

BROWNFIELD ASSESSMENT, REDEVELOPMENT & REMEDIATION

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SITE ASSESSMENTS (PHASE I) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 1 Standard 1

Sunshine State Standards: SS.A.1.4.4, SS.C.1.4

Objectives

The students will practice interview techniques, gather information, interpret and generalize information gathered.

Materials

Historical files at City Hall.

Background

After completing this activity the student will understand that the purpose of Phase I is to identify and document current and historical environmental conditions of a site. Discover the presence of substances that indicate an existing, past or potential adverse impact to the air, soil, ground water or surface water as a result of operations on the site and adjacent and surrounding properties. Determine if further investigation may be necessary to evaluate the potential environmental liabilities associated with the subject site. In the investigation, the students will follow standard testing procedures to evaluate the site.

Procedure

Students will take a field trip to City Hall to investigate records of the site.

Activity:

1. Upon arrival at City Hall, students will meet with the city official in charge of records and interview him/her. After discussion with that person,
2. Students will search records and record any instances of possible hazardous waste on site or on nearby sites.
3. Summarize findings in a report.

Assessment

Discuss findings during following class period and determine the next step in Phase I procedure.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SITE ASSESSMENTS (PHASE I) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 2 Standard 1
Sunshine State Standards: SC.H.1.4.1

Objectives

Students will develop and use a survey instrument, practice analysis skills and practice interview techniques.

Materials

Survey

Background

See Activity 1 Standard 1

Procedures

Students will discuss possible survey questions, how to write them, and to whom to administer the questions.

Activity

Part A

1. Students, through discussion, will develop a set of site appropriate survey questions.
2. In small groups, student teams will come up with five good critical thinking questions for the survey.

Part B

1. Once developed, students will administer the survey to all appropriate people both on and off site.
2. Upon completion, students will compile statistical information.

Assessment

Teacher evaluation of survey and results.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SITE ASSESSMENTS (PHASE I) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 3 Standard 1

Sunshine State Standards: SS.B.1.4.1, SS.B.2.4.1

Objectives

Students will learn how to do a site survey and practice graphing skills.

Materials

Clipboards, graph paper, pencils, tools to measure distances (ruler, yardstick, tape measure, etc.)

Background

See Activity 1 Standard 1

Activity

1. Students will work in teams to draw and label a site plan of the site being studied.
2. After teams have finished their individual drawings, a plan of the entire site can be put together by joining individual team plans together.
3. Complete site plan will be titled, labeled with legend, compass, etc. and mounted on poster board to display in room.

Assessment

Grade individual team site plans and completed site plan.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SITE ASSESSMENTS (PHASE I) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 1 Standard 2

Sunshine State Standards: SS.B.2.4.7

Objectives

Students will determine past history of site through review of historical records.

Materials

Information collected from field trip to City Hall.

Background

During this procedure, the student understands the consequences of NOT following set standards (ASTM E 1527-00), the importance of quality assurance in tasks performed, and documentation necessary to support their findings.

Activity

1. Class will be divided into four teams to review the information collected previously at City Hall regarding the site being studied.

Team A will review historical aerial photos and current aerial photos of site.

Team B will review historical records of site usage from City Hall.

Team C will review historical Sandborn maps of site.

Team D will survey and interview information for on-site historical information.

2. As a whole, class will compile acquired data into book.

Assessment

Discussion of reviewed information and how it may impact on study.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SITE ASSESSMENTS (PHASE I) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 2 Standard 2
Sunshine State Standards: SS.B.2.4.7

Objectives

Students will gather and compile adjacent property information.

Materials

Clipboards, graph paper, camera and survey questions for each team.

Background

See Activity 1 Standard 2

Activity

1. Students, working in teams, will visually observe and record properties to the North, South, East and West of site being studied.
2. Teams will take photographs documenting observations.
3. Teams will interview available property owners to determine:
 - a. Length of time in area.
 - b. Any historical information the homeowner might have of local area.

Assessment

Compile adjacent area information and add to site book.

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HOW ENVIRONMENTAL SITE ASSESSMENTS (PHASE I) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 3 Standard 2
Sunshine State Standards: LA.C.1.4.1

Objectives

Students will practice listening skills and analyze what they learned.

Materials

Guest speaker (Brownfields attorney or paralegal)

Background

See activity 1 Standard 2

Procedure

Students will listen to and ask pertinent questions of the guest speaker who will speak on laws relating to Brownfields.

Activity

1. Students will listen to guest speaker and take notes.
2. Students will ask pertinent questions.
3. General discussion will follow, and students will learn the need for conducting a thorough regulatory review as required by ASTM Standards.

Assessment

Participation of students in discussion.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SITE ASSESSMENTS (PHASE I) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 4 Standard 2
Sunshine State Standards: LA.B.2.4.4

Objectives

Students will determine if site is on any environmental database of State, Federal, City or Local origin.

Background

See Activity 1 Standard 2

Procedures

Student will go to computer lab and research Environmental Data Bases.

Activity

Because the students must do a thorough regulatory review as required to the ASTM Standard, they will, by searching various databases, determine:

1. If the site is on any environmental database of any State, City, Federal organization.
2. If there are any UST sites identified within a 1/8-mile radius of the site.
3. If there are any LUST sites identified within a 1/8-mile radius of the site.
4. If there are any RCRIS – small quantity generator sites identified within a 1/8-mile radius of the site.
5. If there are any RCRA TSD sites identified within a 1-mile radius of the site.
6. If there are any NPL sites identified within a 1-mile radius of the site.
7. If there are any CERCLA sites identified within a ½ mile radius of the site.
8. If there are any HWS sites identified within a ½ mile radius of the site.
9. If there are any mappable SWF/LS facilities within a ½ mile radius of the site.

Then compile data and add to book.

Assessment

Review findings in a general discussion.

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HOW ENVIRONMENTAL SITE ASSESSMENTS (PHASE I) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 5 Standard 2

Sunshine State Standards: SC.H.3.4.1, SC.H.3.4.2
SC.H.3.4.3, SC.D.1.4.5
SC.G.1.4.2

Objectives

Students will practice sampling techniques and learn how to do a site reconnaissance survey.

Materials

Test equipment provided by a Brownfields company and supervised by professional.

Activity

Under guidance of a Brownfields professional, class will conduct experiments to determine presence of:

1. Hazardous waste and hazardous substances
2. Air emissions
3. Asbestos
4. Water and wastewater
5. Water wells
6. Geology and lithology
7. Hydrogeology
8. Underground and above ground storage tanks

Assessment

Evaluate experimental data obtained by students.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SITE ASSESSMENTS (PHASE I) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 6 Standard 2

Sunshine State Standards: LA.C.1.4.1, LA.C.3.4.2

LA.D.2.4.4

Objectives

Students will practice listening skills and practice speaking strategies.

Background

See Activity 1 Standard 2

Procedure

Students will listen and discuss site survey results with a professional attorney, insurance person, etc.

Activity

As a terminating activity for Phase I, students will:

1. Listen to guest speaker talk about the following important subjects:
 - a. Is the compiled report to be legally relied upon by concerned entities (property owners, bankers, purchasers, regulators, etc.)?
 - b. How do insurance providers review this information to assess premiums?
 - c. Why do the public, schools, citizens, and/or property owners, generally have an interest in any issues discovered?
2. Discussion will follow.

Assessment

Participation in discussion.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SURFACE AND SUBSURFACE INVESTIGATIONS (PHASE II) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Standard 1

Sunshine State Standards: SC.H.3.4.1

Objectives

Students will practice standard testing techniques like soil borings and grab samplings.

Materials

Test equipment provided by a Brownfields professional and used under professional supervision.

Background

The student will understand that the purpose of the investigation is to delineate the nature and extent of any likely contamination at a site and to determine what remedial steps would be necessary in order to redevelop, sell or finance the site.

Procedure

Following the direction of Brownfields professionals, students will perform standard tests to determine quality of a site that might affect future purchase or transfer of property.

Activity

Teams of students will perform:

1. Soil sampling, grab sampling and soil borings in areas of potential hot spots or waste piles.
2. Tests for presence of metals, diesel and gasoline, VOC's, mercury and PCB's to determine if present in soil.
3. Visual screening and use of a photo ionization detector to determine the presence of total petroleum hydrocarbons present.
4. Prepare reports of findings.

Assessment

Students will compare results to acceptable standards and determine if samples fall within those standard limits.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SURFACE AND SUBSURFACE INVESTIGATIONS (PHASE II) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 1, Standard 2
Sunshine State Standards: SC.H.3.4.1

Objectives

Students will conduct a complete field investigation under close supervision of professionals.

Materials

Test equipment provided by a Brownfields professional.

Procedure

Under supervision of a Brownfields professional, students will conduct a field investigation of the site.

Activity

In teams, student will perform:

1. A ferromagnetic survey.
2. Grab samples.
3. Hand auger borings.
4. Determine site geology and hydrogeology.

Assessment

Students will then compare their results to an acceptable standard.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SURFACE AND SUBSURFACE INVESTIGATIONS (PHASE II) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 2, Standard 2

Sunshine State Standards: SC.H.3.4.1

Objectives

Students will learn the importance of insuring that samples are not contaminated.

Material

Log books, site map, and graph paper.

Procedure

Students will take a field visit to a local laboratory to view how scientific analysis is done.

Activity

1. Discuss the importance of decontamination and chain-of-custody procedures during the sampling process and the analysis of samples in the laboratory.
2. Observe procedures followed at the laboratory during the guided tour.

Assessment

Discussion of observations from the field visit.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SURFACE AND SUBSURFACE INVESTIGATIONS (PHASE II) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 3, Standard 2

Sunshine State Standards: SC.H.3.4.1

Objectives

Students will be able to create and use probe, sampling maps and logs as well as be able to generate summaries of obtained data.

Material

Log books, site map, and graph paper.

Activity

Using information gathered in previous activities, students will:

1. Prepare a probe and sampling location map using site map provided.
2. Prepare probing logs.
3. Generate analytical summaries for each boring.

Assessment

Grade finished logs.

BROWNFIELD ASSESSMENT & DEVELOPMENT

HOW ENVIRONMENTAL SURFACE AND SUBSURFACE INVESTIGATIONS (PHASE II) AFFECT THE PURCHASE OR TRANSFER OF ANY PROPERTY

Activity 4, Standard 2
Sunshine State Standards: SC.H.3.4.1

Objectives

Students will prepare sampling findings in proper format with an accurate analysis.

Materials

All sample data collected in Phase II.

Activity

Students will, under supervision, prepare a report on findings, so that the following people will be apprised of findings appropriately.

1. Legal (attorneys, banks, etc.)
2. Insurance.
3. General public.

Assessment

Discussion of completed report with professional Brownfields attorney.

BROWNFIELD ASSESSMENT & DEVELOPMENT

REMEDIATION OF A SITE THAT LEADS TO REGULATORY CLOSURE (PHASE III)

Activity 1 (one class period)
Sunshine State Standards: SC.H.3.4.1

Objectives

The student will learn the various alternatives to clean-up depending upon the type, extent, and many other factors including cost/benefit analysis.

Activity

Expert Guest Speaker will be invited to talk with the class and describe clean up options, including, but not limited to:

1. Dual phase vapor extraction wells
2. Air Sparging
3. Biofiltration
4. Natural attenuation
5. Physical Removal
6. Land Farming

Assessment

Students will ask guest speaker previously prepared questions.

BROWNFIELD ASSESSMENT & DEVELOPMENT

REMEDIATION OF A SITE THAT LEADS TO REGULATORY CLOSURE (PHASE III)

Activity 2 (two class periods)
Sunshine State Standards: SC.H.3.4.1

Objectives

The student will complete an Initial Site Characterization based on the Phase I and Phase II information.

Materials

Previously prepared Phase I and Phase II reports.

Activity

Using the reports previously developed during the site investigation, students will:

1. Pull together Phase I and Phase II information
2. Write an encompassing report on the tested site

Assessment

Report will be handed in.

BROWNFIELD ASSESSMENT & DEVELOPMENT

REMEDIATION OF A SITE THAT LEADS TO REGULATORY CLOSURE (PHASE III)

Activity 3 (two or three class periods)
Sunshine State Standards: SC.H.3.4.1

Objectives

The students will create a Corrective Action Plan (CAP) that meets the test of the State agency and US EPA.

Activity

Under guidance from a Brownfields professional, students will:

1. Determine the type of remediation to be used
2. Use the standards for soil and water removal required by the State and US EPA
3. Follow sampling and monitoring requirements
4. Develop an Operations and Maintenance Plan
5. Determine cost of the clean-up operation

Assessment

Grade the Plan and Cost sheet developed.

BROWNFIELD ASSESSMENT & DEVELOPMENT

REMEDIATION OF A SITE THAT LEADS TO REGULATORY CLOSURE (PHASE III)

Activity 4 (two class periods)
Sunshine State Standards: SC.H.3.4.1

Objectives

The student will prepare the necessary reports required by the various agencies that demonstrate progress and accountability of the system that is selected.

Upon achieving the necessary goal, the student will also learn further demonstration and proof that the site is completely clean according to the use of the site.

Activity

Students, using information from Activity 3 of Phase III will prepare final agency reports, which should include:

1. A "No Further Action" letter issued by the State
2. The ability to transfer a "clean" property from one owner to the next
3. Appropriate information for any environmental insurance carrier
4. Comfort to the buyer and seller of the property
5. Comfort to the lending institution
6. Completion of the project

Assessment

Completed work.