COURSE SYLLABUS

COURSE NAME AP ENVIRONMENTAL SCIENCE

SEMESTER/QUARTER AND YEAR
2017-18 school year

INSTRUCTOR & EMAIL:	Mark Fontaine mfontaine@ccri.edu
ROOM:	200
OFFICE HOURS:	As needed

COURSE DESCRIPTION/OVERVIEW:

This course will examine themes in the relationship between varieties of organisms (including human beings) and the environment. These themes will include, but are not limited to, Earth Systems and resources, the Living World, Populations, Land and Water use, Energy resources and consumption, Pollution, and Global Change. Students will study environmental science, ecology, geology, plant and animal adaptations in different habitats, as well as focus on the ecology of New England coastal environments. Additional topics will include competition, predation, species diversity, niches, disturbance succession, biome characteristics, pollution, and conservation. Students will also learn quantitative and qualitative methods of data collection and analysis, field techniques, and conduct an in-depth independent science fair research project.

Concept mastery, rather than memorization is encouraged. Students are taught to isolate important facts and organize them, form hypotheses based on these facts, test alternatives, and draw conclusions. Additionally, students will be taught to glean relevant environmental impact information from scholarly sources, form a personal opinion about the environmental issues, debate their position with their classmates and develop an action plan to address the issue. The work done in the laboratory and in the field plays an important role in supporting this method of learning. Labs and field research will occur frequently and take two distinct forms. Many labs will take place within one or two class periods and focus on data manipulation and skill development. Other laboratory/field research will involve daylong immersions in different environmental settings for the observation of the living world and the acquisition of data for analysis back in the lab (students will be involved in these extended activities for 8-10 hours each). Additionally, students will maintain an on-going quadrat study of their immediate environment throughout the year. The multi-faceted approach to the lab component of this course ensures that the lab activities will average at least one class period per week. Lab reports are typed and turned in after completion of the lab; Field notebooks will be kept on all research; and students will complete an Environmental analysis paper of their quadrat study at the end of the year.

GOALS:

By the end of the course, students will be able to:

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1. describe the role of environmental science in understanding the interrelationships between man and the environment
2. explain the role of values and ethics in the creation of environmental policy
3. debate the cost benefit analysis of various human activities and the impact of those activities on the environment
4. create an outline of the correlation between advances in human history and the development of local, national, and international environmental public policy
5. explain the relationship between environmental chemistry and the energy of life
6. defend the theory of evolution with relevant data and describe the necessity of biodiversity
7. provide real-world examples of the benefits and risks of species interaction
8. teach their peers about one of the major biomes that exist around the planet
9. illustrate and describe the major biochemical cycles that influence ecosystems
10. describe the cause and effect of the increase in human population
11. develop a plan to help address the concerns regarding soil conservation and the ever-increasing agricultural demands of the human populations
12. explain the risks of ever-expanding cities and suggest possible remedies
13. perform air, soil, and water tests to evaluate the health of their environments and suggest ways for improvement
14. describe threats to the earth's air, soil, and water and develop strategies to improve the current situation
15. defend their position on the issue of global warming
16. perform a cost-benefit analysis of the use of fossil fuels and alternative energy sources
17. describe the challenges faced by waste management professionals and the role of public opinion in the resolution of those challenges
18. describe the unique characteristics of Narragansett Bay
19. illustrate and describe the geology, flora, and fauna of Block Island and Beavertail
20. identify the major types of whales indigenous to New England waters

COMMON CORE STANDARDS OVERVIEW:

Key Ideas and Details

- CCSS.ELA-Literacy.RST.11-12.1 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.
- CCSS.ELA-Literacy.RST.11-12.2 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.
- CCSS.ELA-Literacy.RST.11-12.3 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

- CCSS.ELA-Literacy.RST.11-12.4 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.
- CCSS.ELA-Literacy.RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
- CCSS.ELA-Literacy.RST.11-12.6 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.

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Integration of Knowledge and Ideas

- CCSS.ELA-Literacy.RST.11-12.7 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.
- CCSS.ELA-Literacy.RST.11-12.8 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.
- CCSS.ELA-Literacy.RST.11-12.9 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

- CCSS.ELA-Literacy.RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently.

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Key Ideas and Details

- CCSS.ELA-Literacy.RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.
- CCSS.ELA-Literacy.RH.9-10.2 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.
- CCSS.ELA-Literacy.RH.9-10.3 Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

Craft and Structure

- CCSS.ELA-Literacy.RH.9-10.4 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 science.
- CCSS.ELA-Literacy.RH.9-10.5 Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.
- CCSS.ELA-Literacy.RH.9-10.6 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.

Integration of Knowledge and Ideas

- CCSS.ELA-Literacy.RH.9-10.7 Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.
- CCSS.ELA-Literacy.RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims.
- CCSS.ELA-Literacy.RH.9-10.9 Compare and contrast treatments of the same topic in several primary and secondary sources.

Range of Reading and Level of Text Complexity

- CCSS.ELA-Literacy.RH.9-10.10 By the end of grade 10, read and comprehend history/social studies texts in the grades 9–10 text complexity band independently and proficiently.

CLASSROOM RULES/PROCEDURES:

RULES FOR DR. FONTAINE'S STUDENTS

1. All students will be in their seats and ready to begin when the bell rings. Each minute after the bell, without a legitimate pass, will result in the student being assigned two minutes of detention for every minute he or she is late. Detention will be served on the day of the lateness. Time will be rounded up to the next whole minute.

2. All students will bring all necessary materials to class and be prepared to participate fully in every class.

3. All homework will be due on the assigned due date. No credit will be awarded for late assignments.

4. All work missed due to a legitimate absence must be made up within 5 school days of the students returning to school. Extended absences will be dealt with on a case-by-case basis

5. Students will only be allowed to leave the classroom five times per semester unless there is an emergency. Students should utilize passing times to attend to personal needs.

6. Any student that does not understand something should ask for clarification immediately.

7. Any student that feels he or she needs extra help should talk to Dr. Fontaine immediately and arrange to get whatever extra support is needed.

8. The use of any type of electronic devices, except a calculator, will result in the immediate confiscation of the device, which will be turned over to an administrator. Repeated offences will require a parent conference.

RULES FOR DR. FONTAINE

1. Dr. Fontaine will be prepared to begin class when the bell rings.

2. Dr. Fontaine will return all assignments (except extra credit work) within three school days of receiving them.

3. Dr Fontaine will post grades to Edline frequently and punctually.

4. There will be a review prior to all tests and quizzes.

RULES FOR PARENTS

1. Parents should encourage their children to do their best and to seek help from Dr. Fontaine when needed.

2. Parents should help their children in putting together articles.

3. Parents should contact Dr. Fontaine as soon as they have any questions or concerns about their child. The best way to contact Dr. Fontaine is by calling TIMES^2. Dr. Fontaine can also be reached by e-mail at mfontaine@ccri.edu

THIS LIST IS REQUIRED TO BE SIGNED BY DR. FONTAINE, THE STUDENT, AND A PARENT OR GUARDIAN BY TBD. THIS LIST SHOULD BE LEFT IN THE STUDENT'S NOTEBOOK OR FOLDER.

THE EDUCATIONAL EXPERIENCE WORKS BEST WHEN PARENTS, STUDENTS, AND TEACHERS WORK TOGETHER TOWARD A SUCCESSFUL OUTCOME FOR THE STUDENT.

GRADING POLICY:

1. Each assignment is given a point value based on the amount of student effort needed to complete the task. For example:
    a. short in-class assignments where students can use their notes are worth 5 points
    b. homework assignments are worth 5-15 points
    c. labs are worth 15-20 points
    d. tests are worth 20-30 points
2. The point value of each assignment will be announced when the assignment is given.
3. If a student is absent, he or she will have 5 school days to make up any missed work. It is the student's responsibility to inquire about what was missed.
4. The student's average will be calculated as a percentage of the total points possible. For example:

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	Points earned	Points possible
Class assignment	5	5
Homework	8	10
Class assignments	4	5
Lab	13	15
Test	23	25

Student's average: 53/60 x 100% = 88%

COURSE CALENDAR:

DATE (Weekly)	TOPIC(S)	ASSIGNMENT(S)	ASSIGNMENT(S) DUE DATE
TBD	1. utilize the vocabulary of the unit 2. identify natural resources 3. describe the various disciplines that can be applied to Environmental Science 4. explain how the scientific method would be used to solve a problem 5. describe the risks to sustainability of the current rate of growth of the human population 6. interpret a graphical representation of population data 7. develop informed opinions about various environmental issues and debate those positions with classmates	Assignments vary with the needs of the class as a whole and individual students	TBD
TBD	1. utilize the vocabulary of the unit 2. describe the role of culture in everyday choices 3. explain how changing worldviews have influenced humans' regard for the environment 4. differentiate between classical and neoclassical economic theory 5. compare and contrast the	Assignments vary with the needs of the class as a whole and individual students	TBD

	concepts of economic growth, health, and sustainability 6. interpret a graphical representation of GDP vs. GPI data 7. develop informed opinions about various environmental issues and debate those positions with classmates		
TBD	1. utilize the vocabulary of the unit 2. explain why societies create environmental policies 3. differentiate between the motivating factors behind the environmental policies of developed and developing societies 4. describe the institutions responsible for US environmental policy 5. explain the motivations for US environmental policies in an historic context 6. explain the motivations for International environmental policies in an historic context 7. describe the method of reconciliation for international environmental issues 8. interpret a graphical representation of emission data 9. develop informed opinions about various environmental issues and debate those positions with classmates	Assignments vary with the needs of the class as a whole and individual students	TBD
TBD	1. utilize the vocabulary of the unit 2. describe the anatomy of an atom 3. identify and describe the function of the biomolecules essential to life	Assignments vary with the needs of the class as a whole and individual students	TBD

	4. illustrate and describe the processes of photosynthesis, chemosynthesis, and respiration and explain their importance to an ecosystem 5. describe the significance of the fact that water is a liquid at average earth temperatures was essential to the formation of life on the planet 6. explain the hierarchal organization of life 7. describe the changes that the Earth's Systems have experienced during the Earth's existence 8. interpret a graphical representation of phytoremediation data		
TBD	1. utilize the vocabulary of the unit 2. defend the theory of evolution using available evidence 3. differentiate between natural and artificial selection 4. describe the causes of the major extinction events that have occurred in the earth's history 5. create various growth curves based on environmental conditions 6. predict future growth patterns and suggest ways to meet the needs of future populations 7. create action plans to mitigate the loss of biodiversity on the planet 8. interpret a graphical representation of survivorship data 9. develop informed opinions about various environmental issues and debate those	Assignments vary with the needs of the class as a whole and individual students	TBD

	positions with classmates		
TBD	1. utilize the vocabulary of the unit 2. compare and contrast different types of environmental systems 3. differentiate between biotic and abiotic components of environmental systems 4. illustrate and describe the various nutrient cycles 5. differentiate between the origin, transformation, and destruction of different categories of rocks 6. explain the plate tectonic theory of terrestrial changes throughout the earth's history 7. conduct soil quality analysis and devise strategies for remediation of pollution 8. interpret a graphical representation of carbon reservoir data 9. develop informed opinions about various environmental issues and debate those positions with classmates	Assignments vary with the needs of the class as a whole and individual students	TBD
TBD	1. create a timeline of the increase in human population 2. differentiate between developed and 3rd. world countries' opinions regarding children 3. describe global demographic shifts 4. explain the benefits and risks of population growth and develop plans to address the concerns of a growing population 5. explain the effect of the HIV pandemic on world population and theorize how the pandemic could have	Assignments vary with the needs of the class as a whole and individual students	TBD

	been avoided and what should be done now 6. interpret a graphical representation of demographic data 7. develop informed opinions about various environmental issues and debate those positions with classmates		
TBD	1. explain the interrelationship between agriculture and soil 2. create a timeline showing the major events in the history of agriculture 3. create an action plan to prevent soil erosion and degradation 4. describe the need cost / benefit relationship regarding soil conservation 5. explain the challenges of feeding an ever-increasing population 6. describe the process of genetically modifying food 7. debate the risk-benefit analysis of genetically modified food 8. compare and contrast feedlot and grass fed agricultural production 9. define aquaculture and describe the potential benefits and risks involved in aquaculture 10. develop informed opinions about various environmental issues and debate those positions with classmates	Assignments vary with the needs of the class as a whole and individual students	TBD
TBD	1. utilize the vocabulary of the unit 2. describe the biodiversity that exists on the planet 3. explain the causes of the mass extinctions that have occurred in the earth's	Assignments vary with the needs of the class as a whole and individual students	TBD

	history 4. identify the causes of the loss of biodiversity and suggest solutions to solve the problem 5. differentiate between traditional and innovative conservation practices 6. interpret a graphical representation of agricultural effect data 7. develop informed opinions about various environmental issues and debate those positions with classmates		
TBD	1. utilize the vocabulary of the unit 2. identify the challenges and goals of resource management 3. explain the roles of forests both economically and ecologically 4. create a timeline of deforestation in the U.S. 5. describe the roles of the various land management agencies in the U.S. 6. differentiate between various classifications of protected lands and explain the economic and ecological advantages and disadvantages of each 7. interpret a graphical representation of paper demand data 8. develop informed opinions about various environmental issues and debate those positions with classmates	Assignments vary with the needs of the class as a whole and individual students	TBD
TBD	1. utilize the vocabulary of the unit 2. create a timeline of the growth of cities in the U.S. and Europe	Assignments vary with the needs of the class as a whole and individual	TBD

	3. describe the challenges of meeting the demands of ever-growing cities 4. evaluate the availability and utilization of mass transit and devise solutions to ease congestion in the city 5. explain the cost-benefit analysis of urban parks 6. describe advances designed to improve the sustainability of cities 7. interpret a graphical representation of carbon emission data 8. develop informed opinions about various environmental issues and debate those positions with classmates	students	
TBD	1. utilize the vocabulary of the unit 2. describe the major environmental health hazards 3. create an action plan to remediate the health risks 4. differentiate between environmental toxins and pathogens 5. explain the consequences of environmental toxins and pathogens 6. explain the economic and political challenges to cleaning up toxins and pathogens 7. describe the process of risk management 8. compare the ideologies of different countries regarding environmental risk management 9. describe the process of rectifying international disputes regarding environmental toxins and pathogens	Assignments vary with the needs of the class as a whole and individual students	TBD

	10. interpret a graphical representation of risk management data 11. develop informed opinions about various environmental issues and debate those positions with classmates		
TBD	1. utilize the vocabulary of the unit 2. illustrate and describe the water cycle 3. describe the location and risks to the earth's freshwater supply 4. develop action plans to ease the freshwater supply challenges that exist in the world 5. devise solutions to freshwater pollution 6. differentiate between different types of wastewater treatment 7. interpret a graphical representation of water consumption data 8. develop informed opinions about various environmental issues and debate those positions with classmates	Assignments vary with the needs of the class as a whole and individual students	TBD
TBD	1. utilize the vocabulary of the unit 2. illustrate and describe the marine system 3. describe the location and risks to the earth's marine ecosystems 4. develop action plans to ease the marine challenges that exist in the world 5. devise solutions to marine pollution 6. describe the current state of the world's fisheries and propose solutions to alleviate the declining populations	Assignments vary with the needs of the class as a whole and individual students	TBD

	7. interpret a graphical representation of fishing mortality data 8. develop informed opinions about various environmental issues and debate those positions with classmates		
TBD	1. utilize the vocabulary of the unit 2. illustrate and describe the structure of the atmosphere 3. create a timeline showing the history of climate change on the planet 4. describe the location and risks of air pollution 5. develop action plans to ease the air quality challenges that exist in the world 6. differentiate between indoor and outdoor air pollution 7. explain the cause, effect, and methods of remediation of acid rain 8. interpret a graphical representation of air quality data 9. develop informed opinions about global warming and debate those positions with classmates	Assignments vary with the needs of the class as a whole and individual students	TBD
TBD	1. utilize the vocabulary of the unit 2. describe the origin of fossil fuels 3. differentiate between extraction methodologies for fossil fuels 4. describe the social and political realities of the fossil fuel industry 5. describe the processes of conventional alternative fuels 6. conduct a cost-benefit analysis of conventional alternatives to fossil fuel	Assignments vary with the needs of the class as a whole and individual students	TBD

	7. describe the processes of newer alternative fuels 8. conduct a cost-benefit analysis of newer alternatives to fossil fuel 9. interpret a graphical representation of energy data 10. develop informed opinions about various environmental issues and debate those positions with classmates		
TBD	1. utilize the vocabulary of the unit 2. differentiate between the types of waste produced by humans 3. create a timeline of waste management strategies 4. describe the scope of the waste management issues faced by humanity 5. describe conventional waste management techniques 6. create an action plan to reduce the amount of waste entering landfills 7. explain the particular challenges presented by hazardous waste management 8. explain modern approaches to waste management 9. interpret a graphical representation of waste production data 10. develop informed opinions about various environmental issues and debate those positions with classmates	Assignments vary with the needs of the class as a whole and individual students	TBD
TBD	1. utilize the vocabulary of the unit 2. create a timeline describing the rise of the sustainability movement 3. create a campaign to	Assignments vary with the needs of the class as a whole and individual students	TBD

	promote the sustainability argument 4. describe the compatibility between environmental and economic progress 5. predict the future environmental health of the planet is sustainability is adopted and if it is not adopted 6. interpret a graphical representation of human impact data 7. develop informed opinions about various environmental issues and debate those positions with classmates		
TBD	1. describe the process that formed Narragansett bay 2. conduct water quality assessments of both marine and freshwater parts of the bay 3. collect and identify various flora and fauna indigenous to the bay 4. identify and preserve various seaweeds indigenous to the bay 5. explain the geologic history of the formation of Jamestown and Block island and support their argument with evidence observed and collected from field sites 6. identify various whales cited on a whale watch and describe the behaviors observed	Assignments vary with the needs of the class as a whole and individual students	TBD
TBD	1. perform a long-term (multiple quarters) scientific investigation. (experiment, ecological study, engineering investigation) 2. analyze current articles in the popular press dealing with	Assignments vary with the needs of the class as a whole and individual students	TBD

	science and defend their opinion about the article 3. perform a detailed quadrat study of their backyard including biotic and abiotic data throughout the school year		