

# High School Science and Technical Subjects Literacy in Grades 9-12

## Greetings High School Parents!

In Harford County Public Schools (HCPS), we are committed to ensuring that every child graduates having received an outstanding education. We know that you as parents are integral to this process and want you to know the role that the Maryland College and Career-Ready Standards (MCCRS) serve in the implementation of our curriculum.

## What does it mean to be College and Career-Ready in Science and Technical Subjects?

The Harford County Public Schools science curriculum integrates core principles from the disciplinary literacy standards of the MCCRS, which is comprised of a set of reading and writing expectations that sequentially prepare students to successfully gain admission to college and engage in the challenges of higher education and the workplace.

Because students must learn to read, write, speak, listen, and use language effectively in a variety of content areas, the standards promote the literacy skills and concepts required for college and career readiness in multiple disciplines.

Through the curriculum, the students will learn the critical content that they need to excel in the sciences. They will use their literacy skills to demonstrate that knowledge.



## What will lessons look like in the classroom?

Teachers are encouraged to create engaging and interactive lessons, integrating technology when appropriate. Our teachers provide the best environment for learning so that our children grow as learners and scientific thinkers but also gain the content and skills necessary to become productive members of our workforce and society.

## How can you support your child at home?

As you review this brochure, think about ways you can support your child's science learning and literacy at home. Over the course of child's high school career, he or she will need to take three science credits including one in biology required for graduation. We need your help as we implement our curriculum and hold students to the highest standards of academic performance. Through a strong partnership with you, we will ensure that your child is fully prepared for success in school, work, and life.

## Literacy in Science

The MCCRS literacy standards work in tandem with the specific content demands outlined in the Next Generation Science Standards (NGSS).

Reading in science requires that students:

- Appreciate the norms and conventions of the discipline of science.
- Understand the evidence used.
- Attend to precision and detail.
- Make and assess intricate arguments.
- Synthesize complex information and follow detailed procedures.
- Gain knowledge from elaborate diagrams and data that illustrate scientific concepts.

Writing and presenting requires that students:

- Assert and defend claims in science.
- Demonstrate what they know.
- Convey what they have experienced, imagined, thought, and learned.

*Appendix M - NGSS*

# A Sample of What Your Child May Learn in 9<sup>th</sup> and 10<sup>th</sup> Grades

## READING

### Key Ideas and Details

- Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

### Craft and Structure

- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9-10 texts and topics*.
- Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).
- Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.

### Integration of Knowledge and Ideas

- Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
- Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

### Range of Reading and Level of Text Complexity

- By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

## WRITING

### Text Types and Purposes

- Write arguments focused on *discipline-specific content* by including precise claims, distinguishing the claim(s) from alternate or opposing claims, and creating an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.
- Write informative/explanatory texts, including scientific procedures/ experiments, or technical processes. Develop a topic with well-chosen, relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

### Production and Distribution of Writing

- Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
- Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

### Research to Build and Present Knowledge

- Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
- Draw evidence from informational texts to support analysis, reflection, and research.

### Range of Writing

- Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

## A Sample of What Your Child May Learn in 11<sup>th</sup> and 12<sup>th</sup> Grades

### READING

#### Key Ideas and Details

- Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
- Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

#### Craft and Structure

- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11-12 texts and topics*.
- Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
- Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

#### Integration of Knowledge and Ideas

- Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
- Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

#### Range of Reading and Level of Text Complexity

- By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.

### WRITING

#### Text Types and Purposes

- Write arguments focused on *discipline-specific content*. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.
- Write informative/explanatory texts, including scientific procedures/ experiments, or technical processes. Develop a topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge.

#### Production and Distribution of Writing

- Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
- Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

#### Research to Build and Present Knowledge

- Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
- Draw evidence from informational texts to support analysis, reflection, and research.

#### Range of Writing:

- Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.



## Parent Checklist for Supporting Your High School Student in Science

- Have a positive attitude toward science.
- Set high expectations.
- Discuss the environmental issues.
- Find opportunities to discuss science topics in daily life. Look for news stories relevant to science.
- Live a life dedicated to preserving the world and environment. Be a good role model.
- Create quiet work spaces at home for studying for science assessments.
- Allow access to computers and other appropriate technology when doing research and creating data tables and reports.
- Allow your child to argue a viewpoint with relevant evidence related to a topic in science.
- Be supportive of innovative solutions to problems related to design, space, and engineering that may occur at home.
- Encourage enrollment in appropriate but challenging science courses.



### What science-related assessments or advanced courses might my child take during the 2014-15 school year?

Biology:	High School Assessment (Graduation Requirement)
AP Science Courses:	Biology, Chemistry, Physics
AP Mathematics: (Possible)	Algebra, Trigonometry, Precalculus
Additional Options:	Courses related to Science, Engineering, and Technology; Career and Technical Education



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