Ecology Project

Purpose: Today in Ecology there are many problems to be solved and questions to be answered. At times the best way to find solutions is to first look back and learn from the past, plus increase our understanding of basic concepts related to these topics. The projects described are designed to help each of you along this path of opportunity.

Process: Identify which question, problem, or topic you want to learn about. Research this using books and/or videos from the library, plus using information available through reliable Internet sources. Document your source of information and what information you got from that source.

Product: There are 3 parts to this project.

The first part is creating a Power Point or Keynote presentation to teach your classmates about your project area. The maximum time for the presentation is dependent on the number of students doing the work. For a 1-person project the maximum time is 5 minutes, for a 2-person project it is 7 minutes, and for a 3-person project it is 9 minutes.

The second part is creating a set of typed guided notes for your classmates to use and fill in as they follow your presentation. These notes must be a maximum of one side of an 8 ½" X 11" piece of paper.

The third part is to create a binder cover that reflects your topic. If you are working with 1 or 2 partners, all partners can have the same binder cover.

Scoring: The binder cover is worth 5 points; typed guided notes worth 5 points; a document containing sources used and the info from those sources (this can be handwritten) worth 5 points per person; Power Point/Keynote quality and class presentation is worth 25 points for 1-person projects, 30 points for 2-person projects, and 35 points for 3-person projects. The higher point totals are because there is more work to be done by groups and a higher level of expectation.

Presentations will begin on May 29th and the computer file containing the presentation must be submitted to the teacher "Hand In" location on their First Class Conference site by May 25th. In addition, presenters must submit their guided notes, for their classmates, at the same time, along with an answer key.

Note: Project selections can't be duplicated within a class period.

1-Person Projects>>

1. Describe how carbon dioxide can cause global temperatures to rise. Your explanation must include how CO_2 levels have changed over at least the past 5 decades and if there are seasonal changes to these levels.
2. Describe the work or interests of one of the well-known environmentalists listed: Rachel Carson, John Muir, Jane Goodall, and Teddy Roosevelt. Your presentation must include how this individual's work or interest influenced an understanding of ecology, specific ecosystems, or the environment.
3. What is happening to the polar ice caps? What impact would this have on sea levels and coastal areas?

2-Person Projects>>

4. Using specific examples, such as gypsy moths or zebra mussels, explain how the introduction of foreign or invasive species can throw off the balance within a food web. Other invasive species to our area can be chosen only with specific pre-approval.

5. What are the parts involved in the carbon cycle? Your presentation must include how this cycle impacts the ecology of the planet. In particular, what are the shifts in this cycle as it relates to deforestation and increased burning of fossil fuels?
6. What are the parts of the nitrogen cycle? Your presentation must include an explanation of nitrogen fixating plants and the risks associated with excess fertilizer run off (eutrophication).
7. What is the difference between primary and secondary succession? Give specific examples and the steps involved in how each process is used in nature and what will result from each of them. Discuss the link between succession and biodiversity.
8. Explain characteristics of coral reefs. What specific challenges they are facing today and what are the causes of those challenges? Explain how this ecosystem is considered a modern day and ocean based version of the "canary in the coal mine".
9. What does it mean for a material to be "biodegradable"? Explain the difference between methods including microbe-based composting and worm-based composting.
10. Describe how wind power can be used as an energy source and any problems/opportunities associated with it.
11. Describe how solar energy can be used as an energy source and any problems/opportunities associated with it.
12. Describe options for alternative fuels for cars and any problems/opportunities associated with them.
13. Describe how geothermal energy can be used as an energy source and any problems/opportunities associated with it.
14. Describe how hydroelectric power can be used as an energy source and any problems/opportunities associated with it. This could include harnessing tidal energies.

3-Person Projects>>

15. For each of the following land biomes choose one to provide information about. This information must include the biome's location throughout the world, its climate (including average rainfall and temperature ranges as they relate to the seasons) geographic specifics such as altitudes or topography, common plant types, and common animal types.
    a. Tropical Rain Forest
    b. Temperate Deciduous Forest
    c. Taiga
    d. Tundra
    e. Desert
    f. Grasslands or Savannahs
16. For fresh water ecosystem, explain the 3 zones: open water zone, deep water zone, and littoral zone. How do the types of organisms in these zones differ, and what, if any, challenges are they facing today?

Additional Options>> For a 2 or 3-person project you may choose your own project. Your Science teacher must pre-approve the project. You can change a project to allow for more people, up to a maximum of 3, by expanding to scope of the project. Your teacher must approve this option as well.

Good Luck!!