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Submitted to the District of Columbia Board of Education
RE: Global Education
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Thank you for the opportunity to testify before you today on the topic of Global Education and Environmental Literacy in the District of Columbia. My name is Jacklyn Shafir. I am an Environmental Educator and the Director of DC EnvironMentors and I am testifying here today as a member of the District of Columbia Environmental Education Consortium (DCEEC).

In June 2010 members of DCEEC, in coordination with DDOE, contacted stakeholders and called a meeting to form the Environmental Literacy Plan Working Group (ELPWG). The ELP Working Group, which meets monthly, has researched and identified best practices in the development of other states ELPs. This enabled us to begin to chart the best course for the development of the District's ELP. We identified key stakeholders that we hope will see it in their interest to participate in the creation of DC's ELP. We are currently in the process of developing a definition of 'Environmental Literacy' which varies state by state, and creating clear goals and procedures for the ELP. We hope that you will agree that we have made considerable progress in a short amount of time. That being said there is a lot to be done before DC has charted an Environmental Literacy Plan.

We feel that the Board of Education, as advisor to the State Superintendent of Education on matters of education and state standards, is one of the Key Stakeholders in the development of the ELP. As an Environmental Educator that has worked with hundreds of students within DC Public and Charter schools I have personally witnessed a lack of Environmental Literacy in students. Aside from the myriad of reasons to enhance environmental education, such as the climate change issues, alternative energy debates, and place based education which urban students lack, District and National Test scores have shown an extreme lacking in scientific skills in students and research has shown that hands-on dynamic approaches to science can be the most successful educational tools. Many of the current DCPS science and research academic standards as well as the National Core Standards can be met through environmental education projects, trips, and research. However environmental education is still seen as a tertiary subject in most schools, despite its ability to bridge academic subjects, provide hands on activities and examples, as well as create more concerned and educated student citizens.

With that goal in mind the ELP Working Group recommends:

1) Creating new Environmental Literacy standards across academic fields to existing or newly

adopted educational standards.

2) Create and implement additional High School Graduation standards that include Environmental Literacy components.

3) Leadership from the Board of Education on the ELP Working Group to bring attention to this issue and engage the necessary stakeholders. The ELP working group believes that the ultimate implementation of the plan will be more successful if all the stakeholders are involved in the creation of the plan.

We appreciate your time and look forward to moving forward together to ensure the successful development of the Environmental Literacy Plan for the benefit of all DC students.

District of Columbia Public School Standards Encompassed by EnvironMentality:

High School Environmental Science Scientific Investigation and Inquiry Standards 2010

ES.1.

1. Know the elements of scientific methodology (identification of a problem, hypothesis formulation and prediction, performance of experimental tests, analysis of data, falsification, developing conclusions, reporting results) and be able to use a sequence of those elements to solve a problem or test a hypothesis. Also, understand the limitations of any single scientific method (sequence of elements) in solving problems.

2. Know that scientists cannot always control all conditions to obtain evidence, and when they are unable to do so for ethical or practical reasons, they try to observe as wide a range of natural occurrences as possible so as to be able to discern patterns.

3. Recognize the cumulative nature of scientific evidence.

4. Recognize the use and limitations of models and theories as scientific representations of reality.

5. Distinguish between a conjecture (guess), a hypothesis, and a theory as these terms are used in science.

6. Plan and conduct scientific investigations to explore new phenomena, to check on previous results, to verify or falsify the prediction of a theory, and to use a crucial experiment to discriminate between competing theories.

7. Use hypotheses to choose what data to pay attention to and what additional data to seek, and to guide the interpretation of data.

8. Identify and communicate the sources of error (random and systematic) inherent in an experiment

9. Identify discrepant results and possible sources of error or uncontrolled conditions.

10. Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)

11. Formulate and revise explanations using logic and evidence.

12. Analyze situations and solve problems that require combining concepts from more than one topic area of science and applying these concepts.

13. Apply mathematical relationships involving proportionalities, linear relations, quadratic equations, simple trigonometric relationships, exponential growth and decay laws, and logarithmic relationships to scientific situations.

14. Recognize the implications of statistical variability in experiments, and explain the need for controls in experiments.

15. Observe natural phenomena, and analyze their location, sequence, or time intervals (e.g., relative ages of rocks, locations of planets over time, and succession of species in an ecosystem).

Core science principles from the DC Public Schools New Biology Standards, 2010:

1. Demonstrate knowledge of the elements of scientific methodology (identification of a problem, hypothesis formulation and prediction, performance of experimental tests, analysis of data, falsification, developing conclusions, reporting results) and be able to use a sequence of those elements to solve a problem or test a hypothesis. Also, understand the limitations of any single scientific method (sequence of elements) in solving problems.

2. Know that scientists cannot always control all conditions to obtain evidence, and when they are unable to do so for ethical or practical reasons, they try to observe as wide a range of natural occurrences as possible so as to be able to discern patterns.

3. Be able to recognize the cumulative nature of scientific evidence and recognize the use and limitations of models and theories as scientific representations of reality.

4. Be able to distinguish between a conjecture (guess), a hypothesis, and a theory as these terms are used in science.

5. Have the opportunity to plan and conduct scientific investigations to explore new phenomena, to check on previous results, to verify or falsify the prediction of a theory, and to use a crucial experiment to discriminate between competing theories.

6. Be able to use hypotheses to choose what data to pay attention to and what additional data to seek, and to guide the interpretation of the data.

7. Be able to identify and communicate the sources of error (random and systematic) inherent in an experiment and be able to identify discrepant results and possible sources of error or uncontrolled conditions.

8. Be able to select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate).

9. Be able to formulate and revise explanations using logic and evidence, analyze situations and solve problems that require combining concepts from more than one topic area of science within the domain being studied and apply these concepts.

10. Be able to apply mathematical relationships involving linear and quadratic equations, simple trigonometric relationships, exponential growth and decay laws, and logarithmic relationships to scientific situations within each domain as appropriate.

11. Have the opportunity to observe natural phenomena and analyze their location, sequence, or time intervals (e.g., relative ages of rocks and succession of species in an ecosystem).

12. Be able to explain that since discoveries can have both positive and negative implications, involve different decisions regarding ethics and allocation of resources (e.g., organ transplants, stem cell research, forest management, and land use).

13. Be able to recognize and deal with the implications of statistical variability in experiments, and explain the need for controls in experiments.

Biology Content Standards Addressed by studying Water Quality and Micro invertebrates:

B.1.2 Describe the structure and unique properties of water and its importance to living things.

B.2.3 Demonstrate and explain that cell membranes act as highly selective permeable barriers to penetration of substances by diffusion or active transport.

B.3.3 Demonstrate that most cells function best within a narrow range of temperature and pH; extreme changes usually harm cells by modifying the structure of their macromolecules and, therefore, some of their functions

B.17.2 Describe how factors in an ecosystem, such as the availability of energy, water, oxygen, and minerals, and the ability to recycle the residue of dead organic materials, cause fluctuations in population sizes.

B.17.3 Explore and explain how changes in population size have an impact on the ecological balance of a community and how to analyze the effects.

B.17.4 Describe how the physical or chemical environment may influence the rate, extent, and nature of the way organisms develop within ecosystems.

B.18.2 Explain that ecosystems tend to have cyclic fluctuations around a state of rough equilibrium, and change results from shifts in climate, natural causes, human activity, or when a new species or non-native species appears.

B. 19.1 Investigate and describe how point and nonpoint source pollution can affect the health of a bay's watershed and wetlands.

B.19.2 Assess the method for monitoring and safeguarding water quality, including local waterways such as the Anacostia and Potomac rivers, and know that microinvertibrates can be early warning signs of decreasing water quality.

Biology Content Standards Addressed by studying Plants and Air Quality:

B.2.3 Demonstrate and explain that cell membranes act as highly selective permeable barriers to penetration of substances by diffusion or active transport.

B.2.5 Describe that all growth and development of organisms is a consequence of an increase in cell number, size, and/or products.

B.3.6 Explain the photosynthesis process: Plants make simple sugars and other molecules in their leaves, and chlorophyll found in the leaves can make the food and nutrients that the plant can use from carbon dioxide, water, nutrients, and energy from sunlight.

B.4.2 Observe and describe that within the cell are specialized parts for the transport of materials, energy capture and release, waste disposal, and motion of the whole cell or its parts.

B.17.4 Describe how the physical or chemical environment may influence the rate, extent, and nature of the way organisms develop within ecosystems.

B.12.1 Describe the structure and function of roots, leaves, flowers, and stems of plants.

B.12.3 Explain that during the process of photosynthesis, plants release oxygen into the air.

B.12.4 Recognize that plants have a greater problem with "unpredictable environments" because they cannot seek shelter as many animals can.

B. 13.2 Identify the roles of plants in the ecosystem: Plants make food and oxygen, provide habitats for animals, make and preserve soil, and provide thousands of useful products for people (e.g., energy, medicines, paper, resins).

B.16.1 Using ecological studies, explain distinct relationships and differences between urban environments and other environmental systems.

B.17.4 Describe how the physical or chemical environment may influence the rate, extent, and nature of the way organisms develop within ecosystems.

Biology Standards Addressed by studying the Environmental Impacts on Health:

B.2.3 Demonstrate and explain that cell membranes act as highly selective permeable barriers to penetration of substances by diffusion or active transport.

B.3.4 Explain that complex interactions among the different kinds of molecules in the cell cause distinct cycles of activities, such as growth and division.

B.6.3 Explain how the actions of genes, patterns of inheritance, and the reproduction of cells and organisms account for the continuity of life.

B.7.2 Explain how hereditary information is passed from parents to offspring in the form of "genes," which are long stretches of DNA consisting of sequences of nucleotides. Explain that in eukaryotes, the genes are contained in chromosomes, which are bodies made up of DNA and various proteins.

B.15.4 Investigate and cite specific examples of how the mammalian immune system is designed to protect against microscopic organisms and foreign (or nonself) substances from outside the body and against some aberrant (e.g., cancer) cells that arise within.

Reading Standards for Literacy in History/Social Studies 6–12

RH

The standards below begin at grade 6; standards for K–5 reading in history/social studies, science, and technical subjects are integrated into the K–5 Reading standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
1. Cite specific textual evidence to support analysis of primary and secondary sources.	1. Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.	1. Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.
2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.	2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.	2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.
3. Identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).	3. Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.	3. Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.	4. Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social studies.	4. Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines *faction* in *Federalist* No. 10).
5. Describe how a text presents information (e.g., sequentially, comparatively, causally).	5. Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.	5. Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.
6. Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).	6. Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.	6. Evaluate authors' differing points of view on the same historical event or issue by assessing the authors' claims, reasoning, and evidence.
Integration of Knowledge and Ideas		
7. Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.	7. Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.	7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
8. Distinguish among fact, opinion, and reasoned judgment in a text.	8. Assess the extent to which the reasoning and evidence in a text support the author's claims.	8. Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.
9. Analyze the relationship between a primary and secondary source on the same topic.	9. Compare and contrast treatments of the same topic in several primary and secondary sources.	9. Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.
Range of Reading and Level of Text Complexity		
10. By the end of grade 8, read and comprehend history/social studies texts in the grades 6–8 text complexity band independently and proficiently.	10. By the end of grade 10, read and comprehend history/social studies texts in the grades 9–10 text complexity band independently and proficiently.	10. By the end of grade 12, read and comprehend history/social studies texts in the grades 11–CCR text complexity band independently and proficiently.

Reading Standards for Literacy in Science and Technical Subjects 6–12

RST

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
1. Cite specific textual evidence to support analysis of science and technical texts.	1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.	1. 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.
2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.	2. 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.	2. 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.
3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	3. 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.	3. 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		
4. 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 6–8 texts and topics*.	4. 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*.	4. 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*.
5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.	5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).	5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	6. 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.	6. 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		
7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	7. 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.	7. 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.
8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	8. 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.	8. 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.
9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	9. 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.	9. 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		
10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.	10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.	10. By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.