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Robert Bruce Elementary School
EDUC 992 Lesson Plan

Derricks to Desks

Instructor: Greg Mudge

Grade level: 6-8

Subject area: science

Standard:

Understands the interactions of science, technology, and society.

Benchmarks:

Knows that technological solutions have intended benefits and unintended consequences; some consequences can be predicted, but others cannot.

Standard:

Understands basic features of the Earth.

Benchmarks:

Knows the processes involved in the water cycle (e.g., evaporation, condensation, precipitation, surface runoff, percolation) and their effects on climate patterns.

Objectives

Students will understand the following:

1. The threat to water ecosystems is a complex problem because many factors contribute to their pollution and destruction.
2. The following factors all play major roles in the pollution and destruction of water ecosystems: PCBs, DDT, methylmercury chloride, sewer sludge, thermal effluents, radioactive wastes, destruction of marshlands, and beach erosion.
3. Methods to combat the above factors exist.
4. More methods are being developed and need to be developed.

Materials

For this lesson, you will need:

- Research materials about water ecosystems and factors that contribute to their pollution or destruction
- Computer with Internet access

Procedures

1. Ask students to name some water ecosystems. (They might mention oceans, rivers, ponds, lakes, marshlands.)
2. Now ask them to mention any factors they know of that contribute to the pollution and destruction of water ecosystems. List their suggestions on the chalkboard, including the following: PCBs, DDT, methylmercury chloride, sewer sludge, thermal effluents, radioactive wastes, destruction of marshlands, and beach erosion.
3. Divide your class into groups, and have each group research one of the factors you have listed. Groups should focus their research on how their factor affects water ecosystems, particularly those in your area, if applicable, and the methods that are being employed to counter it.

4. When their research is complete, each group should choose one water ecosystem that has been affected by the factor they have been assigned and prepare an environmental-impact statement about it. Each statement should include four elements:
 - a description of the current environmental status of the ecosystem
 - a description of the way or ways in which the factor affects the ecosystem
 - a description of the existing methods that are being used to combat the factor
 - suggestions for future methods of combating the factor
5. When the statements are complete, invite groups to share their findings with the class.

Discussion Questions

1. Discuss the relationship between population growth, advances in technology, and ocean dumping.
2. Discuss the ways in which the traditional uses of the ocean are changing.
3. Explain how toxic substances such as DDT, PCBs, and mercury enter the ocean and become incorporated into food chains.
4. Brainstorm “environmentally friendly” ways of generating electricity, cleaning up wastewater, producing fuel, and developing land.
5. Discuss alternatives to ocean dumping to prevent further contamination of wildlife habitats and commercial seafood.
6. Discuss why there must be international cooperation concerning oil drilling, fishing, and radioactive waste disposal for the ocean to be useful to the whole world.

Evaluation

You can evaluate your students on their assignments using the following three-point rubric:

- **Three points:** complete description of the current status of the ecosystem, accurate description of the way or ways in which the factor affects the ecosystem, clear description of methods being used to combat the factor, reasonable suggestions for future methods
- **Two points:** adequate description of the current status of the ecosystem, acceptable description of the way or ways in which the factor affects the ecosystem, vague description of methods being used to combat the factor, unrealistic suggestions for future methods
- **One point:** vague description of the current status of the ecosystem, unsatisfactory description of the way or ways in which the factor affects the ecosystem, inadequate description of methods being used to combat the factor, no suggestions for future methods

You can ask your students to contribute to the assessment rubric by determining how many suggestions for future methods should be included.