular relationships in linear functions		
	9.3.5	Solve problems which require an understanding of the Pythagorean Theorem relationships		
			9.3.4	Demonstrate an understanding of and apply formulas for area, surface area, and volume of geometric figures including pyramids, cones, spheres, and cylinders
		<b>Quantitative Reasoning</b>		
	9.4.2	Interpret data displays for a given purpose and set(s) of data (e.g., histograms, parallel box plots, stem-and-leaf plots, scatter plots)		
	9.4.7	Define a sample space to compare probabilities using the Fundamental Counting Principle		
	9.4.8	Compare event experimental probability with theoretical probability (Law of Large Numbers)		
			9.4.5	Describe the effect of outliers in one-variable contexts
			9.4.6	Use and design simulations or experiments to determine probabilities of independent events

Process Standards			
Problem Solving	5.3		*Apply and adapt a variety of appropriate strategies to solve problems
	5.4		*Monitor and reflect on the process of mathematical problem solving
	5.2		Solve problems that arise in mathematics and in other contexts
Reasoning & Proof	6.2		*Make and investigate mathematical conjectures
	6.4		Select and use various types of reasoning (such as: compare; analyze; make an inference-inductively and deductively; evaluate) and methods of proof
Communication	7.2		*Communicate their mathematical thinking coherently and clearly to peers, teachers, and others
	7.3		Analyze and evaluate the mathematical thinking and strategies of others
	7.4		Use the language of mathematics to express mathematical ideas precisely
Connections	8.1		Recognize and use connections among mathematical ideas
	8.2		Understand how mathematical ideas interconnect and build on one another to produce a coherent whole

\* These GLEs are not reflected appropriately within the sample items due to the nature of the multiple choice format.

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**APPENDIX B:  
DELAWARE'S ASSESSMENT CONTENT STRAND  
CONFIGURATION**

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<b>Content Strand Configuration for EOC</b>			
<b>Content Standard</b>		<b>Algebra I</b>	<b>Integrated Mathematics I</b>
<b>Algebra</b>	<b>Expressions and Equation Solving</b>	<b>25%</b>	<b>25%</b>
	<b>Linear Functions</b>	<b>25%</b>	<b>25%</b>
	<b>Exponential Functions</b>	<b>15%</b>	<b>20%</b>
	<b>Systems of Equations</b>	<b>15%</b>	<b>0%</b>
<b>Number</b>		<b>5%</b>	<b>5%</b>
<b>Geometry</b>		<b>5%</b>	<b>10%</b>
<b>Probability and Statistics</b>		<b>10%</b>	<b>15%</b>

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**APPENDIX C:  
SAMPLE ITEMS**

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**Content Grade-Level Expectation:**

2.1 Explain slope as a rate of change between dependent and independent variables

And/Or

2.12 Analyze the interrelationship among the table, graph and equation of both linear and exponential functions paying particular attention to the meaning of intercept and slope in the context of the problem

**Process Grade-Level Expectation:**

7.4 Use the language of mathematics to express mathematical ideas precisely

8.1 Recognize and use connections among mathematical ideas

**Intent of the Item:**

The student must recognize that the term “slope” is represented by the rate of change in the table and will be the change in the value of the computer over the change in age of the computer. This ratio captures the average amount that the computer value depreciates each year. The rate of change is not the same for each year, which is why the vocabulary term “line of best fit” is used. The student must correctly interpret the meaning of the “rate of change” in this table, in spite of any specific number variations. A numeric value is not required here, although the student should also be able to do this as well as write an equation for the line of best fit.

**Sample Item:**

The table below shows the age and the value of a computer.

Age (in Years) (x)	Value (y)
0	\$800
1	\$620
2	\$410
3	\$200

Which of these is the meaning of the slope of an equation for a line of best fit for these data?

- A. The value of the computer when it was bought
- B. The amount that the value of the computer decreases per year
- C. The age of the computer depends on the value of the computer
- D. The cost it takes to purchase a new computer

**Answer:** Choice B

**Content Grade-Level Expectation:**

2.1 Explain slope as a rate of change between dependent and independent variables

**Process Grade-Level Expectation:**

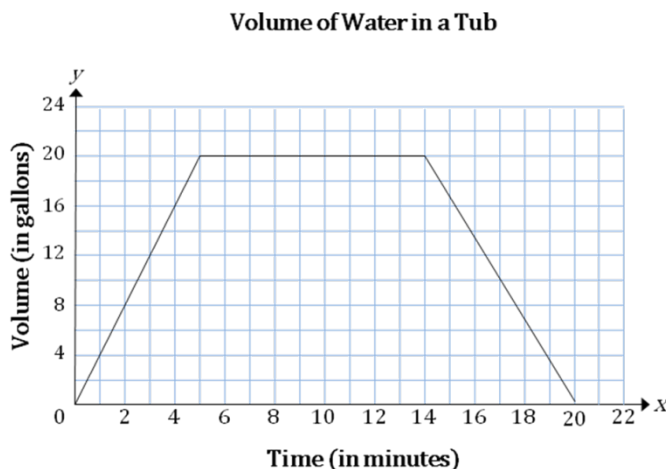
8.1 Recognize and use connections among mathematical ideas

**Intent of the Item:**

The student must first interpret the graphical representation in terms of the context in order to determine the section of the graph that represents “filling the tub.” The student must then understand that the rate of change is represented by the slope of the line during this section of the graph. The student needs to correctly determine the slope of this line and finally the student must be able to convert the slope into a unit rate (per 1 minute) or initially read the graph using 1 as the change in the  $x$  direction.

**Sample Item:**

The graph below models the relationship between time, in minutes, and the volume of water, in gallons, in a tub.



What is the rate, in gallons per minute, at which the tub is being filled?

- A. 1 gallon per minute
- B. 4 gallons per minute
- C. 14 gallons per minute
- D. 20 gallons per minute

Answer: **Choice B**

**Content Grade-Level Expectation:**

2.3 Describe the effect of parameter changes on linear functions within a context, table, graph, and equation.

**Process Grade-Level Expectation:**

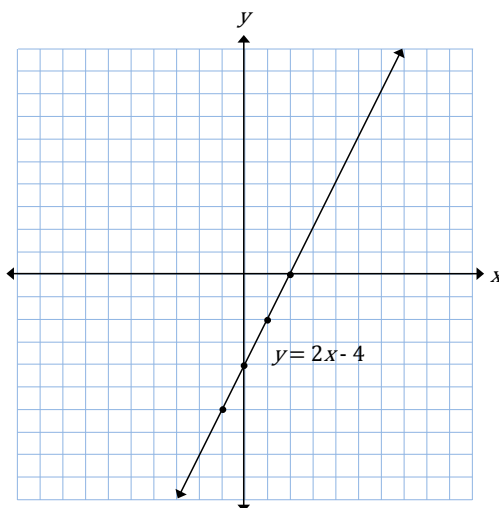
6.4 Select and use various types of reasoning (such as compare, analyze, make an inference-inductively and deductively, evaluate) and methods of proof

**Intent of the Item:**

The item assesses student knowledge of linear intercepts within a graphical representation. Some students may also use clues from the equations and/or need to sketch the new graph.

**Sample Item:**

The graph of  $y = 2x - 4$  is shown below.



If the slope of the line is doubled, the new equation is  $y = 4x - 4$ . Which of these is a correct comparison of the two lines?

- A. The  $x$ -intercept and  $y$ -intercept change.
- B. The  $x$ -intercept and  $y$ -intercept stay the same.
- C. The  $x$ -intercept changes, and the  $y$ -intercept is the same.
- D. The  $x$ -intercept is the same, and the  $y$ -intercept changes.

**Answer:** Choice C

**Content Grade-Level Expectation:**

2.6 Use a variety of strategies to write expressions that generate linear and exponential patterns

And/Or

2.2 Understand and compare the graphs, tables, and equations within linear contexts that are proportional (y-intercept is the origin) and those that are not

**Process Grade-Level Expectation:**

5.2 Solve problems that arise in mathematics and in other contexts

8.1 Recognize and use connections among mathematical ideas

**Intent of the Item:**

The student is expected to recognize a pattern that generates the value of Canadian currency given the number of dollars, and then create an abstract representation of the pattern in the form of an expression using the variables  $v$  and  $n$ . The strategy used to first define the pattern will vary, but many students may choose to generate the pattern for several different discrete numbers of dollars, paying attention to the process they used to generate the discrete values before they are able to write the process abstractly.

$\$1 = \$1.42$ ;  $\$2 = 2 \times \$1.42$  or  $\$2.84$ ;  $\$3 = 3 \times \$1.42$  or  $\$4.26 \rightarrow$

To get the value of the Canadian money, I take the number of U.S. dollars times  $\$1.42 \rightarrow$

$V = n \times \$1.42$       OR       $V = 1.42n$

**Sample Item:**

When Maria went to Canada, one U.S. dollar was worth  $\$1.42$  in Canadian money. If  $n$  stands for the number of U.S. dollars, which equation gives the value ( $v$ ) of those dollars in Canadian money?

A.  $v = n - 1.42$

B.  $v = 1.42n$

C.  $v = \frac{n}{1.42}$

D.  $v = \frac{1.42}{n}$

**Answer:** Choice B

**Content Grade-Level Expectation:**

2.7 Model and solve real-world linear situations using tables, graphs, and symbols

**Process Grade-Level Expectation:**

5.2 Solve problems that arise in mathematics and in other contexts

7.4 Use the language of mathematics to express mathematical ideas precisely

**Intent of the Item:**

The intent of this item is to analyze and define the process for finding the monthly cell phone bill, and then write this process in the abstract format of an equation. Some students will use a strategy of finding one or several discrete answers in order to identify the process being used to find monthly cost when the minutes are over 100. For example, if the minutes are 150, then  $(150-100) 50 \times \$0.08$  is \$4.00 which is added to the monthly fee of \$23.95. Leading them to the abstract form of  $C = (m-100) \times (0.08) + 23.95$ . They must finally recognize that this equation could be written using different formats such as  $c = 23.95 + 0.08(m-100)$

**Sample Item:**

A cellular phone company charges monthly rates according to the following plan:

- Monthly fee of \$23.95
- The first 100 minutes of calling time are free
- \$0.08 charge per minute of calling time over 100 minutes

If  $c$  is the total monthly cost and  $m$  is the number of minutes of calling time, which equation models this rate plan when  $m$  is greater than 100 minutes?

- A.  $c = 0.08m - 76.05$
- B.  $c = 0.08(m - 100) - 23.95$
- C.  $c = 23.95 + 0.08(m - 100)$
- D.  $c = 23.95 + 0.08m$

**Answer:** Choice C

**Content Grade-Level Expectation:**

2.7 Model and solve real-world linear situations using tables, graphs, and symbols

**Process Grade-Level Expectation:**

6.4 Select and use various types of reasoning (such as: compare; analyze; make an inference-inductively and deductively; evaluate) and methods of proof

8.2 Understand how mathematical ideas interconnect and build on one another to produce a coherent whole

**Intent of the Item:**

The cognitive demand of this item requires students to move beyond the skill level of writing an equation directly from the given context. Students must analyze the context and compensate for the fact that the information given is not at the beginning of the payment cycle, rather eight weeks into the cycle. The student should be able to acknowledge that the beginning value and the rate of payback are the two values necessary to write the equation. They must also be able to devise a strategy for finding the beginning value. Finally, the student must write the process for finding the amount owed in the abstract form of an equation.

**Sample Item:**

A man borrows money from his relatives to buy a used car and agrees to pay them back \$45 each week. After 8 weeks, he still owes them \$1,620. Which equation expresses the amount he still owes ( $R$ ) as a function of the number of weeks ( $W$ )?

- A.  $R = 1980 - 45W$
- B.  $R = (1980 - 45)W$
- C.  $R = 45W$
- D.  $R = 1620 - 45W$

**Answer:** Choice A

**Content Grade-Level Expectation:**

2.12 Analyze the interrelationship among the table, graph and equation of both linear and exponential functions paying particular attention to the meaning of intercept and slope in the context of the problem

**Process Grade-Level Expectation:**

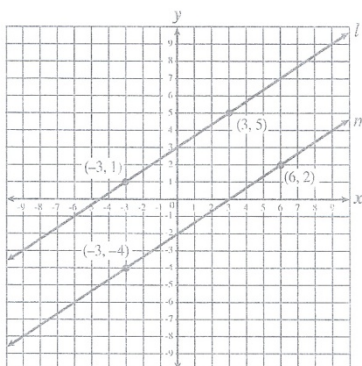
7.4 Use the language of mathematics to express mathematical ideas precisely

**Intent of the Item:**

This item assesses the student’s knowledge of the meaning of mathematical terms (intercept, slope, parallel, and perpendicular) within the context of a coordinate grid and linear representations.

**Sample Item:**

The coordinate grid below shows the graphs of two lines: line  $l$  and line  $m$ .



Which of the following is a true statement about the relationship between line  $l$  and line  $m$ ?

- A. The slope of line  $l$  is greater than the slope of line  $m$ .
- B. The  $x$ -intercept of line  $m$  is greater than the  $x$ -intercept of line  $l$ .
- C. The  $y$ -intercept of line  $m$  is greater than the  $y$ -intercept of line  $l$ .
- D. The slope of line  $m$  is greater than the slope of line  $l$ .

**Answer:** Choice B

**Content Grade-Level Expectation:**

2.17 Solve single variable equations and inequalities algebraically

**Process Grade-Level Expectation:**

5.3 Apply and adapt a variety of appropriate strategies to solve problems

**Intent of the Item:**

These two items are based on the same stem and assess whether students can identify an equation that models the context and then whether the student can recognize a solution and/or problem solve for a solution.

**Sample Item:**

Chris and Kim worked together to paint skateboards. Kim painted 10 more than twice the number of skateboards that Chris painted. Together they painted 100 skateboards. Which of these equations can be used to find the number of skateboards ( $c$ ) that Chris painted?

- A.  $2c + 10 = 90$
- B.  $3c + 10 = 90$
- C.  $2c + 10 = 100$
- D.  $3c + 10 = 100$

**Answer: D**

Find the number of skateboards that Kim and Chris painted based on the item above.

- A. Kim = 90, Chris = 40
- B. Kim = 74, Chris = 26
- C. Kim = 70, Chris = 30
- D. Kim = 90, Chris = 45

**Answer: C**

**Content Grade-Level Expectation:**

2.4 Compare linear with exponential functions using, the context, table, graph, or equation  
And/Or

2.5 Demonstrate and apply recursive thinking to classify linear and exponential functions

**Process Grade-Level Expectation:**

6.4 Select and use various types of reasoning (such as: compare; analyze; make an inference-inductively and deductively; evaluate) and methods of proof

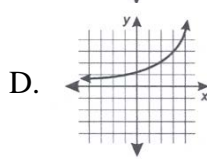
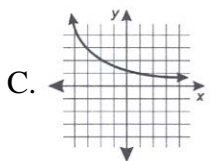
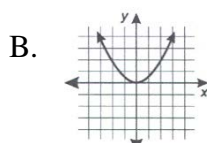
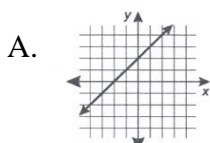
8.1 Recognize and use connections among mathematical ideas

**Intent of the Items:**

These two items assess whether a student can recognize the different characteristics of linear and exponential functions and can use this knowledge to compare the context, table, graph, or equation in order to identify the appropriate function family. Function families are introduced and first studied through a focus on patterning. Exponential patterns are studied following linear patterns due to the connection between the recursive patterns of both functions (constant addition vs. constant multiplication).

**Sample Items:**

Which graph represents exponential growth?



**Answer:** Choice D

Which of the following represents a linear function?

A.  $f(x) = 3^x$

B.  $f(x) = x^3$

C.  $f(x) = 3x^2$

D.  $f(x) = x + 3$

**Answer:** Choice D

**Content Grade-Level Expectation:**

2.4 Compare linear with exponential functions using, the context, table, graph, or equation

**Process Grade-Level Expectation:**

6.4 Select and use various types of reasoning (such as: compare; analyze; make an inference-inductively and deductively; evaluate) and methods of proof

Or

8.2 Understand how mathematical ideas interconnect and build on one another to produce a coherent whole

**Intent of the Item:**

This item assesses whether students understand that the recursive pattern that builds an exponential function continuously multiplies (by 2) rather than adding (3) which would build a linear pattern. As opposed to comparing the two functions, students must also be able to apply knowledge of exponential characteristics to infer/predict the value of  $r$ .

**Sample Item:**

Consider the table below.

$x$	$y$
0	3
1	6
2	$r$

What value of  $r$  will make the table a representation of an exponential function?

- A. 3
- B. 18
- C. 9
- D. 12

**Answer:** Choice D

**Content Grade-Level Expectation:**

2.8 Model and solve situations involving systems of equations with tables or graphs using technology

**Process Grade-Level Expectation:**

5.2 Solve problems that arise in mathematics and in other contexts

6.4 Select and use various types of reasoning (such as: compare; analyze; make an inference-inductively and deductively; evaluate) and methods of proof

**Intent of the Item:**

This item assesses whether a student can write equations to represent the context and then use those equations either symbolically or with technology to find the point when both equations will intersect or equal the same value.

**Sample Item:**

Anna and Ravi became members of different health clubs on the same day.

- Anna's club charges members \$25 per month and does not require a registration fee.
- Ravi's club charges members \$15 per month plus a one-time registration fee of \$50.

After how many months of membership will Anna and Ravi have paid the same total of money?

- A. 2
- B. 4
- C. 5
- D. 10

**Answer:** Choice C

**Content Grade-Level Expectation:**

- 2.16 Convert between equivalent forms of linear functions
- 3.1 Represent and verify parallel and perpendicular relationships in linear functions

**Process Grade-Level Expectation**

- 7.4 Use the language of mathematics to express mathematical ideas precisely

**Intent of the Item:**

If a student is able to correctly rewrite the format of the first given equation into slope-intercept form, it will be apparent that both equations have a slope of -1. If a student decides to apply the method of substitution, they must then make sense of why all the variables are canceled.

**Sample Item:**

Consider the system of equations below.

$$x + y = 6$$

$$y = -x + 2$$

Which statement correctly describes the graphs of these equations?

- A. The lines are parallel.
- B. The lines are perpendicular.
- C. The lines intersect at (2, 4).
- D. The lines intersect at (-2, 8).

**Answer:** Choice A

**Content Grade-Level Expectation:**

1.6 Apply the “order of operations”

**Process Grade-Level Expectation:**

7.4 Use the language of mathematics to express mathematical ideas precisely

**Intent of the Item:**

Students must demonstrate knowledge of the “order of operations” to simplify a numeric expression along with an understanding of mathematical notation such as  $3^2$  represents  $3 \times 3$  not  $3 \times 2$ . A common misconception is that multiplication is always completed before division no matter the left-to-right order of expression.

**Sample Item:**

What is the value of the expression below?

$$18 \div 2 \cdot 3^2$$

- A. 81
- B. 54
- C. 9
- D. 1

**Answer:** Choice A

**Content Grade-Level Expectation:**

1.8 Use properties of the real number system to simplify expressions (Associative, Commutative, Identity, Inverse, and Distributive)

**Process Grade-Level Expectation:**

8.1 Recognize and use connections among mathematical ideas

**Intent of the Item:**

The student must recognize that equivalent equations can be generated by applying the same operation to all terms in an existing equation. The student must also recognize that in order to obtain  $4t$  or  $(1)(4t)$  the inverse operation must be applied to 3 and then this same operation applied to 1 (the multiplication of  $1/3$ ).

**Sample Item:**

Suppose the equation below is true.

$$3(4t) = 1$$

Which of the following must also be true?

A.  $4t = \frac{1}{3}$

B.  $4t = \frac{3}{4}$

C.  $4t = 1$

D.  $4t = 3$

**Answer:** Choice A

**Content Grade-Level Expectation:**

3.1 Represent and verify parallel and perpendicular relationships in linear functions

**Process Grade-Level Expectation:**

6.2 Make and investigate mathematical conjectures

8.2 Understand how mathematical ideas interconnect and build on one another to produce a coherent whole

**Intent of the Item:**

Students must know that parallel lines must have equal slopes, know how to determine the slope of a line given two points, and then test the possible point combinations that reflect a slope equal to that of the original line GH. They must also incorporate number sense when comparing slopes.  $5/5$  is equivalent to 1 and therefore also equivalent to  $2/2$ .

**Sample Item:**

Points E, G, and H are located in the coordinate plane as follows:

E (2, 5)

G (4, 1)

H (-1,-4)

For which coordinates of point F will  $\overline{EF}$  be parallel to  $\overline{GH}$ ?

A. (-4,4)

B. (-5,-3)

C. (0,3)

D. (-1,1)

**Answer:** Choice C

**Content Grade-Level Expectation:**

3.1 Represent and verify parallel and perpendicular relationships in linear functions

**Process Grade-Level Expectation:**

5.3 Apply and adapt a variety of appropriate strategies to solve problems

Or

6.4 Select and use various types of reasoning (such as: compare; analyze; make an inference-inductively and deductively; evaluate) and methods of proof

**Intent of the Item:**

This item assesses the understanding of perpendicularity in relation to an equation's format and the ability to symbolically rewrite an equation in order to discover the slope. Students must recognize that slopes of perpendicular lines are negative reciprocals, whose product is -1. Although the slopes of the equations in the options are easily read as the coefficients of  $x$ , the equation in the prompt is not in the "slope-intercept" format. Therefore, students must use one of several strategies to determine the slope in the given equation ( $m = \frac{3}{4}$ ).

**Sample Item:**

Which is the equation of a line perpendicular to  $3x - 4y = 12$ ?

A.  $y = 3x + 5$

B.  $y = -\frac{3}{4}x + 8$

C.  $y = \frac{4}{3}x - 3$

D.  $y = -\frac{4}{3}x + 12$

**Answer:** Choice D

**Content Grade-Level Expectation:**

3.5 Solve problems which require an understanding of the Pythagorean Theorem relationships

**Process Grade-Level Expectation:**

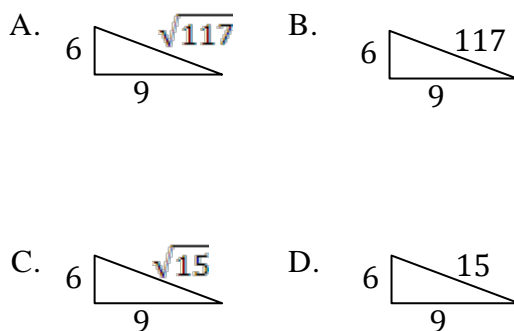
5.3 Apply and adapt a variety of appropriate strategies to solve problems

**Intent of the Item:**

This item is written at a low cognitive level and simply requires the skill of solving an equation for  $c$  in the formula,  $a^2 + b^2 = c^2$ . Students should be able to symbolically manipulate and solve this formula for missing values of legs or hypotenuse.

**Sample Item:**

Jacob used the Pythagorean Theorem to see how much distance he would save taking a shortcut home from football practice. He usually walked 6 blocks south and 9 blocks east. Which picture shows his shortcut?



**Answer:** Choice A

**Content Grade-Level Expectation:**

3.5 Solve problems which require an understanding of the Pythagorean Theorem relationships

**Process Grade-Level Expectation:**

8.1 Recognize and use connections among mathematical ideas

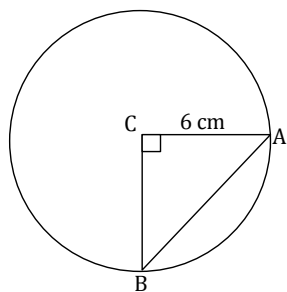
5.2 Solve problems that arise in mathematics and in other contexts

**Intent of the Item:**

Students must first recognize that CA and DB are both radii of the same circle and that therefore the value of both legs of the right triangle are known. They must then use the Pythagorean formula to solve for the value of the hypotenuse, which is the length of AB.

**Sample Item:**

Given Circle C with points A and B on the circle, find the length of  $\overline{AB}$ .



- A.  $\sqrt{12} \text{ cm}$
- B.  $\sqrt{18} \text{ cm}$
- C. 36 cm
- D.  $\sqrt{72} \text{ cm}$

**Answer:** Choice D

**Content Grade-Level Expectation:**

3.5 Solve problems which require an understanding of the Pythagorean Theorem relationships

**Process Grade-Level Expectation:**

5.3 Apply and adapt a variety of appropriate strategies to solve problems

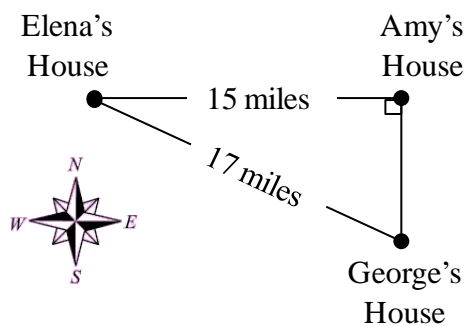
6.4 Select and use various types of reasoning (such as: compare; analyze; make an inference-inductively and deductively; evaluate) and methods of proof

**Intent of the Item:**

This item assesses whether a student can apply the Pythagorean Theorem to find a missing distance or leg in a right triangular context.

**Sample Item:**

Elena's house is 15 miles west of Amy's house and 17 miles northwest of George's house. The houses are represented by the points shown in the diagram below.



What is the distance between George's house and Amy's house?

- A. 2 miles
- B. 8 miles
- C. 16 miles
- D. 11 miles

**Answer:** Choice B

**Content Grade-Level Expectation:**

4.2 Interpret data displays for a given purpose and set(s) of data (e.g., histograms, parallel box plots, stem-and-leaf plots, scatter plots)

**Process Grade-Level Expectation:**

6.4 Select and use various types of reasoning (such as: compare; analyze; make an inference-inductively and deductively; evaluate) and methods of proof

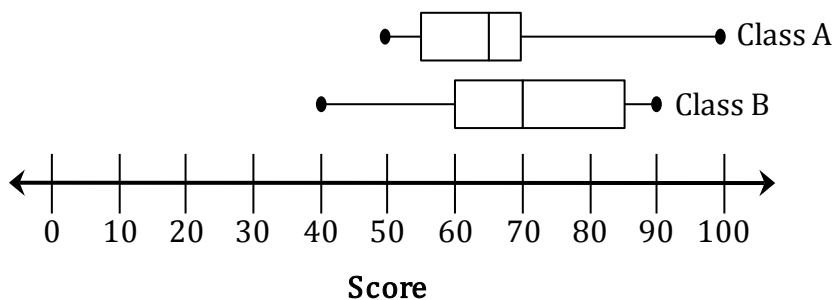
8.2 Understand how mathematical ideas interconnect and build on one another to produce a coherent whole

**Intent of the Item:**

Students must be able to interpret the meaning of the box, the median line, and the “whiskers” in terms of the portion of total students each part represents. Each side of the box and both whiskers represent 25% of the total class size. They then need to apply a problem-solving strategy such as compiling the number of students in each class 70 or above and subtracting this information to find “how many more.”

**Sample Item:**

The box plots below show the distribution of social studies test scores for two different classes.



The minimum passing score was 70. No two students earned the same score. Class A has 28 students and class B has 32 students. How many more students in class B passed the test than in class A?

- A. 4
- B. 8
- C. 9
- D. 10

**Answer:** Choice C

**Content Grade-Level Expectation:**

4.7 Define a sample space to compare probabilities using the Fundamental Counting Principle

**Process Grade-Level Expectation:**

5.2 Solve problems that arise in mathematics and in other contexts

**Intent of the Item:**

Students may use the procedural knowledge of the Fundamental Counting Principle to multiply the number of shirt choices by the number of pant choices by the number of shoe choices. Students may also use strategies that help them discretely list or sort all possible choices such as a tree diagram or an organized list.

**Sample Item:**

Suppose you have one of each of the following items in your closet:

**Items in Closet**

<b>Category</b>	<b>Type/Color</b>
shirts	plaid, red, blue, or tan
pants	brown, black
shoes	plastic sandals, canvas shoes, leather shoes

How many combinations can you make using one item from each category?

- A. 9
- B. 12
- C. 18
- D. 24

**Answer:** Choice D

**Content Grade-Level Expectation:**

4.7 Define a sample space to compare probabilities using the Fundamental Counting Principle

**Process Grade-Level Expectation:**

7.3 Analyze and evaluate the mathematical thinking and strategies of others

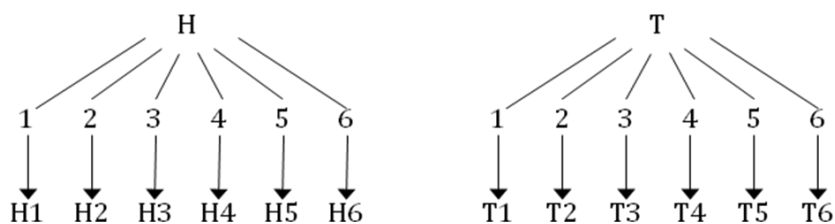
7.4 Use the language of mathematics to express mathematical ideas precisely

**Intent of the Item:**

The item assesses the student’s ability to interpret a diagram that organizes the total possible outcomes for rolling a die and flipping a coin.

**Sample Item:**

The diagram shows the outcomes of flipping a coin and rolling a die.



Which statement regarding the diagram is *true*?

- A. The probability of obtaining “H6” is 2 out of 12.
- B. There are 14 possible outcomes in the sample space.
- C. The chance of flipping “heads” and rolling a “5” is 1 in 6.
- D. Flipping “tails” and rolling a “2” represents about 8% of the possible outcomes of the sample space.

**Answer:** Choice D

**Content Grade-Level Expectation:**

2.13 Determine if a given value is a solution to a given equation or inequality

**Intent of the Item:**

Students must demonstrate the procedural skill of replacing a variable with a discrete value in order to justify that both sides of the equation represent equivalent values. Number sense understandings such as integer addition are required as well the ability to read. Knowledge of mathematical language is necessary to interpret the symbolic meaning of all the mathematical expressions and operations in the equation.

**Sample Item:**

Which value of  $p$  makes the equation  $(-4 + p) 10 = 2p$  true?

- A. -40
- B. 5
- C.  $-\frac{1}{2}$
- D. -5

**Answer:** Choice B

**Content Grade-Level Expectation:**

2.13 Determine if a given value is a solution to a given equation or inequality

**Process Grade-Level Expectation:**

7.4 Use the language of mathematics to express mathematical ideas precisely

**Content of the Item:**

Students must be able to symbolically solve an inequality for an unknown variable yet be able to use the inequality symbol and interpret its use, as the item choices reverse the direction of the symbol in comparison to the original equation.

**Sample Item:**

What is the solution to the following inequality?

$$\frac{1}{3}(6 - x) \geq -2$$

- A.  $x \geq 0$
- B.  $x \leq 0$
- C.  $x \geq 12$
- D.  $x \leq 12$

**Answer:** Choice D

**Content Grade-Level Expectation:**

4.5 Describe the effect of outliers in one-variable contexts

**Process Grade-Level Expectation:**

7.2 Communicate their mathematical thinking coherently and clearly to peers, teachers, and others

**Intent of the Item:**

This item assesses the knowledge that the mean differs greatly from the median when outliers are present in the data. The student must recognize that the low of 60 is very different from the other numbers, an outlier, with a greater effect on the average of the numbers as opposed to the middle of the numbers.

**Sample Item:**

The table below shows the number of geese living at Wildlife Park from February through October.

Month	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Number of Geese	60	161	178	188	203	228	196	180	172

- The mean of the data is 174.
- The median of the data is 180.

Which statement best explains why the mean is less than the median?

- A. The data set only includes 9 months.
- B. The range of the data set is very large.
- C. The minimum value of 60 is well below the other numbers in the data set.

**Answer:** Choice C

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## **Additional Grade-Level Expectations**

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## Algebra I

The following tables represent the set of additional grade 9 GLEs to be included in an Algebra I course. Consequently, this content may be embedded in the DCAS summative items but may not be directly assessed on the EOC test.

<b>Numeric Reasoning</b>	
1.1	Demonstrate an understanding of numbers as rational or irrational
1.3	Estimate square roots
1.4	Determine the appropriateness of an answer by using number sense or estimation
1.5	Represent and operate with very large and very small numbers to include various representations of them
1.7	Make generalizations about the effect of operations on rational numbers
<b>Algebraic Reasoning</b>	
2.11	Demonstrate an understanding of the difference between discrete and continuous data
2.14	Make strategic selection of graphing calculator viewing window and scale to <b>solve</b> problems
<b>Geometric Reasoning</b>	
3.2	Classify 3-dimensional figures according to the shapes of their base(s) and faces
3.3	Use properties of triangles and quadrilaterals to construct them in the coordinate plane
3.4	Demonstrate an understanding of and apply formulas for area, surface area, and volume of geometric figures including pyramids, cones, spheres, and cylinders
3.6	Compare the relationship between the volume of different shapes with the same base and height (e.g., cylinder and cone, prism and pyramid)
<b>Quantitative Reasoning</b>	
4.1	Describe and <b>explain</b> how the validity of predictions are affected by number of trials, sample size, and the population
4.3	Find an appropriate mathematical <b>model</b> of a linear or exponential function and use the <b>model</b> to make predictions recognizing the limitations of the <b>model</b>
4.4	Analyze the validity of statistical conclusions on both one- and two-variable data
4.5	Describe the effect of outliers in both one-variable and two-variable contexts
4.6	Use and design <b>simulations</b> or experiments to determine probabilities of independent and <b>dependent events</b>
<b>Problem Solving</b>	
5.1	Build new mathematical knowledge
<b>Reasoning &amp; Proof</b>	
6.1	Understand that reasoning and proof are fundamental aspects of mathematics
6.3	Develop and evaluate mathematical arguments and proofs
<b>Communication</b>	
7.1	Organize and consolidate their mathematical thinking through communication
<b>Connections</b>	
8.3	Recognize and apply mathematics in contexts outside of mathematics

## Integrated Mathematics I

The following tables represent the set of additional grade 9 GLEs to be included in an Integrated Mathematics I course. Consequently, this content may be embedded in the DCAS summative items but may not be directly assessed on the EOC test.

<b>Numeric Reasoning</b>	
1.1	Demonstrate an understanding of numbers as rational or irrational
1.3	Estimate square roots
1.4	Determine the appropriateness of an answer by using number sense or estimation
1.5	Represent and operate with very large and very small numbers to include various representations of them
1.7	Make generalizations about the effect of operations on rational numbers
<b>Algebraic Reasoning</b>	
2.11	Demonstrate an understanding of the difference between discrete and continuous data
2.13	Determine if a given value is a solution to a given equation or inequality
2.14	Make strategic selection of graphing calculator viewing window and scale to <b>solve</b> problems
2.15	Determine symbolically the equation of a line given combinations of point, slope, and intercept information
2.16	Convert between equivalent forms of linear functions
<b>Geometric Reasoning</b>	
3.2	Classify 3-dimensional figures according to the shapes of their base(s) and faces
3.3	Use properties of triangles and quadrilaterals to construct them in the coordinate plane
3.6	Compare the relationship between the volume of different shapes with the same base and height (e.g., cylinder and cone, prism and pyramid)
<b>Quantitative Reasoning</b>	
4.1	Describe and <b>explain</b> how the validity of predictions are affected by number of trials, sample size, and the population
4.3	Find an appropriate mathematical <b>model</b> of a linear or exponential function and use the <b>model</b> to make predictions recognizing the limitations of the <b>model</b>
4.4	Analyze the validity of statistical conclusions on both one- and two-variable data
<b>Problem Solving</b>	
5.1	Build new mathematical knowledge
<b>Reasoning &amp; Proof</b>	
6.1	Understand that reasoning and proof are fundamental aspects of mathematics
6.3	Develop and evaluate mathematical arguments and proofs
<b>Communication</b>	
7.1	Organize and consolidate their mathematical thinking through communication
<b>Connections</b>	
8.3	Recognize and apply mathematics in contexts outside of mathematics

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**END-OF-COURSE RECOMMENDATIONS FOR  
ALGEBRA II AND INTEGRATED MATHEMATICS III**

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## I. INTRODUCTION: DEFINITION OF THE TASK

Delaware’s Secretary of Education, Lillian Lowery, in consultation with the Delaware Chief School Officers, approved the development of high school end-of-course exams (EOC) for Algebra II and Integrated Mathematics III. The charge to the design team was to formulate the end-of-course assessment expectations and guidelines aligned to the recently adopted Delaware Common Core State Standards (CCSS). The Algebra II and Integrated Mathematics III assessments are intended to serve as the basis for the No Child Left Behind Act (NCLB) accountability requirement for an end-of-course assessment in high school.

For assessment purposes, the high school end-of-course exams for mathematics are called Algebra II and Integrated Mathematics III (EOC 2). These particular exams are also better aligned with the content expected at the high school level for the majority of students and avert the possibility of middle school students taking this content.

## II. THE PROCESS

The design team consisted of five high school math teachers and three high school math specialists representing each of the three counties in Delaware, one curriculum education associate, and two assessment education associates from the Delaware Department of Education (DOE). The design team consisted of teachers with diverse classroom experience representing special education as well as both the middle school and high school levels:

Michael Reitmeyer	Red Clay School District	New Castle County
Michael Walls	NCC Vocational School District	New Castle County
Hester Sutton	Brandywine School District	New Castle County
Jennifer Trievel	Colonial School District	New Castle County
Andrea Winkleblech	Polytech Vocational School District	Kent County
Renae Worley	Milford School District	Kent County
Michael Young	Cape Henlopen School District	Sussex County
Danette Mumford	Indian River School District	Sussex County
Diana Roscoe	Curriculum, Instruction and Professional Development	Delaware DOE
Katia Foret	Accountability Resources	Delaware DOE
Rita Fry	Accountability Resources	Delaware DOE

The focus of this design team was to identify the expectations that comprise “big ideas” in terms of college and career readiness and should therefore be assessed in the third course of a four-course pathway as defined by the recently adopted CCSS. The design team began the development process on day one by reviewing the historical events leading up to the current assignment.

The design team used a toolkit that contained documents compiled to assist the analysis and comparison of big ideas in high school mathematics. Reviewing the work previously completed for Delaware’s Algebra I and Integrated Math I framed the process of moving forward to align the big ideas in Algebra II and Integrated Math III into course assessment specifications. The initial work of selecting big ideas that inform course designs was based on classroom teaching

experience shaped by the Delaware Prioritized Standards and Grade-Level Expectations. The design team was then ready to reflect on any changes necessary to align this vision with the newly adopted Delaware Common Core State Standards.

The task for day two was to review both course designs in search of “gaps” or differences that either design may have with national documents. The following reflects the documents reviewed:

- Prior Work: Course Specifications Document for Algebra I and Integrated Math I
- Common Core State Standards Delaware Learning Progressions (Know-Understand-Do)
- Common Core State Standards Documents—high school only
- Delaware High School Prioritized Standards and Grade-Level Expectations
- Course Specification Crosswalk with multiple states, Achieve Pathways, and College Board (CA, GA, ID, IN, MA, MI, MN, MO, NV, NY, NC, OR, PA, TN, TX, VA)
- Delaware Current Standards Crosswalk with the newly adopted CCSS
- CCSS Appendix: Achieve High School Pathways Document
- Massachusetts Model Course Specifications for Algebra 2 and Integrated Math 3
- North Carolina Model Course Specifications for Algebra 2 and Integrated Math 3
- Sample Curricular Tools: CCSS Crosswalks for Traditional and Integrated Pathways

On day three, the team worked to address the “alignment gaps” between the current course-level expectations and what the CCSS document requires to be taught in a four-course sequence.

- The very nature of an Integrated Mathematics Pathway makes it difficult to assess one discrete standard independent of other standards. It is for this reason that the Integrated Math III standards to be assessed in the third year actually incorporate content introduced during earlier years of Integrated Math. The selected quadratic functions, geometry, and probability standards are examples of content revisited through connections within and across domains enabling students to develop a robust and connected view of mathematics. The assessment recommendation is the result of a compromise between divergent pedagogical designs across domains within the parameters that define “Integrated Mathematics.”
- The very nature of a Traditional Pathway makes it difficult to assess the probability and statistics standards prior to a fourth year. Algebra I and Algebra II focus on the algebra, functions, and number standards. Geometry exclusively focuses on the geometry standards. Probability and statistics have been currently offered as an optional fourth-year course. The design team acknowledged that Algebra II will need to incorporate standards from probability and statistics. This is the reason the probability standards were included as part of the Algebra II assessment specifications.

The identified alignment gaps were noted, but the team determined that the matrix of standards (see Appendix A shaded red) used to describe the big ideas to be assessed was the best compromise at this time. The design team discussed additional consideration for further EOC 2 work:

1. An assessment item bank is formed from newly developed items: written for Algebra II/Integrated Math III; current items already written for Algebra I/Integrated Math I; and past items already written for the 9<sup>th</sup> and 10<sup>th</sup> grade state assessments. Using this bank, multiple mixed-content forms of an “end-of-course” assessment could be written. The

multiple forms would ensure that all students are assessed on the same content knowledge, simply at different times in the required course sequence. While this may be a desirable outcome, it may not be available for some time.

2. Sample items are compiled and shared to further articulate the meaning of the standards identified for assessment and instruction.
3. Course descriptions and outlines are fully articulated for the Traditional and Integrated Mathematics Pathways using a narrative format in addition to the current list of standards.
4. This document will need to be edited and reviewed by a broader base of high school and higher education content experts.

### **III. RECOMMENDATION FOR THE ASSESSMENT DESIGN**

The standards from which the course descriptions can be designed appear in Appendix A. The standards from which assessment items will be designed are indicated by red shading in the first column in Appendix A. The differences between the two courses are characterized by an emphasis on algebraic standards, a stronger emphasis on quadratics, and the inclusion of polynomial functions for Algebra II. Integrated Math III is characterized by an emphasis on function standards and the inclusion of additional geometry standards. The major focus of both assessment designs is a comprehensive understanding of:

- Creating equations;
- Reasoning with equations and inequalities—specifically within the context of linear programming;
- Interpreting functions; and
- Building functions.

### **IV. SUGGESTIONS AND CAUTIONS**

This document outlines an “assessment” end-of-course list of expectations. Under no circumstances does it serve as a “course” list of expectations. The beauty of assessing only a core list of big ideas is that it will give districts the flexibility to address the remaining course expectations and mathematical practices in a way that suits their district needs. The danger of assessing only a core list of big ideas is two-fold. Some districts may develop coursework that only addresses the identified big ideas and then find that other years in the pathway may need to include too many ideas. Other districts may find that students pass the state end-of-course exam but not their district coursework. Regardless, a high school mathematics program should include four courses which include the entire Delaware-adopted High School Common Core State Standards.

#### **Format of Test Expectations**

1. The assessment is an online, 60-item, fixed-form test that yields immediate scores. It is the expectation that all new Delaware Common Core State Standards outlined in the course specifications will be taught even if not assessed directly on the state assessment as some of the concepts are intertwined and part of other standards.
2. The mathematical practices will be incorporated as much as possible in the format of the items. The Modeling requirements of the Common Core State Standards will need to be

assessed locally. The design team recommends that districts develop a brief, common extended-response portion administered at the conclusion of the coursework to be locally scored and included in the local classroom grade. This portion of the test mirrors the instruction of mathematics in the classroom, and it is therefore expected on the end-of-course tests as a possible policy in Delaware.

## **V. SUMMARY**

The Delaware math design team developed a list of the Common Core State Standards to be assessed on the Algebra II and Integrated III End-of-Course Assessments as well as identified the Common Core State Standards to be included in course descriptions. A content strand configuration has been created based on third-year course emphasis as determined by the overall pathway sequencing of content. In addition, development of an item sampler has been proposed to enhance teachers and test developers in their understanding of the Delaware Common Core State Standards.

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**APPENDIX A:  
DELAWARE'S COURSE STANDARDS  
SPECIFICATIONS**

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<b>Algebra II</b>	
	An “*” after standard indicates a standard for Mathematical Practice: Modeling
<b>Assessed</b>	<b>Seeing Structure:</b> Interpret the structure of expressions and write expressions in equivalent forms to solve problems. Reading an expression with comprehension involves analysis of its underlying structure. This may suggest a different but equivalent way of writing the expression that exhibits some different aspect of its meaning. Viewing an expression as the result of operation on simpler expressions can clarify its underlying structure and connections to the context.
	<b>A.SSE.1</b> Interpret expressions that represent a quantity in terms of its context.* <b>A.SSE.1a</b> Interpret parts of an expression, such as terms, factors, and coefficients. <b>A.SSE.1b</b> Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret <math>P(1+r)^n</math> as the product of <math>P</math> and a factor not depending on <math>P</math>.</i>
	<b>A.SSE.2</b> Use the structure of an expression to identify ways to rewrite it. <i>For example, see <math>x^4 - y^4</math> as <math>(x^2)^2 - (y^2)^2</math>, thus recognizing it as a difference of squares that can be factored as <math>(x^2 - y^2)(x^2 + y^2)</math>.</i>
	<b>A.SSE.3</b> Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*
	<b>A.SSE.3c</b> Use the properties of exponents to transform expressions for exponential functions. <i>For example the expression <math>1.15^t</math> can be rewritten as <math>(1.15^{1/12})^{12t} \approx 1.012^{12t}</math> to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.</i>
	<b>N.RN.1</b> Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. <i>For example, we define <math>5^{1/3}</math> to be the cube root of 5 because we want <math>(5^{1/3})^3 = 5^{(1/3)3}</math> to hold, so <math>(5^{1/3})^3</math> must equal</i>
	<b>N.RN.2</b> Rewrite expressions involving radicals and rational exponents using the properties of exponents.
	<b>F.IF.8</b> Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
	<b>F.BF.3</b> Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$ , $k f(x)$ , $f(kx)$ , and $f(x + k)$ for specific values of $k$ (both positive and negative); find the value of $k$ given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i>
<b>Assessed</b>	<b>Seeing Structure:</b> Interpret the structure of <i>graphical</i> representations, identify key features, connecting them to written expressions and context to solve problems.
	<b>F.LE.3</b> Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
	<b>F.IF.7</b> Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*
	<b>F.IF.7c</b> Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

<b>Algebra II</b>	
	An “*” after standard indicates a standard for Mathematical Practice: Modeling
	<b>F.IF.7e</b> Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
	<b>A.SSE.3a</b> Factor a quadratic expression to reveal the zeros of the function it defines.
	<b>A.SSE.3b</b> Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. Use an appropriate strategy to reveal the maximum and minimum value in a quadratic expression of the function it defines.
	<b>F.IF.8a</b> Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
	<b>A.APR.3</b> Identify zeros of polynomials when suitable factorizations are defined by the polynomial.
	<b>F.IF.4</b> For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*</i>
	<b>F.IF.9</b> Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i>
<b>Assessed</b>	<b>Functions:</b> Understand how the concept of function can be used to interpret, analyze and model functions that emerge from contexts including those contexts that are purely mathematical.
	<b>F.IF.1</b> Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If $f$ is a function and $x$ is an element of its domain, then $f(x)$ denotes the output of $f$ corresponding to the input $x$ . The graph of $f$ is the graph of the equation $y = f(x)$ .
	<b>F.IF.2</b> Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
	<b>F.IF.5</b> Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function <math>h(n)</math> gives the number of person-hours it takes to assemble <math>n</math> engines in a factory, then the positive integers would be an appropriate domain for the function.*</i>
<b>Assessed</b>	<b>Create Equations:</b> An equation is a record of a computation with numbers, symbols that represent numbers, arithmetic operations, exponentiation, and, at more advanced levels, the operation of evaluating a function. Numeric relationships can be symbolically represented as equations and inequalities and fluency in transforming these symbolic representations is a tool for solving problems.
	<b>F.BF.1</b> Write a function that describes a relationship between two quantities.*
	<b>F.BF.1a</b> Determine an explicit expression, a recursive process, or steps for calculation from a context.

<b>Algebra II</b>	
	An “*” after standard indicates a standard for Mathematical Practice: Modeling
	<b>S.ID.6</b> Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. <b>S.ID.6a</b> Fit a function to the data; use functions fitted to data to solve problems in the context of the data. <i>Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.</i>
	<b>A.SSE.4</b> Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. <i>For example, calculate mortgage payments.*</i>
	<b>A.CED.2</b> Create equations in two or more variables to represent relationships between quantities: graph equations on coordinate axes with labels and scales.
	<b>G.GPE.1</b> Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. Write the equation of a circle of given center and radius using the Pythagorean Theorem.
	<b>A.CED.3</b> Represent constraints by equations or inequalities, and by systems and/or inequalities.
	<b>A.APR.1</b> Add, subtract, and multiply polynomials.
<b>Assessed</b>	<b>Problem Solving:</b> Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary.
	<b>A.REI.4</b> Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in $x$ into an equation of the form $(x-p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection, taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. (Up to this section only) Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers $a$ and $b$ .
	<b>A.REI.2</b> Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. Solve equations in one variable, to include simple rational and radical equations.
	<b>A.REI.11</b> Explain why the $x$ -coordinates of the points where the graphs of the equations $y=f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$ ; find the solutions approximately.
	<b>A.REI.12</b> Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. <b>Linear programming is a big idea that both courses want assessed.</b>

<b>Algebra II</b>	
	An “*” after standard indicates a standard for Mathematical Practice: Modeling
	<ul style="list-style-type: none"> <li># <b>N.Q.1</b> Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.</li> <li># <b>N.Q.2</b> Define appropriate quantities for the purpose of descriptive modeling.</li> <li># <b>N.Q.3</b> Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</li> <li># <i>These standards are embedded within items.</i></li> </ul>
Assessed	<b>Probability:</b> Data are gathered, displayed, summarized, examined, and interpreted to discover patterns and deviations from patterns. In a probability model, sample points represent outcomes and combine to make up events; probabilities of events can be computed by applying the Addition and Multiplication Rules. Interpreting these probabilities relies on an understanding of independence and conditional probability.
	<b>S.CP.3</b> Understand the conditional probability of $A$ given $B$ as $P(A \text{ and } B)/P(B)$ , and interpret independence of $A$ and $B$ as saying that the conditional probability of $A$ given $B$ is the same as the probability of $A$ , and the conditional probability of $B$ given $A$ is the same as the probability of $B$ .
	<b>S.CP.5</b> Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. <i>For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.</i>
	<b>S.CP.6</b> Find the conditional probability of $A$ given $B$ as the fraction of $B$ s outcomes that also belong to $A$ , and interpret the answer in terms of the model.
	<b>S.CP.7</b> Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ , and interpret the answer in terms of the model.
	<b>S.MD.5 (+)</b> Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.

## Integrated Math III

An “\*” after standard indicates a standard for Mathematical Practice: Modeling

Assessed	<p><b>Seeing Structure:</b> Interpret the structure of expressions and write expressions in equivalent forms to solve problems. Reading an expression with comprehension involves analysis of its underlying structure. This may suggest a different but equivalent way of writing the expression that exhibits some different aspect of its meaning. Viewing an expression as the result of operation on simpler expressions can clarify its underlying structure and connections to the context.</p>
	<p><b>A.SSE.1</b> Interpret expressions that represent a quantity in terms of its context.*  <b>A.SSE.1a</b> Interpret parts of an expression, such as terms, factors, and coefficients.  <b>A.SSE.1b</b> Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret <math>P(1+r)^n</math> as the product of <math>P</math> and a factor not depending on <math>P</math>.</i></p>
	<p><b>A.SSE.3</b> Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*</p>
	<p><b>A.SSE.3c</b> Use the properties of exponents to transform expressions for exponential functions. <i>For example the expression <math>1.15^t</math> can be rewritten as <math>(1.15^{1/12})^{12t} \approx 1.012^{12t}</math> to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.</i></p>
	<p><b>F.IF.8</b> Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p>
	<p><b>F.BF.3</b> Identify the effect on the graph of replacing <math>f(x)</math> by <math>f(x) + k</math>, <math>k f(x)</math>, <math>f(kx)</math>, and <math>f(x + k)</math> for specific values of <math>k</math> (both positive and negative); find the value of <math>k</math> given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i></p>
Assessed	<p><b>Seeing Structure:</b> Interpret the structure of <i>graphical</i> representations, identify key features, connecting them to written expressions and context to solve problems.</p>
	<p><b>F.IF.7</b> Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*</p>
	<p><b>F.IF.7c</b> Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.</p>
	<p><b>F.IF.7e</b> Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</p>
	<p><b>A.SSE.3a</b> Factor a quadratic expression to reveal the zeros of the function it defines.</p>
	<p><b>A.SSE.3b</b> Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. Use an appropriate strategy to reveal the maximum and minimum value in a quadratic expression of the function it defines.</p>
	<p><b>F.IF.8a</b> Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.</p>

<b>Integrated Math III</b>	
	An “*” after standard indicates a standard for Mathematical Practice: Modeling
	<b>A.APR.3</b> Identify zeros of polynomials when suitable factorizations are defined by the polynomial.
	<b>F.IF.4</b> For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*</i>
	<b>F.IF.9</b> Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i>
Assessed	<b>Functions:</b> Understand how the concept of function can be used to interpret, analyze and model functions that emerge from contexts including those contexts that are purely mathematical.
	<b>F.IF.1</b> Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If $f$ is a function and $x$ is an element of its domain, then $f(x)$ denotes the output of $f$ corresponding to the input $x$ . The graph of $f$ is the graph of the equation $y = f(x)$ .
	<b>F.IF.2</b> Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
	<b>F.IF.5</b> Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function <math>h(n)</math> gives the number of person-hours it takes to assemble <math>n</math> engines in a factory, then the positive integers would be an appropriate domain for the function.*</i>
Assessed	<b>Create Equations:</b> An equation is a record of a computation with numbers, symbols that represent numbers, arithmetic operations, exponentiation, and, at more advanced levels, the operation of evaluating a function. Numeric relationships can be symbolically represented as equations and inequalities and fluency in transforming these symbolic representations is a tool for solving problems.
	<b>F.BF.1</b> Write a function that describes a relationship between two quantities.*
	<b>F.BF.1a</b> Determine an explicit expression, a recursive process, or steps for calculation from a context.
	<b>S.ID.6</b> Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. <b>S.ID.6a</b> Fit a function to the data; use functions fitted to data to solve problems in the context of the data. <i>Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.</i>
	<b>A.SSE.4</b> Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. <i>For example, calculate mortgage payments.*</i>
	<b>A.CED.2</b> Create equations in two or more variables to represent relationships between quantities: graph equations on coordinate axes with labels and scales.
	<b>A.CED.3</b> Represent constraints by equations or inequalities, and by systems and/or inequalities.

<b>Integrated Math III</b>	
	An “*” after standard indicates a standard for Mathematical Practice: Modeling
	<b>A.APR.1</b> Add, subtract, and multiply polynomials.
<b>Assessed</b>	<b>Problem Solving:</b> Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary.
	<p><b>A.REI.4</b> Solve quadratic equations in one variable.</p> <p>a. <u>Use the method of completing the square to transform any quadratic equation in <math>x</math> into an equation of the form <math>(x-p)^2 = q</math> that has the same solutions</u>  <u>Derive the quadratic formula from this form.</u></p> <p>b. <u>Solve quadratic equations by inspection, taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation.</u> (Up to this section only)  Recognize when the quadratic formula gives complex solutions and write them as <math>a+bi</math> for real numbers <math>a</math> and <math>b</math>.</p>
	<b>A.REI.2</b> Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. Solve equations in one variable, to include simple rational and radical equations.
	<b>F.LE.4</b> For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where $a$ , $c$ , and $d$ are numbers and the base $b$ is 2, 10, or $e$ ; evaluate the logarithm using technology.
	<b>G.MG.2</b> Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot),
	<b>A.REI.11</b> Explain why the $x$ -coordinates of the points where the graphs of the equations $y=f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) =g(x)$ ; find the solutions approximately.
	<b>A.REI.12</b> Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. <b>Linear programming is a big idea that both courses want assessed.</b>
	<p>⊕ <b>N.Q.1</b> Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.</p> <p>⊕ <b>N.Q.2</b> Define appropriate quantities for the purpose of descriptive modeling.</p> <p>⊕ <b>N.Q.3</b> Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</p> <p>⊕ <i>These standards are embedded within items</i></p>

<b>Integrated Math III</b>	
	An “*” after standard indicates a standard for Mathematical Practice: Modeling
Assessed	<b>The Circle and Trigonometry:</b> A correspondence between numerical coordinates and geometric points allows methods from algebra to be applied to geometry and vice versa. Properties of Circles can be described by theorems that integrate algebraic and geometric understanding with modeling.
	<b>G.C.5</b> Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.
	<b>F.TF.1</b> Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
	<b>F.TF.8</b> Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$ , $\cos(\theta)$ , or $\tan(\theta)$ given $\sin(\theta)$ , $\cos(\theta)$ , or $\tan(\theta)$ and the quadrant of the angle.
	<b>F.TF.5</b> Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*
Assessed	<b>Circle Properties:</b> Geometric shapes can be described by equations, making algebraic manipulation into a tool for geometric understanding, modeling, and proof.
	<b>G.GPE.1</b> Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. Write the equation of a circle of given center and radius using the Pythagorean Theorem.
	<b>G.C.3</b> Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
	<b>G.C.2</b> Identify and describe relationships among inscribed angles, radii, and chords. <i>Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; <u>the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</u></i>
Assessed	<b>Probability:</b> Data are gathered, displayed, summarized, examined, and interpreted to discover patterns and deviations from patterns. In a probability model, sample points represent outcomes and combine to make up events; probabilities of events can be computed by applying the Addition and Multiplication Rules. Interpreting these probabilities relies on an understanding of independence and conditional probability.
	<b>S.CP.3</b> Understand the conditional probability of $A$ given $B$ as $P(A \text{ and } B)/P(B)$ , and interpret independence of $A$ and $B$ as saying that the conditional probability of $A$ given $B$ is the same as the probability of $A$ , and the conditional probability of $B$ given $A$ is the same as the probability of $B$ .
	<b>S.CP.5</b> Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. <i>For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.</i>
	<b>S.CP.6</b> Find the conditional probability of $A$ given $B$ as the fraction of $B$ s outcomes that also belong to $A$ , and interpret the answer in terms of the model.
	<b>S.CP.7</b> Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ , and interpret the answer in terms of the model.
	<b>S.MD. 5 (+)</b> Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.

## Mathematical Practices

### 1. Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense”? They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

### 2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

### 3. Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

## Mathematical Practices

### **4. Model with mathematics.**

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

### **5. Use appropriate tools strategically.**

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

### **6. Attend to precision.**

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express and numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school, they have learned to examine claims and make explicit use of definitions.

## Mathematical Practices

### 7. Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see  $7 \times 8$  equals the well-remembered  $7 \times 5 + 7 \times 3$ , in preparation for learning about the distributive property. In the expression  $x^2 + 9x + 14$ , older students can see the 14 as  $2 \times 7$  and the 9 as  $2 + 7$ . They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see  $5 - 3(x - y)^2$  as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers  $x$  and  $y$ .

### 8. Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation  $(y - 2)/(x - 1) = 3$ . Noticing the regularity in the way terms cancel when expanding  $(x - 1)(x + 1)$ ,  $(x - 1)(x^2 + x + 1)$ , and  $(x - 1)(x^3 + x^2 + x + 1)$  might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

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**APPENDIX B**  
**DELAWARE'S ALGEBRA II/INTEGRATED MATH III**  
**CONTENT STRAND CONFIGURATION**

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<b>Delaware Algebra II/Integrated Math III Content Strand Configuration</b>			
		<b>Algebra II</b>	<b>Integrated Math III</b>
<b>Content Standard</b>		<b>Total %</b>	<b>Total %</b>
<b>Algebra</b>	Seeing Structure in Expressions	<b>40-45%</b>	<b>25-30%</b>
	Arithmetic with Polynomials and Rational Expressions		
	Creating Equations		
	Reasoning with Equations and Inequalities		
<b>Functions</b>	Interpreting Functions	<b>30-35%</b>	<b>40-45%</b>
	Building Functions		
	Linear, Quadratic, and Exponential Models		
	Trigonometric Functions		
<b>Number</b>	The Real Number System	<b>5%</b>	<b>0%</b>
<b>Geometry</b>	Circles	<b>&lt; 5%</b>	<b>5-10%</b>
	Expressing Geometric Properties with Equations		
<b>Probability/ Statistics</b>	Interpreting Categorical and Quantitative Data	<b>15-20%</b>	<b>15-20%</b>
	Conditional Probability and the Rules of Probability		
	Using Probability to Make Decisions		
<b>Total</b>		<b>100%</b>	<b>100%</b>

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**END-OF-COURSE SPECIFICATIONS FOR  
U.S. HISTORY**

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## **I. INTRODUCTION: DEFINITION OF THE TASK**

Delaware’s Secretary of Education, Lillian Lowery, in consultation with the Delaware Chief School Officers, approved the development of a high school end-of-course (EOC) exam for Social Studies. A Social Studies design team was charged with the task of formulating course expectations and alignment to the Delaware Content Standards.

Delaware has redesigned the student testing program to require specific end-of-course assessments aligned to the content standards. United States History was chosen as the Social Studies end-of-course assessment.

### **At what grade should the test be given to students?**

The Delaware Department of Education recommends that U.S. History be offered to students in grade 11. This aligns with the Delaware Recommended Curriculum in Social Studies. Students should plan to take the U.S. History EOC upon completing the course.

### **What will the EOC Assessment in Social Studies be titled?**

The EOC for Social Studies will be called U.S. History. No matter what the district/school decides to call its course, the EOC Assessment will be referred to as U.S. History.

## **II. THE PROCESS**

The Social Studies Design Team consists of district-level specialists, the curriculum and assessment education associate from the Delaware Department of Education, and content specialists from the University of Delaware.

Lisa Prueter	Appoquinimink School District
Bartley Dryden	Christina School District
Franklin Read	Colonial School District
Preston Shockley	Delaware Department of Education
Renee Jerns	Indian River School District
Nancy Carnevale	Milford School District
Rebecca Reed	Red Clay School District
Barbara Emery	University of Delaware
Margaret Legates	University of Delaware
Bonnie Meszaros	University of Delaware
Fran O’Malley	University of Delaware

Delaware educators worked with Learning-Focused school consultants in 2009 to prioritize the Delaware Social Studies benchmarks. The Social Studies Design Team decided to target each high school benchmark in a specific high school course in order to set curricular and assessment expectations. The team selected benchmarks for an integrated instructional design. The Civics, Economics, and Geography benchmarks that best matched the context and content of a U.S. History course join the History benchmarks as learning targets. The team used the 1995 Social

Studies Curriculum Framework and the Social Studies Standards Clarifications to guide its decisions.<sup>1</sup>

### III. RECOMMENDATIONS FOR THE ASSESSMENT DESIGN

The EOC assessment is based on the Delaware Social Studies Content Standards and high school benchmarks, so the test is a transfer task assessment rather than an assessment based on specific course content.

The 11<sup>th</sup> grade course in the Social Studies Recommended Curriculum has a broad chronological scope. Instruction in American history uses Delaware and the United States as a context. Since Civics, Geography, and Economics instruction is expected during this grade, the historical time frame in which instruction takes place must have a wide range. Opportunities to apply the understandings contained within the benchmark will arise from this time frame.

**A student should know historical chronology in such a way as to be able to place people, laws, and events.** For example, from 1850 to 2000, there was a Civil War, Reconstruction in the South, the settlement of the West, the rise of industrialization and urbanization, a labor movement, imperialism, the rise of segregation, two world wars, a Cold War, the rise of the Third World, the end of colonialism, a Great Depression, a civil rights movement, a woman’s movement, a war in Korea and Vietnam, increasing technological change, and globalization. Without knowing the exact years for an event, a student should still be able to place all these trends and events within the chronology, 1850 to 2000, in their approximate place. In other words, students should know the major events and their approximate time.

An organized mental framework of events, people, trends, and other historical phenomena is essential to understanding, evaluating, and constructing historical interpretations. Such a framework allows us to draw logical inferences concerning the continuing impact of the past on the present. Individual periods, regions, or events should not be studied in isolation but rather in comparison to one another. Nor should the broad sweep of events or an emphasis on leaders, great works, and pivotal events obscure the importance of seeking to understand the everyday life of ordinary people in other times and places.

The chart below shows benchmarks selected from the 9–12 grade cluster designated for a U.S. History course. It is expected that classroom instruction in a high school U.S. History course will target these essential benchmarks, and the DCAS will reflect that expectation on the EOC assessment.

<b>Grade 9-12 /Benchmarks Measured in the U.S. History EOC Assessment</b>	
<b>Civics 2a</b>	<b>Geography 3a</b>
<b>Civics 2b</b>	<b>History 1a</b>
<b>Economics 1a</b>	<b>History 2a</b>
<b>Economics 2a</b>	<b>History 2b</b>
<b>Geography 1a</b>	<b>History 3a</b>

The curricular and assessment expectations of these benchmarks are outlined in Appendix A.

<sup>1</sup> Both of these documents may be found at [www.doe.k12.de.us/ss](http://www.doe.k12.de.us/ss).

## **Cognitive Framework**

Norm Webb’s Depth of Knowledge framework has been used to specify the cognitive levels expected within each benchmark assessed on the EOC. (Depth of Knowledge Levels for Four Content Areas, March 28, 2002).<sup>2</sup> *The Social Studies Design Team asserts that an accurate measurement of the Delaware Social Studies benchmarks assessed on the EOC will not include Level 1 items.*

### **Level 1 – Recall of Information**

Level 1 asks the student to recognize or identify specific information contained in graphics. This level generally requires students to identify, list, or define. The items at this level usually ask the student to recall who, what, when, and where. Items that require students to “describe” and “explain” could be classified at level 1 or 2 depending on what is to be described and explained. A level 1 “describe or explain” item would recall, recite, or reproduce information. Items that require students to recognize or identify specific information contained in maps, charts, tables, graphs, or drawings are generally level 1.

### **Level 2 – Basic Reasoning**

Level 2 includes the engagement of some mental processing beyond recalling or reproducing a response. This level generally requires students to:

- Contrast or compare people, places, events, and concepts;
- Convert information from one form to another;
- Give an example;
- Classify or sort items into meaningful categories;
- Describe, interpret, or explain issues and problems, patterns, reasons, cause and effect, significance or impact, relationships, points of view, or processes.

A level 2 “describe or explain” item would require students to go beyond a description or explanation of recalled information to describe or explain a result or “how” or “why.”

### **Level 3 – Complex Reasoning**

Level 3 requires reasoning, using evidence, and a higher level of thinking than the previous two levels. Students would go beyond explaining or describing “how and why” to justifying the “how and why” through application and evidence. The cognitive demands at level 3 are more complex and more abstract than levels 1 or 2.

Items at Level 3 include:

- Drawing conclusions;
- Citing evidence;
- Applying concepts to new situations;
- Using concepts to solve problems;
- Analyzing similarities and differences in issues and problems;

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<sup>2</sup> [www.asccc.org/events/Curriculum/.../NormanWebbs4levels.pdf](http://www.asccc.org/events/Curriculum/.../NormanWebbs4levels.pdf)

- Proposing and evaluating solutions to problems;
- Recognizing and explaining misconceptions or making connections across time and place to explain a concept or big idea.

#### **Level 4 – Extended Reasoning**

Level 4 requires the complex reasoning of level 3 with the addition of planning, investigating, or developing that will most likely require an extended period of time. The extended time period is not a distinguishing factor if the required work is only repetitive and does not require applying significant conceptual understanding and higher-order thinking. At this level, the cognitive demands should be high and the work should be very complex. Students should be required to connect and relate ideas and concepts within the content area or among content areas in order to be at this highest level.

The distinguishing factor for level 4 would be evidence through a task or product that the cognitive demands have been met. A level 4 performance will require students to analyze and synthesize information from multiple sources, examine and explain alternative perspectives across a variety of sources, and/or describe and illustrate how common themes and concepts are found across time and place. In some level 4 performance, students will make predictions with evidence as support, develop a logical argument, or plan and develop solutions to problems.

Many on-demand assessment instruments will not include assessment activities that could be classified as level 4. However, standards, goals, and objectives can be stated so as to expect students to perform thinking at this level. On-demand assessments that do include tasks, products, or extended responses would be classified as level 4 when the task or response requires evidence that the cognitive requirements have been met.

#### **IV. SUGGESTIONS AND CAUTIONS**

##### **What is the role of History Standard Four?**

- History Standard Four 9-12a: Students will develop an understanding of modern United States history, its connections to both Delaware and world history, including:
  - Civil War and Reconstruction (1850–1877)
  - Development of an industrialized nation (1870–1900)
  - Emergence of modern America (1890–1930)
  - Great Depression and World War II (1929–1945)
  - Postwar United States (1945–early 1970s)
  - Contemporary United States (1968–present)

Teachers should not be concerned as they examine the content description in History Standard Four above and think, “That’s too much. I could never do that in a school year.” Actually, it is too much to cover, and becomes more ponderous with each passing year. What teachers, schools, and districts must learn to do is selectively abandon certain topics in the course of history. Do not try to cover everything. It is impossible. Do not focus too much on early 20<sup>th</sup> century topics and leave no time for more contemporary study. Adopt an approach that could be called “post-holing.” Dig deeply into some topics rather than trying to “cover” everything. It is better for a student to clearly understand a concept and to be able to use *something* in history in

an explanation than it is to have a limited understanding of a concept and know a lot of “*somethings*” in history. Students understand a standard when they can apply it in a new or different situation. The teacher does not have to “cover” every potential situation for the student to be prepared. The student who can apply understanding to a new situation is well equipped for any assessment of the Delaware History Standards and for life after school.

Social Studies content should be about:

- Themes, broad historical trends, and topics that allow the four strands of the social studies to be integrated and provide a cultural context for the student.
- Relevant and important contemporary issues.
- Resources for education and not the scope and sequence contained in a textbook.

Students should know chronology in broad outlines and enough trends in history that they have a reservoir of information they can use to provide factual support and examples in their short, written responses. Students should have an understanding of trends and patterns in order to use that understanding as evidence when drawing conclusions or making inferences.

It is hard to imagine a Social Studies, History, Economics, Geography, Civics, or Government course or program that ignores events from 1950 to the present. For example, a student responding to a historian’s writing published in the 1950s should be aware that the 1950s came after the Second World War or during the Cold War or during the beginning of a Civil Rights movement.

Consider these two sentences that the student might write:

1. He wrote this because Americans were angry at Russia.
2. This historian was influenced by the Cold War then taking place between the United States and Russia.

Obviously the second sentence is much stronger and reflects more understanding specifically the historical fact/content of the Cold War.

Select historical topics which are transferable, relevant, integrated, contemporary, and important. Students should study what resonates throughout history and prepares them for decisions they will face as adult citizens.

A student must know history; do not be fooled by Standard Four. The reason why specific people, laws, events, etc., are not listed in the History Standards is because no group of historians will ever agree on the essential and necessary facts that everyone should know. Remember, history does not exist until the historian looks at the sources and decides what is important and therefore what is history. This is why the initial History Standards committee decided not to produce a required list of people, laws, events, etc. The absence of a specific list does not mean students do not have to know anything. It means that a student is free to use whatever historical knowledge he or she gained in that classroom.

If students have a reservoir of historical knowledge and they understand the History Standards, they can do well on any assessment. If they lack either one—historical knowledge or an understanding of the standards—they will not do well. Make certain in your teaching that your students acquire an understanding of history and how it works as a discipline (Standards One, Two, and Three) and that they acquire knowledge of people, laws, and events and when these

historical specifics fall chronologically (Standard Four). The History Standards do not dictate a curriculum, but they do require students to have courses that equip them to bring some knowledge of history and an understanding of the standards and how to apply the standards. If the students learn information they can use it. Any assessment of the Delaware History Standards is not one to which a student can simply apply common sense or street-level knowledge. He or she must bring knowledge and an understanding of the standards to it to do well. Obviously, if he or she has little to recall (Standard Four), or if they do not understand history as a discipline (Standards One, Two, and Three), then he or she will have little to offer as a factually supported, accurate and relevant explanation.

## **V. SUMMARY**

Separate content standards for each discipline are not intended to imply that they should be taught in isolation, but to suggest each discipline's unique contribution to an understanding of the world. Instruction should not consist only of history, for example, without reference to geography or economics—interdisciplinary approaches are essential to reinforce students' comprehension. The individual standards should be viewed as building blocks which can be combined in any number of ways to create a solid foundation for effective citizenship.

Delaware schools are preparing our students to live in the 21<sup>st</sup> century, and while it is not possible to predict with certainty the issues that will concern Americans in the future, students prepare by learning the skills necessary to analyze contemporary issues. Some of these issues represent threats to our society: wars, poverty, or ecological disasters. Some affect the way we view ourselves: immigration, civil rights, and women's rights. Others suggest possible solutions to our most difficult problems: information technology, conservation efforts, or volunteer organizations tackling social concerns. By applying skills gained in the study of the core disciplines to contemporary issues, teachers prepare their students to deal with future challenges in their adult lives. Students learn that events are subject to different interpretations, and that they have to be capable of analyzing competing positions before making a decision. This also instills the expectation that every American citizen has both the responsibility and the right to take part in the decision-making process.

Learning in Delaware classrooms should be active rather than passive. The transfer of factual knowledge through formal presentation will always be necessary, but the Delaware high school standards also require an emphasis on critical analysis, problem solving, and application of knowledge. Assessments should center on students demonstrating understanding by transferring concepts into new contexts rather than recalling correct answers. Opportunities to teach the standards in depth should be identified in the curriculum. A teacher should use open-ended questions that have no definite right or wrong answers to invite the open debate and discussion that is most conducive to understanding. Instruction should be enhanced using the resources relevant to each content area and each standard within the content area. Students should demonstrate understanding, analysis, and application by using the tools of social studies “to think with”—maps, charts, graphs, diary and journal entries, photographs and drawings, newspaper headlines, political surveys, etc.

It is the intent of the U.S. History End-of-Course Assessment to represent essential understandings and skills (what all students should know and be able to do), not individual

discrete facts. Further, the assessment is designed to equitably measure knowledge and skills of all students with respect to the Delaware Social Studies Standards.

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**APPENDIX A:  
DELAWARE SOCIAL STUDIES BENCHMARKS  
ASSESSED ON THE U.S. HISTORY EOC TEST AND  
SAMPLE ITEMS**

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<b>Benchmark</b>	<b><u>Civics Standard Two 9-12a: Students will examine and analyze the extra-Constitutional role that political parties play in American politics.</u></b>
<b>Sample Questions</b>	<ul style="list-style-type: none"> <li>● Why are political parties necessary to democracy? Why do two political parties dominate in America but other democracies have more?</li> <li>● Under what conditions might political parties evolve or collapse?</li> <li>● How might political parties provide a bridge between the people and government?</li> <li>● How might political parties foster citizenship and participation?</li> <li>● How do political parties help organize the government?</li> <li>● Why would voting for presidents and congressional representatives be more difficult if political parties were not allowed?</li> </ul>
<b>Cognitive Level</b>	Level 3

<b>Benchmark</b>	<b><u>Civics Standard Two 9-12b: Students will understand that the functioning of the government is a dynamic process which combines the formal balances of power incorporated in the Constitution with traditions, precedents, and interpretations which have evolved over the past 200 years.</u></b>
<b>Sample Questions</b>	<ul style="list-style-type: none"> <li>● What problems would arise if a government failed to adapt to changing needs and desires of the people?</li> <li>● How do the structures and traditional processes of government minimize the dangers of change?</li> <li>● Why has the relative power of the Presidency increased since the early days of the country?</li> <li>● Why do many consider the Constitution a “living” document that needs to be reinterpreted from time to time to reflect new social realities?</li> <li>● Why are traditions not found in the Constitution or laws important for the conduct of government?</li> </ul>
<b>Cognitive Level</b>	Level 3

For more information on the meanings and understandings in the above Civics benchmarks, please refer to the [Civics 9–12 Clarifications](#).

<b>Benchmark</b>	<b><u>Economics Standard One 9-12a:</u> Students will demonstrate how individual economic choices are made within the context of a market economy in which markets influence the production and distribution of goods and services.</b>
<b>Sample Questions</b>	<ul style="list-style-type: none"> <li>• How does economic self-interest (individual consumers and producers) contribute to the greater good?</li> <li>• Does competition ensure efficiency?</li> <li>• How do government policies affect markets?</li> </ul>
<b>Cognitive Level</b>	Level 3

<b>Benchmark</b>	<b><u>Economics Standard Two 9-12a:</u> Students will develop an understanding of how economies function as a whole, including the causes and effect of inflation, unemployment, business cycles, and monetary and fiscal policies.</b>
<b>Sample Questions</b>	<ul style="list-style-type: none"> <li>• Why is our economy interdependent?</li> <li>• How might government policy decisions affect the stability of the economy?</li> </ul>
<b>Cognitive Level</b>	Level 3

“Economic Stability,” an instructional unit for the Delaware Recommended Curriculum that measures Economics Standard Two 9-12a, can be found at [http://www.doe.k12.de.us/infosuites/staff/ci/content\\_areas/social\\_studies/standards/pilot.shtml](http://www.doe.k12.de.us/infosuites/staff/ci/content_areas/social_studies/standards/pilot.shtml).

For more information on the meanings and understandings in the above economics benchmarks, please refer to the [Economics 9–12 Clarifications](#).

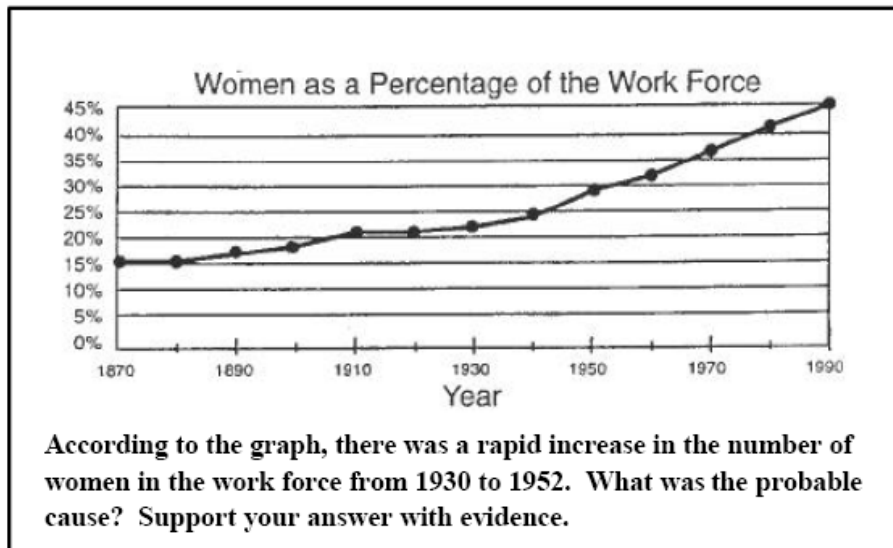
<b>Benchmark</b>	<b><u>Geography Standard One 9-12a:</u> Students will identify geographic patterns which emerge when data is mapped, and analyze mapped patterns through the application of such common geographic principles as “hierarchy,” “accessibility,” “diffusion” and “complementarity.”</b>
<b>Sample Questions</b>	<ul style="list-style-type: none"> <li>• How is competition or interaction between places influenced by their relative location and accessibility?</li> <li>• How might the position of a place in a settlement hierarchy affect the life of the people in that place?</li> <li>• What makes it likely or unlikely that people and/or goods will flow between two points?</li> </ul>
<b>Cognitive Level</b>	Level 3

<b>Benchmark</b>	<b><u>Geography Standard Three 9-12a:</u> Students should understand the processes which result in distinctive cultures, economic activity and settlement form in particular locations across the world.</b>
<b>Sample Questions</b>	<ul style="list-style-type: none"> <li>• Why are some places more culturally diverse or similar than others?</li> <li>• How does the culture of a place change over time?</li> </ul>
<b>Cognitive Level</b>	Level 3

For more information on the meanings and understandings in the above geography benchmarks, please refer to the [Geography 9–12 Clarifications](#).

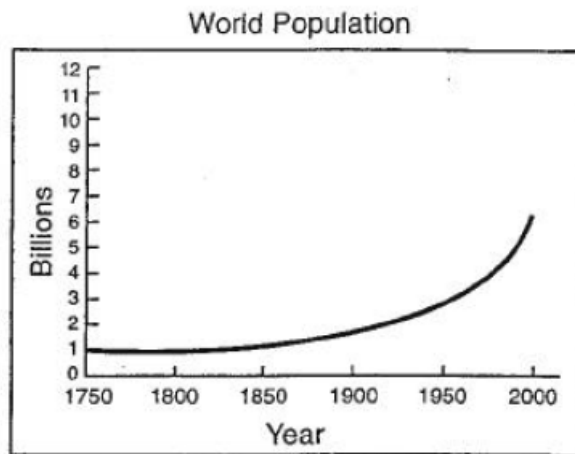
<b>Benchmark</b>	<b>History Standard One 9-12a: Students will analyze historical materials to trace the development of an idea or trend across space or over a prolonged period of time in order to explain patterns of historical continuity and change.</b>
<b>Sample Questions</b>	<ul style="list-style-type: none"> <li>• Were contemporary issues also problematic for past societies? Why are those issues difficult? Is there a pattern of continuity or change?</li> <li>• How much can we learn from studying historical responses to societal problems?</li> <li>• What factors explain the migration within the United States of population from the Frostbelt or Rustbelt to the Sunbelt? Were the attractions of retirement communities the only explanation?</li> </ul>
<b>Cognitive Level</b>	Level 3

To illustrate the assessment of this benchmark, consider this sample item that focuses on the development of a trend over a period of time to explain the pattern of change. The item asks students to use information presented in a line graph (the number of women in the work force from 1870 to 1990) and to explain the rapid increase in the number of women in the work force from 1930 to 1952.



Here is another item that illustrates the assessment of this benchmark. This test item focuses on a trend in world population between the years 1750 and 2000. This trend is shown through data on a line graph.

Below is a graph of world population between 1750 and 2000.



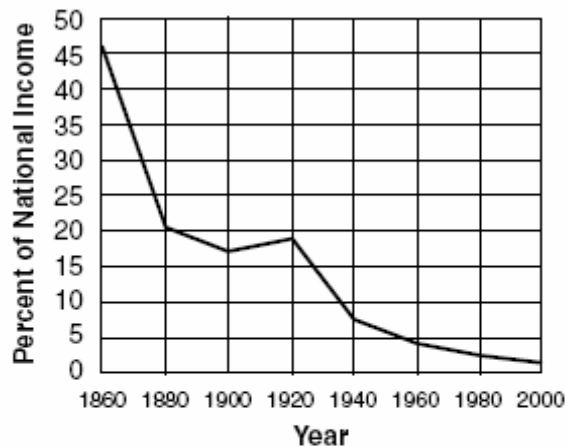
What was the *most* probable cause of the rapid increase shown on the graph?

- a. Advances in communication
- b. New energy choices
- c. Advances in medical care\*
- d. World war

Students should recall events during that time period and analyze the effect of those events on world population in order to determine the correct answer.

The following item that asks students to be aware of the chronology, impact, and consequences of industrialization and technology on agriculture over a long period, 1860 to 2000.<sup>3</sup> In order to answer this question a student must know that the introduction of more and more mechanization greatly increased output. The long-term effect was to reduce the number of farmers needed to feed the rest of us.

**D** This graph shows the U.S. farmers' share of the national income from 1860 to 2000.



What was the *main* reason for the long-term trend shown on the graph?

- F** Immigration
- G** Global warfare
- H** Natural disaster
- J** Industrialization

This assessment item uses a graph that shows the long-term decline in the farmers' share of the national income. The correct response is option J. All four possible answers—immigration, global warfare, natural disasters, and industrialization—occurred within the dates for the graph, 1860 to 2000, but only industrialization explains this long-term decline in the farmers' share of the national income, the shift from an agricultural-based economy to an industrial-based economy.

An instructional unit for the Delaware Recommended Curriculum entitled “Pandemics” that measures History Standard One 9-12a in a World History course can be found at [http://www.doe.k12.de.us/infosuites/staff/ci/content\\_areas/social\\_studies/standards/pilot.shtml](http://www.doe.k12.de.us/infosuites/staff/ci/content_areas/social_studies/standards/pilot.shtml).

<sup>3</sup> This is a released item from the Delaware Student Testing Program. Item Samplers with annotated student work can be found at [http://www.doe.k12.de.us/aab/social\\_studies/default.shtml](http://www.doe.k12.de.us/aab/social_studies/default.shtml)

<b>Benchmarks</b>	<p><b>History Standard Two 9-12a:</b> Students will develop and implement effective research strategies for investigating a given historical topic.</p> <p><b>History Standard Two 9-12b:</b> Students will examine and analyze primary and secondary sources in order to differentiate between historical facts and historical interpretations.</p>
<b>Sample Questions</b>	<ul style="list-style-type: none"> <li>• What is the evidence for this argument? Is that <i>all</i> the evidence, or just what the author wanted me to read?</li> <li>• Why does differentiating between fact and interpretation matter?</li> <li>• Ask students to develop research strategies, given a particular historical problem, and examine the difficulties inherent in some research.</li> <li>• Ask questions of the person who advocates a particular position. Where did they get their information? What factors influenced their point of view? How much is based on facts and how much is based upon interpretation? An understanding of the role of documentary support behind an assertion is essential for future citizenship.</li> <li>• When does the historian base their argument solidly upon sources and when does the historian express an interpretation based upon their overall research on that topic?</li> </ul>
<b>Cognitive Level</b>	Level 4

An instructional unit for the Delaware Recommended Curriculum entitled “Historical Research” that measures History Standard Two 9-12a can be found at [http://www.doe.k12.de.us/infosuites/staff/ci/content\\_areas/social\\_studies/standards/pilot.shtml](http://www.doe.k12.de.us/infosuites/staff/ci/content_areas/social_studies/standards/pilot.shtml).

<b>Benchmark</b>	<b>History Standard Three 9-12a: Students will compare competing historical narratives, by contrasting different historian’s choice of questions, use and choice of sources, perspectives, beliefs, and points of view, in order to demonstrate how these factors contribute to different interpretations.</b>
<b>Sample Questions</b>	<ul style="list-style-type: none"> <li>• How does the way research is conducted influence a historian’s interpretation?</li> <li>• To what degree is a historical investigation about the historian as much as the history? Why is it necessary to include an investigation of the writer in regard to what we read?</li> <li>• What factors contributed to this historian’s conclusion and how did these factors contribute to this historian’s conclusions?</li> <li>• What forces molded and shaped that historian? What did he/she live through? What were the major ideas floating in the air when they grew to intellectual maturity?</li> </ul>
<b>Cognitive Level</b>	Level 3

Here is an item that focuses on the research procedure a historian uses to arrive at a conclusion.

Stephen Ambrose wrote a history of the Allies’ D-Day invasion of Europe during the Second World War. Unlike other historians, Ambrose interviewed only soldiers in the lower ranks of the military.

**How might Stephen Ambrose’s use of this source and the questions he asked lead to a perspective of the D-Day invasion that differed from other historians? Explain your answer.**

Specifically, it focuses on two aspects of this benchmark—what sources are used and what questions are asked of these sources. Both can dramatically affect the historian’s conclusion. Neither the historian nor the sources are neutral. The historian brings his or her background, personal bias, and political outlook to any research. For many relatively recent topics, a wide variety of potential sources exist. The historian decides to approach a topic from a particular angle, perhaps not even clearly articulated, to write an interpretation of a historical event. The foundation of this standard is the understanding that the design of the research influences the conclusion. In addition, the personal background, experiences, bias, and outlook of the historian impact the research strategy. The historical facts do not speak for themselves; a historian makes the facts speak by interpreting the facts. The context of this item is information about a book by the historian, Stephen Ambrose, who interviewed only the typically nameless soldiers, whose names appear more frequently on casualty lists than in history books. His resulting book tells the story of the D-Day invasion from the perspective of a soldier, but little or nothing about the thinking behind the detailed planning or the grand strategy.

For more information on the meanings and understandings in the above History benchmarks, please refer to the [History 9–12 Clarifications](#).

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**APPENDIX B:**  
**U.S. HISTORY SAMPLE COURSE OUTLINE**

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## **Appendix B**

### **U.S. History Sample Course Outline**

The 11<sup>th</sup> grade course in the Social Studies Recommended Curriculum has a broad chronological scope. Instruction in American history uses Delaware and the United States as a context. Since Civics, Geography, and Economics instruction is expected during this grade, the historical time frame in which instruction takes place must have a wide range. Opportunities to apply the understandings contained within the benchmark will arise from this timeframe.

**A student should know historical chronology in such a way as to be able to place people, laws, and events.** For example, from 1850 to 2000, there was a Civil War, Reconstruction in the South, the settlement of the West, the rise of industrialization and urbanization, a labor movement, imperialism, the rise of segregation, two world wars, a Cold War, the rise of the Third World, the end of colonialism, a Great Depression, a civil rights movement, a woman's movement, a war in Korea and Vietnam, increasing technological change, and globalization. Without knowing the exact years for an event, a student should still be able to place all these trends and events within the chronology, 1850 to 2000, in their approximate place. In other words, students should know the major events and their approximate time.

An organized mental framework of events, people, trends, and other historical phenomena is essential to understanding, evaluating, and constructing historical interpretations. Such a framework allows us to draw logical inferences concerning the continuing impact of the past on the present. Individual periods, regions, or events should not be studied in isolation but rather in comparison to one another. Nor should the broad sweep of events or an emphasis on leaders, great works, and pivotal events obscure the importance of seeking to understand the everyday life of ordinary people in other times and places.

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#### **Grade 9-12 Benchmarks Measured in U.S. History EOC Assessment**

<b>Civics 2a</b>	<b>Geography 3a</b>
<b>Civics 2b</b>	<b>History 1a</b>
<b>Economics 1a</b>	<b>History 2a</b>
<b>Economics 2a</b>	<b>History 2b</b>
<b>Geography 1a</b>	<b>History 3a</b>

### Essential Question

How can thinking like a historian help us draw credible conclusions?

#### Benchmarks

History 2ab, History 3a

#### Content

Civil War and Reconstruction

#### Model Unit Available

[History 2ab – Historical Research](#)

### Essential Question

How might where and when events occur affect the way people live?

#### Benchmarks

Economics 1a, Geography 1a

#### Content

Development of an Industrial and Urban Nation

### Essential Question

How can informed and active citizens help to create a well-governed society?

#### Benchmarks

Civics 2a, History 2b, Economics 2a, Geography 3a

#### Content

Immigration, Progressivism, Imperialism, Federal Reserve

#### Model Units in production

Geography 3a – Migration Patterns

History 2b – Analyzing Historical Data

### Essential Question

How can historical sources help us understand Americans and their experiences?

#### Benchmarks

Economics 2a, History 3a

#### Content

Great Depression, the New Deal, U.S. entry into World War II

### Essential Question

How might new experiences, ideas, and interactions change one's view of the world?

#### Benchmarks

History 1a, Civics 2b, Geography 3a

#### Content

Postwar United States, Cold War, and Containment, Expansion of Civil Liberties

### Essential Question

How have advances in technology affected our lives?

#### Benchmarks

Economics 1a, History 1a

#### Content

Contemporary United States, Information Age, Changing American Demographics, Globalization