

**Lesson Plan Guide**  
**Georgia Learning Connections**



**TITLE:**

Where does all the waste go? Using science to make environmental decisions.

**Annotation**

This activity involves student research and role-play to explore a complex environmental issue and develop a science-based resolution. Students will investigate solid waste management and disposal. The lesson culminates in a City Council Meeting role-play at which the Council must decide the fate of a landfill expansion that would encroach on a community park. Students will use an environmental decision-making model to support their decision-making based on specific values and scientific information.

**Primary Learning Outcome:**

Students should be able to locate information important in making science-based environmental decisions.

Students should be able to use a decision-making model to make a decision about an environmental issue

**Additional Learning Outcomes:**

Students should understand the basic concepts of landfill construction, identify alternative waste management practices, and appreciate complexity of environmental issues.

**Assessed QCC:**

Grade: 9-12

*Science*

Environmental Science

2

*Topic:* Inquiry, Process and Problem Solving

Uses traditional reference materials to explore background and historical information *Standard:* regarding a scientific concept.

2.1 Uses current technologies such as CD-ROM, Internet and on-line data search to explore current research related to a science concept.

5

*Topic:* Advent of Environmental Concerns

*Standard:* Describes the impact of cultural revolutions on the environment.

5.2 Analyzes the nature and impact of environmental pollution.

5.3 Predicts short and long term impact of pollution on the environment.

**Non-Assessed QCC:**

Grade: 9-12

*Science*

Environmental Science

19

*Topic:* Waste Disposal and Waste Management

*Standard:* Identifies types of wastes, their generation, disposal, and management problems.

19.1 Differentiates between biodegradable and non-biodegradable wastes and their disposal methods.

19.2 Describes ways of managing organic wastes, radioactive and non-radioactive industrial wastes.

19.3 Defines and identifies various types and sources of wastes and their impact on health.

19.4 Understands the role of the EPA and other agencies in attaining the national goals of waste management including composting, recycling, re-using, and reclaiming.

Standards: Local and/or National

**Total Duration:**

Approx. 4 hours. This is designed as a 3-5 day activity culminating with the Council Meeting role-play on the final day.

**Materials and Equipment:**

Handouts: “Attention Citizens” Flyer, Role Assignment Table, Decision-Making Model.

**Technology Connection:**

Internet access.

**Procedures:****Step One – Background and Role Assignment**

Provide students with the “Attention Citizens” flyer. This flyer announces a special meeting of the Yourtown City Council being convened to discuss a proposal to expand the Yourtown Municipal Landfill. The landfill expansion proposal has arisen following a study by the Landfill Steering Committee concluding that at current trends the local landfill will reach full capacity by the year 2010. There are currently no waste reduction programs in place in Yourtown. The City Council has invited several experts to attend the meeting as well as the citizens of Yourtown. The flyer also provides a map of Yourtown. The map shows that the proposed expansion site lies in a city-owned forest that is adjacent to the city park. There is no other land available in Yourtown for the proposed expansion. Explain this scenario to students as they review the flyer.

Next, provide students with the role assignment and decision-making handouts. Assign an appropriate number of students to each of the roles listed on the table. Explain each description, perspective, and motivation of each role.

**Estimated Time:**

15 minutes

**Lesson Materials to be Attached:**

Title: “Attention Citizens” flyer

Annotation: Flyer providing background information and announcing special meeting of Yourtown City Council.

Title: Role Assignments Table

Annotation: Table provides list of role assignments, suggested number of students for each role, and selected information resources related to each role.

Title: Decision Making Model

Annotation: Provides a framework for students to organize information and opinions prior to making a decision on an environmental issue.

**Web Links:**

Provided on Role Assignments Table

**Step Two – Student Research**

After receiving a role assignment, students should spend a significant amount of time obtaining information that will allow them to perform their roles in the Council Meeting. All students should seek general background information on landfills and alternative solid waste management options (e.g recycling or composting). In addition, each student should seek specific information related to his/her assigned role. For example, the Landfill Manager should be familiar with the basic construction of a landfill. General and role-specific information resources are provided on the Role Assignments Table. These resources are not all-inclusive. Other useful resources will include periodical news publications, especially area newspapers. Encourage students to explore a wide range of sources and information.

Upon completion of student research, students should summarize their findings by completing the decision-making model. The model should be completed from the perspective of a student’s assigned role and should form the basis for each student’s participation in the role-play activity.

**Estimated Time:**

1-3 hours as time allows.

### **Step Three – Role-Play**

On the final day of this lesson, a role-play activity will be held simulating the Yourtown City Council Meeting. The instructor will serve as Yourtown Mayor and preside over the Council Meeting. Organize your room to achieve as realistic an environment as possible (e.g. allow for council seating at the front of the room, include a designated podium for speakers). At the beginning of the class period, the Mayor should call the meeting to order and describe the purpose of the meeting. That is, the City Council will consider a proposal to expand the Municipal Landfill. Beginning with the landfill manager, each student will then be asked to present information related to the assigned role. Following these presentations and any discussion that arises, the council will vote on whether to allow the expansion or to pursue other options. An outline of the meeting might go as follows.

- Mayor - Call to order, opening remarks
- Landfill Manager - Discuss expansion plan, describe landfill construction
- Environmental Scientist – Present factual, science-based information on impacts of landfill expansion and alternative waste management practices
- Environmental Activist - Oppose expansion plan, discuss drawbacks of landfilling, present alternative waste management practices
- Community Members - Present research information and opinions
- Council Members - Present opinions, may question experts
- All - Questions, rebuttals
- Mayor with interaction from all - Summarize meeting, formulate policy options, call Council to Vote
- Council Vote
- Meeting Adjourned

All student opinions and positions should be justified by student research and decision-making model. Students should work together to formulate policy options and bring those options to a vote.

#### **Estimated Time:**

1 hour.

### **Step Four – De-Briefing**

This lesson attempts to introduce students to the complex nature of environmental problem-solving and decision-making. However, the activity is still greatly simplified in comparison to real life. As a wrap-up to this activity, you may conduct a de-briefing discussion or have students provide short essay answers to the following questions.

- How would your decision be different if you were playing a different role than you were assigned?
- This lesson was a simplified version of a real-life scenario. What other issues might come into play in the real world?

- Although all of our environmental decisions should be made using the best available scientific knowledge, what other factors can influence environmental decisions?
- Do you think that science can be manipulated to support one view over another? How might that manipulation be used to negatively influence an environmental decision?

**Assessment:**

Student research will be assessed by checking completion of decision-making model. Students will also be assessed through participation in the Council Meeting. Students should express views based on adequate research and consideration of the decision-making model.