

AGRICULTURAL LANDFILL INVESTIGATIONS

Performance Standards 13B/12E/11A/13A.H

Students will apply the processes of scientific inquiry to explore natural resource conservation and management programs accordingly:

- *Knowledge*: identify the impact of agricultural waste issues associated with landfills and the environment.
- *Application*: conduct research about the agricultural parameters which influence the existence and future of a landfill.
- *Communication*: correlate individual research presentations to final conclusions about the future of an agricultural landfill.

Procedures

1. ***In order to know and apply concepts that describe the features and processes of the Earth and its resources (12E); the concepts, principles and processes of scientific inquiry (11A); the accepted practices of science (13A); and concepts that describe the interaction between science, technology and society (13B)***, students should experience sufficient learning opportunities to develop the following:

- Formulate hypothesis for investigating local agricultural issues of landfill capacity from classroom questions.
- Design an issue investigation which addresses the hypothesis from classroom decisions.
- Select and delegate responsibilities for associated research, analysis and communication components.
- Determine applicability (usefulness) of qualitative and quantitative data.
- Research conceptual, mathematical and physical models about local landfill capacity, design and composition.
- Preview associated research and governmental policies about landfills and pertinent agricultural wastes.
- Collect pertinent data from expert sources.
- Propose applicable survey instrument to conduct and assess depths of informed opinions on agricultural wastes and landfill issue such as effectiveness and support of policies regulating local landfill, etc.
- Explaining basis of safety practices, procedures and regulations associated with landfill creation, maintenance and closure.
- Explaining decomposition, absence of decomposition, contamination or leaching of materials sent to local landfill.
- Interpret and represent analysis of data, research and policy correlation.
- Evaluate survey validity.
- Report, display and defend the process and findings of investigation.
- Propose action response options for agricultural wastes and landfill future prospects.
- Generate further questions or issues for consideration.

Note to teacher: This activity integrates information as suggested in Standard 13B at Stage H. It incorporates information from Standard 12E, the processes of scientific inquiry for issue investigations from Standard 11A, as well as the understanding of the accepted safety practices of science described in Standard 13A.

The agricultural industry is directly concerned with the proper use of safety practices, procedures and regulations associated with landfill creation, maintenance and closure. Agriculture/horticulture students study the need for landfills and proper locations, the need for recycling, biodegradable products made from corn and soybeans and the effect of runoff from landfills and how that runoff might affect underground water sources.

This assignment aligns with the Illinois Workplace Skills I.1 (Maintaining a Safe and Healthy Work Environment/Identify safety and health rules, regulations and policies), I.3 (Maintaining a Safe and Healthy Work Environment/Identifying conservation and environmental practices and policies), I.4 (Maintaining a Safe and Healthy Work Environment/Act during emergencies) and I.6 (Maintaining a Safe and Healthy Work Environment/Identifying hazardous substance in the workplace).

2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Begin investigation of the status of the local or regional landfill. Have the agriculture/horticulture students generate possible questions about where agricultural wastes go (and stay). Organize a classroom investigation which researches and reports on the future of the local landfill. Determine and delegate student assignments for a class research project. Include research on the geology, economics, safety and governmental factors, as well

as the current capacity and design, anticipated closure and alternative locations. Consider scientific reports, agricultural applications and community perceptions. Organize and conduct a public opinion survey which addresses the depth of understanding of the community (agricultural and non-agricultural) about the issues facing the landfill's future. Generate a final report from individual student assignments to explain the past history and the future of the local or regional landfill. Individual students should generalize the process and findings of the classroom issue investigation and submit a personal reflection journal summary.

4. Evaluate each agriculture/horticulture student's work using the Science Rubric as follows, and add the scores to determine the performance level:
 - *Knowledge*: The varying impact of different factors affecting agricultural wastes, landfills and the environment were addressed qualitatively and quantitatively.
 - *Application*: The assigned research topic descriptions about the interactions associated with the past and future of the local landfill were thorough, well detailed and accurate.
 - *Communication*: The final conclusions about the future of agricultural wastes in landfills from the individual presentations and personal reflection journal were thorough and well reasoned.

Examples of Student Work

- [Meets](#)
- [Exceeds](#)

Resources

- Access to experts and resources for research and public opinion survey process
- Science Rubric

Time Requirements

- One-to-two class periods for investigation orientation and delegation of questions and duties
- Three-to-five days for group work in research (within or beyond classroom), survey development, data collection and analysis, etc.
- One day for presentation preparation
- One day for presentation and journal reflection

SCIENCE RUBRIC

Exceeds - must receive no more than one 3 and the rest 4s in the other areas of the rubric.

Meets - may receive no more than one 2 and a combination of 3s and 4s in the other areas of the rubric.

Approaches - may receive no more than one 1 and a combination of 2s, 3s or 4s, in the other areas of the rubric.

Begins - must receive at least a 1 in all 3 areas of the rubric.

	KNOWLEDGE	APPLICATION	COMMUNICATION
	Knows and understands scientific terms, facts, concepts, principles, theories and methods.	Applies scientific knowledge, skills and methods to manipulate, analyze, synthesize, create and evaluate.	Communicates scientific knowledge and applications through writing, speech and visual displays.
4	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are complete and correct. 	<ul style="list-style-type: none"> • Applications are thorough, appropriate and accurate. 	<ul style="list-style-type: none"> • Written, oral and/or visual communication is well organized and effective.
3	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are mostly complete and correct. 	<ul style="list-style-type: none"> • Applications are mostly thorough, appropriate and accurate. 	<ul style="list-style-type: none"> • Most of the written, oral and/or visual communication is well organized and effective.
2	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are somewhat complete and correct. 	<ul style="list-style-type: none"> • Applications are somewhat appropriate and accurate. 	<ul style="list-style-type: none"> • Some of the written, oral and/or visual communication is organized and effective.
1	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are minimally present or correct. 	<ul style="list-style-type: none"> • Applications are minimally appropriate and accurate. 	<ul style="list-style-type: none"> • Little of the written, oral and/or visual communication is organized and effective.
0	<ul style="list-style-type: none"> • All descriptions of scientific terms, facts, concepts, principles, theories and methods are missing and/or incorrect. 	<ul style="list-style-type: none"> • All applications are missing and/or incorrect. 	<ul style="list-style-type: none"> • All of the written, oral or visual communication is missing and/or lacks organization.
Score			