Title: Identifying and acting to mitigate and environmental problem.

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Abstract:

Students identify an environmental problem of personal concern, research the topic, plan an action to help resolve/mitigate the problem, carry it out, write it up, and present it.

Subject, Grade, Level:

Environmental Science, Honors (grades 11 & 12)

Learning objectives:

- Identify an environmental problem.
- Research the problem.
- Design a strategy to mitigate or resolve the problem.
- Carry out the strategy and monitor the results.
- Write a paper outlining the problem and summarizing the actions and results taken.
- Present the paper/share the work.
- Overarching Goals
    - Students will make connections between what we are learning in class and their project, thereby increasing engagement.
    - Juniors will develop experience in working on a semester-long project, thus helping them prepare for their senior projects. It may also stem ideas for senior project topic selection.
    - Students will have an accomplishment to share in application letters and interviews.
- The following standards might relate to this lesson. The standards addressed will be project/student dependent.
    - SC.912.L.17.8: Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
    - SS.912.G.5.4: Analyze case studies of how humans impact the diversity and productivity of ecosystems.

- SC.912.L.17.11: Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
- SC.912.L.17.12: Discuss the political, social, and environmental consequences of sustainable use of land.
- SC.912.L.17.14: Assess the need for adequate waste management strategies.
- SC.912.L.17.16: Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
- SC.912.L.17.20: **Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.**
- SS.912.G.5.2: Analyze case studies of how changes in the physical environment of a place can increase or diminish its capacity to support human activity.
- SC.912.L.17.13: Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
- SC.912.N.4.2: Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
- SC.912.L.17.18: Describe how human population size and resource use relate to environmental quality.
- HE.912.C.1.3: Evaluate how environment and personal health are interrelated.

Timeframe:

- This project will take place over the course of the semester. The estimated time is 500 minutes for writing. This does not include student time to be spent out of class working on their project.

List of materials:

- Computer with internet access
- Each student will be working on a different project. Students will be responsible for materials not readily available in the classroom.

Procedure and general instructions (for instructor).

1. Big Picture
    a. Each student will select a project topic.
    b. Students will work on it throughout the semester.

c. Peer and teacher feedback will be provided on the written portions along the way.
d. The project will be presented during the semester exam period. The paper and presentation will count as their semester exam.
e. Students may need to use time spent out of class to carry out their solution.

2. Details for the paper the students will submit:
    a. Students, you will need to make an original contribution. Make sure it is clear what your original contribution is.
    b. Preface: Why it is important to you?
    c. Research your topic and take notes, making sure you keep track of your references.
    d. Introduction:
        i. Give your audience the background they need to understand your project.
        ii. Identify the problem you will solve.
        iii. Briefly state what you will do for your project.
    e. Action (Materials and Methods)
        i. Gather information on the current state of what you are studying.
        ii. Plan and carry out your action
        iii. Gather information on what the outcome of your action was
    f. Data analysis [There is flexibility wrt to the type of data us use. You may use pre-existing data and analyse it in a novel way. Clear this through the teacher.]
    g. Discussion and Conclusion
        i. Outcome
        ii. Complications
        iii. Next steps

3. Presentation: This will be project dependent. The following are possibilities. The selection must be approved by the teacher.
    a. Power Point
    b. Ecotour
    c. Poster
    d. Video