Planning Document

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| Title | Water quality  |
| Author | Eva Gapulan & Bo Lang & Victoria Mathew |
| School, District | Baltimore Polytechnic Institute |
| Audience (grade, course) |  9th and 12th graders |

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| **Curriculum Anchor** | **Notes** |
| Defining the Learning Objectives and Curriculum ConnectionCurriculum indicators, performance expectations, and/or learning objectives.* LS2A- Interdependent relationships in Ecosystems
* LS2 C- Ecosystem Dynamics, Functioning and resilience
* LS4 D- Biodiversity & Humans
* ESS3 C- Human impacts on earth Systems

College, Carrier and Civic readiness standards for social Studies ( C3)* Dimension 2: applying disciplinary Concepts & Tools :Civics
* Dimension 2: Applying Disciplinary Concepts & Tools :Geography

Students will be able to apply knowledge to solve problems related to wildlife conservation and management. Students will have a greater knowledge of how wildlife conservation and management relates to the economy and environment, both currently and in the future.Students will understand the general principles of ecology as how they related to terrestrial and/or aquatic plant and animal conservation and management.  |  |
| Describing the Local ContextThe issue that will serve as the context for learning.Chesapeake Bay is the largest estuary in the United States. Unfortunately, the health of the Chesapeake Bay is in critical condition due to human activities. These include polluted stormwater runoff, over fertilization, pollutants from industrialization, trash, and wetland destruction from agricultural, urban, and suburban development. Students will be investigating how their institution (Baltimore Polytechnic Institute) contribute to the health and management of the Chesapeake Bay. The student-led activities will take place at Jones Falls, which dumps into the Patapsco River which eventually lead to the Chesapeake Bay.  |  |
| Identifying the Driving QuestionA broad, open-ended, life-relevant question that is based on the standards/learning objectives. Guides inquiry for the investigation(s) and prompts the development of actionable claims.How does Baltimore Polytechnic Institute impact the Chesapeake Bay? | Click or tap here to enter text. |

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| **Issue Investigation** | **Notes** |
| Asking Questions, Defining Issues and ProblemsStudents define the issue, problem, or phenomenon to be investigated and develop questions that are relevant for investigation. Supporting questions:1. What student/teacher practices contribute to the amount of garbage produced at BPI?
2. What chemicals run-offs from Poly end up at the Jones Falls?
3. How much garbage does BPI produce on a monthly basis?

What can BPI do to help improve the health of Chesapeake Bay?  | Click or tap here to enter text. |
| Planning and Conducting Investigations* Students develop plans for collecting, analyzing, and communicating information and/or data to help them answer their questions and understand the problem. Students identify and justify appropriate sources of information and/or data, and determine methodologies for the collection of information and/or data. Students will go around the school campus and evaluate the school yard quality using the School yard report card questionnaire. Students will also collect & examine water sample from Jones falls, Inner Harbor, domestic water etc. & compare the water quality based on the micro and macroinvertebrate population and ecosystem dynamics. Students should be able to generate questions about how humans impact the water quality of these ecosystems and specifically identify ways by which the school, as a community impacts the Chesapeake Bay.
* Students will read the current State of the Bay Report in order to identify human impact and the importance of saving the bay.
1. Students will be immersed in various field trips that involves data collection and & use of technology to determine water quality.
* School Yard Evaluation – Students will go around Poly collecting data on the school’s green practices.
* Jones Falls Water Quality Investigations – Students will conduct macroinvertebrate count monitoring to determine the water quality. They will also conduct the watershed condition investigation to rate the water quality. Lastly, students will conduct dissolved oxygen test, pH test, conductivity and salinity test, turbidity test, nitrate test, and phosphate test to rate the health of the stream’s ecosystem. Their results will be compared to literature values.
* Kayaking, Canoe & Scoop Activity – Civil service activity - students will collect trash at Masonville Cove, which feeds to the Chesapeake Bay.
* Living Classrooms Masonville Cove Education Center – Conduct dissolved oxygen test, pH test, conductivity and salinity test, turbidity test, nitrate test, and phosphate test to rate helath of the Cove’s ecosystem. Their results will be compared to literature values. Students will also partake in hands-on lessons prepared by the Masonville Cove Education Center like a nature hike while identifying bird and plant species, a tour of Captain Trashwheel, etc.
* Field trip to the water treatment facility and water treatment plant – Students will go on a guided tour around the water treatment facility and water treatment plant. They will also get to participate in hands-on lab work that treatment facility/plant scientists perform on a daily basis.
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| Analyzing and Interpreting Data Students present and share information and/or data to reveal patterns that indicate relationships. Students apply disciplinary concepts as they analyze and interpret information and/or data to make sense of the issue, problem, or phenomenon.* School Yard Evaluation- this experience will allow students to realize the effect of run-offs and improper waste disposal to Jones falls that will eventually reach the Chesapeake Bay.
* Jones Falls Water Quality Investigations- allows students to explore biodiversity and ecosystem dynamics. They will also investigate the importance of a balanced ecosystem.
* Kayaking, Canoe & Scoop Activity- Allows students to realize how much garbage reaches the Chesapeake bay.
* Living Classrooms Masonville Cove Education Center-Investigate biodiversity, ecosystem dynamics of Micro and macroinvertebrates between the Bay & Jones falls
* Field Trips to Water Treatment facility & Water Treatment plant- make connection between the water cycle & human use/impact
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| Constructing, Communicating, and Refining ExplanationsStudents identify, synthesize, and apply evidence from their investigations (for example, measurements, observations, and patterns) to draw conclusions about the driving question.* School Yard Evaluation- this experience will allow students to make correlations between human impact and the health of the Chesapeake Bay: increase in trash and pollutant generated by students and teachers results in worse state of the Chesapeake Bay.
* Jones Falls Water Quality Investigations- students will draw the relationship between the quality of the water and biodiversity in streams: poor water quality may result in poor biodiversity of macroinvertebrate life in the water.
* Kayaking, Canoe & Scoop Activity- students will understand that trash that is not properly disposed may all end up in the Chesapeake Bay and harm wildlife.
* Living Classrooms Masonville Cove Education Center- students will draw the relationship between the quality of the water and biodiversity in streams: poor water quality may result in poor biodiversity of macroinvertebrate life in the water.
* Field Trips to Water Treatment facility & Water Treatment plant- Understand the importance of conserving water

All these activities are designed to guide students to realize that individual’s activities impact the health of the bay. Every action and effort counts.  | Click or tap here to enter text. |

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| **Stewardship and Civic Action** | **Notes** |
| Developing a Claim and Identifying Solutions Students develop a claim based on conclusions drawn in the Issue Investigation. The claim should reflect a problem, challenge, or opportunity that warrants informed action. Students identify and explore solutions to address the problem, challenge, or opportunity reflected in their claim.Students will work in teams to come up with proposals on how to improve Poly’s impact on the bay. We imagine that students will identify reducing plastic pollution in the school since it is so prevalent. Students will then select the best & most realistic proposal for implementation. | Click or tap here to enter text. |
| Designing a Plan and Taking Informed Action Students design a plan for implementing solutions through informed action in their classrooms, schools, and/or communities. The plans should include criteria for determining the extent to which the action successfully addresses the problem, challenge, or opportunity reflected in the claim. Students implement their plans. Student will generate solutions how to manage & reduce plastic pollution in the campus & nearby community to improve the health of the watershed and the Chesapeake Bay.Each class will spend the rest of the year carrying out the action their respective action projects.( Student- Directed Potential Action Project)Students will raise Environmental Literacy on the Poly Campus and in the community by:* Making Posters to raise Environmental Literacy Awareness by identifying correct ways to recycle
* Posting these posters in strategic places on campus & around the community
* Strengthening Recycling awareness by segregating biodegradable from non- biodegradable waste.
* Advocate in reducing plastic pollution through self- discipline.
* Students will collect & weigh plastic wastes around the campus on a weekly basis.
* Composting biodegradable waste materials
* Encourage energy usage reduction
* Encourage teachers to use google classroom instead of traditional teaching method to reduce paper consumption
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| Evaluating Action Students reflect on the action and determine the extent to which it successfully addresses the problem, challenge, or opportunity reflected in the claim. Students share proposals for sustaining or extending the action.* The teachers will build into the curriculum bi-weekly checkpoints where the students will conduct a periodic progress evaluation of the class action project.
* Regular Schoolwide information dissemination and environmental awareness drive ( during weekly morning announcement)
* Regular collaboration with the Recycling Club, environmental Club, student Body government and the Arctic Club.
* Students presentation & recommendation during staff meetings
* Collection of plastics around the campus though out the year ( compare amount of plastic collected from the beginning and end of the project
* Students will conduct a periodic report of the status of their action proposals during morning announcements
* Students create video PSA’s and post on the school website
* Periodic visitation and replacement of worn out posters
* Segregation of trash and recycling waste at home
* Students implement proper waste disposal on campus and even in their own neighborhood
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