

Bridgeport Public Schools Science Department

Embedded Performance Task



Connecticut Brownfield Sites

Science, Technology & Society Teacher Materials

Connecticut Brownfield Sites

Teacher Materials

This curriculum-embedded science performance task is related to the content standards and expected performances for Grades 9-10, as described in the Core Science Curriculum Framework, under Scientific Inquiry, Literacy and Numeracy, Strand III – Global Interdependence.

Targeted Content Standard

9.9 - Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems.

Targeted Scientific Inquiry, Literacy and Numeracy Standards

D INQ. 1 Identify questions that can be answered through scientific investigation.

D INQ. 2 Read, interpret and examine the credibility and validity of scientific claims in different sources of information.

D INQ. 4 Design and conduct appropriate types of scientific investigations to answer different questions.

D INQ. 5 Identify independent and dependent variables, including those that are kept constant and those used as controls.

D INQ. 9 Articulate conclusions and explanations based on research data, and assess results based on the design of an investigation.

D INQ. 10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

Learning objective:

Students will formulate a question about a Brownfield site that may be answered through scientific investigation and then design the investigation.

Materials:

Access to computers/Internet

Considerations:

More than 290 sites in Connecticut have been identified as “Brownfield Sites.” These are parcels of property once used for industrial, commercial or manufacturing purposes and now typically are abandoned due to **suspected** contamination. Often these unused parcels adversely affect the quality of living in the area and may pose potential health risks to local citizens. Financial assistance is available from the state and federal governments to assess and remediate these sites.

The Connecticut Brownfield Inventory is updated on a regular basis and may be accessed at the Connecticut Department of Environmental Protection’s website:

<http://dep.state.ct.us/wst/remediation/brownfields/brownfields.htm>.

The objective of this exercise is to allow students to explore environmental issues that are close to home. The students are not expected to create a protocol for retrieving a specific chemical such as toluene from a site. Instead the task is to formulate a general procedure for exploring the effect the contamination may have on the site or nearby property. Students may design an investigation that focuses on one specific chemical and its contamination plume at the site. They may consider where the sampling will occur (water, soil, air) and other parameters of the investigation such as the number of test sites, distances from the source, etc. Other students may design an investigation with a focus on one contaminant and its influence on a particular species of plant or animal in the area. If students are not able to identify the suspected contaminants at the site based on the general information on the inventory, the list below can be used for direction.

Contaminant	Possible source of contamination
Heavy metals: arsenic, cadmium chromium, lead, mercury	metal finishing/plating shops, manufacturing and foundries, coal burning power plants
Gasoline/constituents of gasoline: gasoline, benzene, ethylbenzene, toluene, xylene	gasoline stations, tank farms, pipelines
Solvents: tetrachloroethylene, trichloroethylene, III-trichloroethane	dry cleaners, machine shops, metal finishing/plating shops

This is an opportunity to invite an environmental engineer to the classroom to discuss the assessment and remediation processes at Brownfield sites. The time frame of assessment, follow-up remediation and cost may surprise students.

A professional in environmental engineering or environmental science may give students feedback on the feasibility of their proposed scientific investigations. Local community members may speak to the prior use of the property or to the process by which the site was identified as a Brownfield site.