

Lesson Plan 5

Title:	Lesson 5: Learning the Impacts of Decision-Making on Waste Treatment and Disposal
Target Grade Levels:	Grades 11-12
Time Allotted:	1–2 class periods
Instructor:	
Method of Instruction:	Lecture, small group discussion, individual learning

Instructional Goal

Upon completion of the unit, the student will be able to describe stewardship activities and issues relating to the Department of Energy's activities on the Oak Ridge Reservation.

Lesson Objectives

- Discuss the impacts of decision-making in waste treatment and disposal
- Discuss the introduction of stewardship into cleanup planning and remediation
- Work as a group to reach consensus on the disposal of waste and the stewardship of contaminated sites at a fictional location

Materials & Resources

- Glossary

Visual Aids

- Course Overhead Transparencies—Lesson Plan 5

Handouts

- Case Study
- Handout of Case Study Questions

Vocabulary (refer to Glossary for definitions)

- Proposed Plan
- Remedial Action Report
- Remedial Design Work Plan
- Remedial Investigation/Feasibility Study
- Record of Decision

Section	Instruction	Visual Aids
1.0	<p><u>Course Goal</u></p> <p><i>Review course goal:</i></p> <p>Upon completion of the lesson, the student will be able to describe stewardship activities and issues relating to the Department of Energy's activities on the Oak Ridge Reservation.</p>	OVERHEAD 1: Stewardship on the Oak Ridge Reservation
2.0	<p><u>Lesson 5 Objectives</u></p> <p><i>Review objectives:</i></p> <ul style="list-style-type: none"> • Discuss the impacts of decision-making in waste treatment and disposal • Discuss the introduction of stewardship into cleanup planning and remediation • Work as a group to reach consensus on the disposal of waste and the stewardship of contaminated sites at a fictional location 	OVERHEAD 2: Lesson Objectives
3.0	<p><u>The Impacts of Decision-Making in Waste Treatment and Disposal</u></p> <p><i>Discuss the impact of decision-making in waste treatment and disposal.</i></p> <p>Hazardous waste comes in many shapes and forms. Chemical, metal, and furniture manufacturing are some examples of processes that create hazardous waste. The Resource Conservation and Recovery Act (RCRA) tightly regulates all hazardous waste from production to disposal. It also regulates garbage and industrial waste. Common garbage is municipal waste, which consists mainly of paper, yard trimmings, glass, and other materials. Industrial waste is process waste that comes from a broad range of operations. Some wastes are managed by other federal agencies or state laws. Examples of such wastes are animal waste, radioactive waste, and medical waste.</p> <p>How wastes are treated and disposed of has national, state, and local consequences. The "best" methods of waste treatment and disposal are frequently discussed and debated but ultimately the question of disposal must be resolved for long-term stewardship efforts to be successful.</p>	

Section	Instruction	Visual Aids
	<p>By reviewing case studies, we can examine the decision-making impacts of waste treatment and disposal and engage in dialog that will serve to enhance our overall understanding of long-term stewardship responsibility.</p>	
<p>4.0</p>	<p><u>Stewardship in Cleanup Planning and Remediation</u></p> <p><i>Discuss how stewardship must be factored into the cleanup process.</i></p> <p>For stewardship to be successful, planning for it must be considered during cleanup decision-making, and stewardship elements must be taken into account during the resulting remediation activities. Remediation activities include removal and treatment of the waste and prevention of the spread of contamination.</p> <p>There are several steps in the remediation process. These steps are sequential and are documented by a series of CERCLA reports.</p> <ol style="list-style-type: none"> 1. <u>Remedial Investigation/Feasibility Study</u> - determines the nature and extent of the cleanup and presents alternative cleanup strategies. 2. <u>Proposed Plan</u> - presents the proposed solution and must be subject to public review and comment. 3. <u>Record of Decision</u> - provides the technical basis for the chosen cleanup alternative. 4. <u>Remedial Design Work Plan</u> - outlines the procedures to be used in the cleanup efforts. 5. <u>Remedial Action Report</u> - documents that cleanup work has been conducted according to the plans. <p>Cleanup of contaminated areas will occur step-by-step through this documented process of scientific studies, proposed alternatives, evaluation of alternatives, selection of the preferred alternative, and development of the technical details and procedures of carrying out the work. Finally, the effectiveness of the remediation is monitored and recorded.</p>	

Section	Instruction	Visual Aids
<p>5.0</p>	<p><u>Case Study</u></p> <p><i>Allow groups of three or four students to address the specific remediation and stewardship issues as specified in the case study. Each group should reach consensus before recording their resolution and recommendations.</i></p> <p><i>Provide background and description of the fictional site.</i></p> <p><i>Provide a handout with leading questions that must be answered to define the problems and introduce the decisions that must be made concerning the hypothetical waste.</i></p> <p><i>Compare the innovative decisions and direction of logical thinking within the groups.</i></p> <p><i>Emphasize the different approaches and values developed within each group.</i></p>	
<p>6.0</p>	<p><u>Lesson Summary</u></p> <p><i>Review objectives, and summarize what was learned in this lesson.</i></p>	<p>OVERHEAD 2: Lesson Objectives</p>