

Middle School Activities



The Litter at Our School

Content Area: Science
Grade Levels: Grades 6 and 7
Time to Complete: One to two class periods

1. South Carolina Curriculum Standards Addressed

SCIENCE

Grades 6 and 7

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

- 1.d.1. Make inferences based on observations.
- 2.b. Pose questions and problems to be investigated.
- 2.h. Analyze data to construct explanations and draw conclusions.

Grade 7

III. Earth Science

A. Structure of the Earth System

- 7.f. Evaluate the effects of human population on air, water, and land.
- 7.g. Analyze the benefits of solid waste management (reduce, reuse, recycle).

2. Brief Description of Lesson/Activity

In this lesson, students focus on the amount of litter that exists at their own school and then work to find ways to reduce the littering that occurs there.

3. Focus Questions for Students

1. Are some areas of our school more littered than others?
2. What kind of problems could our school have if we do not reduce the amount of litter here?
3. What are some ways we can encourage students not to litter and to participate in a cleanup?
4. What type of support do we need from the school administrators?

4. Culminating Assessment

After completing a survey of the school grounds and considering the results, students write a letter to the principal explaining the littering problem at their school and proposing solutions to the problem.

5. Materials, Equipment, and/or Resources Needed

- chart paper, markers
- clipboards, paper, pencils

6. Teacher Preparation

Gather the necessary items.

7. Procedures

| Teacher Activity | Student Activity | Assessment |
|--|---|---|
| <p>Write the focus questions on the board and have selected students add the questions to wall charts. Guide the students as they respond to the questions and have the selected students write the responses on the charts.</p> | <p>The selected students write the focus questions and the students' answers on the wall charts.</p> | <p>Student participation in the writing the focus questions</p> |
| <p>Lead the students into a discussion about the litter problem at their school. Have them consider such issues as how much litter there is at the school, where it is, and what the hazards are if it remains there.</p> | <p>Students discuss their responses to the issues raised by the focus questions.</p> | <p>Student participation in the discussion</p> |
| <p>Have students brainstorm for ideas about how to evaluate and solve the litter problem: "How can we determine if our school has a litter problem?" "What can we do at the school level to make other students aware of the problem and to get them involved in litter reduction?" Take notes on the students' responses.</p> | <p>Students brainstorm ideas on about how they can evaluate and solve the litter problem at their school.</p> | <p>Student participation in the brainstorming activity</p> |
| <p>Divide the class into four teams and explain that the students in each team are to investigate the amount and type of litter that exists in the area that is assigned to them: (1) the classrooms, (2) the hallways and restrooms, (3) the cafeteria, or (4) the outside areas.</p> | | |

| Teacher Activity | Student Activity | Assessment |
|---|--|--|
| <p>Tell students they are to record their findings in this manner: draw a line down the middle of a sheet of chart paper to create two columns. Head the first column “Type of Litter Found and Location on Campus Where Found.” Head the second column “Questions Generated by the Situation” (for example, “Are trash bins available at this location?” “What are students doing to produce the trash?” “Are there procedures regarding the disposal of trash in classrooms?”).</p> | <p>Student teams survey the litter in their assigned area of the school. They then record their findings and their subsequent questions on the chart paper.</p> | <p>Student participation in the litter surveying</p> |
| <p>Have each group analyze its findings, record on chart paper four things they learned about how litter is generated at their school, and then create a plan for attacking the school litter problem.</p> | <p>Student groups analyze their findings, determine four things they have learned about how litter is generated at their school, and create a plan for attacking the school litter problem. They record this information on chart paper.</p> | <p>Student participation in the analysis and chart preparation</p> |
| <p>Finally, have student groups write letters to the principal sharing the results of their investigation. The letters must also include plans for addressing the litter problem based on the data the students have collected. After sharing their ideas with the principal, the students return to the area they originally examined and conduct a cleanup.</p> | <p>Using the results from their investigation, students write a letter to the principal that contains suggestions on how to address the litter problem at their school.</p> <p>Students return to the area they originally surveyed and clean up the litter.</p> | <p>Letter written to principal</p> <p>Student participation in the cleanup</p> |

8. Differentiation of Instruction

Special-needs students can be given specific questions to investigate, a chart with check-off items, and a short-answer test that can be completed orally. Advanced students can conduct an independent litter survey at a local elementary or high school.

9. Service-Learning Connection

Preparation. After the students examine the litter in different areas around the school, they write a report describing their findings and explaining their ideas about

how to address the litter problem at their school. They request a meeting with the principal to discuss their ideas in greater detail.

Service. After receiving the support of the principal, students implement a plan for controlling the litter problem at their school. They make suggestions such as establishing a schoolwide litter patrol team, organizing cleanup days several times a month, and implementing an incentive program for students who commit to picking up one piece of litter every day.

Reflection. The students divide into groups to discuss and evaluate the success of their project.

Celebration. The students share their success by giving a report on their project to the PTO/PTA during a schoolwide open house event.

Every Piece of Litter Does Count

Content Area: Science
Grade Levels: Grades 6 and 7
Time to Complete: Two weeks

10. South Carolina Curriculum Standards Addressed

SCIENCE

Grades 6 and 7

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

- 1.e.1. Predict the results of actions based on patterns in data and experiences.
- 2.a. Recognize potential hazards within a scientific investigation and practice appropriate safety procedures.
- 2.b. Pose questions and problems to be investigated.
- 2.d. Distinguish and operationally define independent (manipulated) and dependent (responding) variables.
- 2.f. Collect and record data using appropriate metric measurements.
- 2.g. Organize data in tables and graphs.
- 2.h. Analyze data to construct explanations and draw conclusions.

B. Abilities Necessary to Do Technological Design

- 5.a. Identify the four stages of problem solving: problem identification, solution design, implementation, and evaluation.

Grade 7

III. Earth Science

A. Structure of the Earth System

- 7.f. Evaluate the effects of human population on air, water, and land.
- 7.g. Analyze the benefits of solid waste management (reduce, reuse, and recycle).

11. Brief Description of Lesson/Activity

This lesson encourages students to take responsibility for the cleanliness of their surroundings and to understand that a littered campus indicates a lack of student pride. Students conduct surveys, take photographs, and implement a plan to control litter. In an effort to implement lasting change, students share their results and ideas with school officials.

12. Focus Questions for Students

1. How does litter happen?
2. Who is in control of litter?
3. Is it important for our school to be clean and litter free? Why?
4. What are some ways you can take pride in the places where you live, play, and learn?
5. What are some ways to curtail the problem of littering?
6. Can we afford to ignore a litter problem?
7. Does our community or town have a plan for reducing litter? Can some of those ideas be implemented at school?

13. Culminating Assessment

Each student is asked to conduct a litter-control survey of the teachers, administrators, school staff, and other students at their school. (See the “Litter Survey Form” below.) Student groups are then responsible for developing and implementing a cleanup and maintenance plan for the campus. To determine the effectiveness of the two-week cleanup effort, students implement a tracking system including photographs, written observations, and graphs. Finally, students share their results and conclusions in oral presentations to school administrators and local school board representatives.

14. Materials, Equipment, and/or Resources Needed

- notepads or clip boards with filler paper
- chart paper, poster board, rulers
- pens, pencils, and markers or crayons
- trash bags, gloves
- camera and film (or ask parents to donate a disposable camera)

15. Teacher Preparation

1. Assemble the necessary items.
2. Identify littered areas around the school.
3. Alert school administrators about the cleanup project and obtain the necessary permission.
4. Inform administrators, faculty, and school staff about the survey and ask for their cooperation.
5. Make a copy of the “Litter Survey Form” (provided below) for every student.



16. Procedures

| Teacher Activity | Student Activity | Assessment |
|---|--|--|
| <p>Divide the class into groups and assign each group a focus question to discuss and then record their answer on chart paper. Allow the groups to share their responses.</p> | <p>Student groups discuss their assigned focus question, record their answer on chart paper, and then share their response with the rest of the class.</p> | <p>Student responses written on chart paper</p> <p>Student participation in the activity as a whole</p> |
| <p>Distribute copies of the “Litter Survey Form” (below). Explain to the students that they should record the results of their survey.</p> | <p>The student groups survey administrators, school staff, teachers, and other students using the “Litter Survey Form.” They then record the survey results.</p> | <p>Student participation in distributing the survey forms, collecting the completed forms, and recording the results</p> |
| <p>Assign each group a different section of the campus to clean up and maintain. Prior to the cleanup, have each group do the following:</p> <ol style="list-style-type: none"> (1) Take photographs of their assigned area. (2) Write down on notepads exactly what they observe regarding the assigned area. They should consider the following issues: <ul style="list-style-type: none"> • Does that particular area have a great deal of litter? • If so, why? Who or what is contributing to the problem? • Does the location itself have anything to do with the problem? | <p>Student groups go to their assigned areas, write down their observations, and take photographs.</p> | <p>Written observations and photographs</p> |
| <p>On the basis of their photographs and written observations of their areas, lead the student groups in developing their specific cleanup and maintenance plans. Have them consider two methods for determining the effectiveness of their project: (1) taking “before” and “after” photos and (2) weighing the collected trash at intervals during the two-week project and graphing the results.</p> | <p>Student groups formulate the details of their cleanup plans and tracking systems.</p> | <p>Student participation in the group work</p> |
| <p>Assign each group of students to</p> | <p>Students work together to write up</p> | <p>Written explanation of cleanup</p> |

| Teacher Activity | Student Activity | Assessment |
|---|--|---|
| turn in a written explanation of their specific cleanup plan and tracking system. | the details of their group's cleanup plan and tracking system. | plan and tracking system details |
| <p>Have the students cleanup their assigned areas and maintain them for two weeks. Have the students take photographs, determine the amount of trash they have collected, import the data onto spreadsheets, and graph the results on poster board.</p> <p>Display the student graphs and pictures outside the classroom in an effort to make others aware of the litter problem.</p> | Students clean up their areas and take photographs. They then determine amount of litter they have collected over the two-week period, import their data onto spreadsheets, and graph the results on poster board. | Completed spreadsheets and posters with graphs |
| Lead the students in a discussion about the changes brought about since the cleanup. Revisit the focus questions and ask the students to provide additional input. | Students reexamine the focus questions in a whole-group discussion. | Student participation in the discussion |
| Assign oral presentations: each student group will share with school administrators and local school board representatives the results of their surveys and cleanup project and their ideas about ways to encourage others to pick up litter on the school campus. | Students work in their groups to develop oral presentations to school administrators and local school board representatives about the results of their surveys and cleanup project and their ideas for making others more aware of the litter problem at the school. | Student participation in preparing the oral presentations |

17. Differentiation of Instruction

Special-needs students can work with partners or in a small group to conduct the litter survey. After the litter collection, special-needs students can work with partners to complete the spreadsheets and graph the amount of litter collected. Advanced students can hold a debate about the effective ways, such as the establishment of penalties, to deal with the school's litter problem.

18. Extension to Other Content Areas

Language Arts. Students can use their research findings to write stories for students in the lower grades to read. (The stories could be real or imaginary; the book *The Lorax*, by Dr. Seuss, may stimulate some ideas.) Selected students can hold a debate on the subject of litter.

Mathematics. The students can take the spreadsheets to the school’s mechanical drawing or art classes to set up a new drawing of the campus. These ideas could be shared with the school’s PTO/PTA or at a school improvement council meeting.

19. Service-Learning Connection

Preparation. Students clean up and maintain their assigned areas for two weeks. They also conduct a schoolwide litter survey, implement a tracking system, and complete graphs showing the amounts of litter they collect during the two-week period. Students then plan a drop-in and issue invitations to school administrators and local school board representatives to hear the results of their project.

Service. Students share results of the cleanup project with school administrators and local school board representatives at a drop-in or evening gathering. After sharing their results and ideas, the students brainstorm with the school administrators and local school board representatives to come up with ideas for implementing a long-term plan for keeping the school clean and litter free.

Reflection. The students discuss the issues surrounding the idea that a lack of pride is related to the litter problem and that increasing pride is a good way to address that problem.

Celebration. “Before” and “after” photos of the assigned areas are posted on a bulletin board outside the classroom or are published in the school newspaper. The PTO/PTA acknowledges and pledges to support the students’ efforts.

Litter Survey Form

Name: _____

1. Have you ever paid any attention to the area surrounding our school building?
2. How would you rate the quality of the grounds surrounding this building in relation to the grounds of other buildings in this neighborhood?
3. What do you like about our school grounds?
4. Do some places on our school grounds look more inviting than other places on the grounds do?
5. Have you noticed a lot of litter on our campus? Where in particular?
6. Whose job is it to keep the campus clean?
7. How would you feel about going outside for one period every school day for two weeks to pick up litter?



What Effect Does Litter Have on the Acid Balance, Temperature, and Permeability of Soil?

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|--------------------------|-----------------------|
| Content Area: | Science |
| Grade Levels: | Grades 6 and 7 |
| Time to Complete: | Several class periods |

20. South Carolina Curriculum Standards Addressed

SCIENCE

Grades 6 and 7

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

- 1.c.1. Select and use appropriate tools (e.g., metric ruler, graduated cylinder, thermometer, balances, spring scales, stopwatches) and units (e.g., meter, liter, Celsius, gram, Newton, second) to measure to the unit required in a particular situation.
- 2.b. Pose questions and problems to be investigated.
- 2.g. Organize data in tables and graphs.
- 2.h. Analyze data to construct explanations and draw conclusions.
- 3.a. Select and use appropriate tools and technology (such as calculators, computers, probes, thermometers, balances, spring scales, microscopes, binoculars, and hand lenses) to perform tests, collect data, and display data.

Grade 7

III. Earth Science

A. Structure of the Earth System

- 2.b. Analyze soil properties that can be observed (soil profile, composition, texture, particle size) and measured (permeability, temperature, pH, moisture) to predict soil quality.
- 2.d. Evaluate ways in which human activities have affected soil and the measures taken to control the impact (silt fences, ground cover, farming, land use, nutrient balance).
- 7.a. Compare and contrast the abiotic factors that affect population growth and size (quantity of light, water, range of temperatures, soil compositions).
- 7.f. Evaluate the effects of human population on air, water, and land.
- 7.g. Analyze the benefits of solid waste management (reduce, reuse, recycle).

21. Brief Description of Lesson/Activity

In this lesson, students investigate the impact that litter has on soil. They examine the characteristics of soil—acid balance (the pH factor), temperature, and permeability—in a series of tests that compare uncontaminated soil with soil that has been contaminated by litter.

22. Focus Questions for Students

1. What is soil composed of?
2. What impact does litter have on the quality of soil?
3. How does litter affect the pH, temperature, and permeability of soil?

23. Culminating Assessment

After conducting the pH, permeability, and temperature tests, students analyze their results and record them on wall charts. The students then write reflections about what they learned about the relationship between the quality of soil and the effect of litter. In the reflections, each student also writes his or her own answer to the key question regarding litter and the campus soil: “What can we as students and a school population do to solve this problem?”

24. Materials, Equipment, and/or Resources Needed

- paper, pencils, clipboards, chart paper, markers
- pH soil test kit for each student group (available at garden supply stores)
- pH water test kit for each group (available at pet stores, Wal-Mart, or stores that sell tropical fish and aquariums)
- shovels, buckets, and gloves for collecting soil and litter from the school grounds
- two samples of soil from the top 8 inches (20 cm) of the campus grounds for each student group (see specific quantities below): one uncontaminated sample and another sample contaminated with litter that has been collected from the school grounds or a roadside area, cut into small pieces, and mixed into the soil

For soil temperature test:

- dial or digital probe thermometer for each group
- 12 cm finishing nail and hammer for each group
- wooden block with 6 mm diameter hole through it for each group
- calibration thermometer for each group

For soil permeability test:

- 100 ml of water per student group
- 100 ml of uncontaminated soil per group
- 100 ml of contaminated soil per group (see above)
- filter paper or coffee filters for each group
- beaker (250 ml) to collect the drained water for each group
- stopwatch or watch/clock with a second hand for each group

Web sites:

NASA's "Soil Science Education Home Page"

- <http://ltpwww.gsfc.nasa.gov/globe/>

GLOBE Teacher's Guide, hyperlinked table of contents for "Soil Investigation" chapter

- [http://archive.globe.gov/sda-bin/wt/ghp/tg+L\(en\)+P\(soil/Contents](http://archive.globe.gov/sda-bin/wt/ghp/tg+L(en)+P(soil/Contents)

25. Teacher Preparation

1. Gather the necessary items and information.
2. You may want to take a soil sample to your local Clemson Extension office or a local nursery for an authentic analysis before your students begin their own testing. Do not release this information to your students but rather use it to monitor and guide your students' work.
3. Become familiar with the directions for testing the soil. You may want to make a copy of the directions for each group of students.
 - For the **pH soil test**, follow the directions on the kit.
 - For the **soil permeability test**, follow these directions:
 1. Put 100 ml of uncontaminated soil in a piece of filter paper
 2. Suspend the soil in the filter inside a 250 ml beaker by securing the filter with a rubber band around the beaker's mouth.
 3. Pour 100 ml of water over the soil.
 4. Start the stopwatch when you start pouring. Record the amount of time the water takes to drain through the soil.
 5. Save the sample of water.
 6. Repeat steps 1 through 4 with the sample of contaminated soil.
 - For the **pH water test**, follow the directions on the kit to test each of the two water samples that were drained from the jars in the soil permeability test.
 - For the **soil temperature test**, follow *GLOBE Teacher's Guide* directions at [http://archive.globe.gov/sda-bin/wt/ghp/tg+L\(en\)+P\(soil/Temperature\)>](http://archive.globe.gov/sda-bin/wt/ghp/tg+L(en)+P(soil/Temperature)>).



26. Procedures

| Teacher Activity | Student Activity | Assessment |
|---|---|---|
| Lead the class in a discussion of the focus questions. | Students discuss their responses to the focus questions. | Student participation in the discussion |
| One week prior to running the soil temperature test, have students collect the soil samples and the litter from the school grounds and mix the bits of litter into the soil that is to be used as the contaminated sample. | Students collect soil and litter from the school grounds. | Student participation in the activity |
| <p>Direct students to divide the soil samples into two equal portions. Tell them to mix in pieces of litter in one sample and label the sample, “Contaminated with Litter.”</p> <p>Explain in detail pH and its relationship to soil. Tell the students that the next class, they will be given a short quiz on pH.</p> | Students divide the soil and make the sample of contaminated soil. They use this soil to complete the testing activity. | Student participation in the activity |
| The next day, give the class a quiz on pH. | Students take the quiz on pH. | Quiz on pH |
| Divide the class into groups and give group the pH soil test kit you have chosen to use and demonstrate how to conduct the test according to the directions given in the kit. | Working in their groups, students conduct pH tests on both soil samples collected. They record the test results in their journals or on data sheets. | <p>Student participation in the testing activity</p> <p>Recorded pH testing results</p> |
| Give students the instructions and materials for conducting the soil permeability test. Remind them to save the water that is drained through the soil. | Students conduct the permeability test on both samples of soil according to directions. They record the test results in their journals or on data sheets. | <p>Student participation in the testing activity</p> <p>Recorded soil testing results</p> |

| Teacher Activity | Student Activity | Assessment |
|---|---|---|
| Give the students the instructions and materials to conduct the pH water test on the water collected from the permeability test. | Students conduct the pH test on the water collected from the soil permeability test and record the test results in their journals or on data sheets. | Student participation in the testing activity Recorded water testing results |
| Take students outside to the campus area where they collected their soil samples prior to beginning the lesson. Give the students instructions and materials for conducting the soil temperature tests. | Students conduct the soil temperature test according to the directions and record the test results in their journals or on data sheets. | Student participation in the testing activity Recorded soil testing results |
| Lead the class in an analysis of their test findings, discussing what they have found regarding the effect that litter has on soil. | Students analyze the data their tests have produced regarding the effect that litter has on soil. | Student participation in the discussion and analysis |
| Have the student groups record on chart paper their test results and the conclusions they have drawn. | Student groups record their findings and conclusions on wall charts. | Wall charts with explanations |
| Have students write reflections regarding what they have learned about the relationship between the quality of soil and the effect of litter. They are then to use their findings to write an answer to this key question regarding litter and the campus soil: “What can we as students and a school population do to solve this problem?” | In their journals, students write reflections about what they learned about the relationship between the quality of soil and the effect of litter. Each student then writes his or her own answer to the key question regarding litter and the campus soil: “What can we as students and a school population do to solve this problem?” | Written reflections and answers to the key question |
| Have students turn in their journals. | Students review their journals for completeness and then turn them in for assessment. | Journal entries assessed for concepts and critical-thinking skills |

27. Differentiation of Instruction

Special-needs students can work with partners to conduct the soil tests and can be given teacher-made data sheets to record the results of their tests. If necessary, the teacher can lead the whole class in conducting each of the tests and reporting results on a class data sheet.

Advanced students can design and conduct additional tests on the soil. They can add this data to the overall test data, graph the findings, and determine if there is any kind of statistical relationship between the amount of litter in the soil and the quality of the soil.

28. Extension to Other Content Areas

Language Arts. Students can produce a pamphlet about their findings. (This activity could substitute for reflections in their journals.)

Mathematics. The class can report the test results on a grid or information sheet. Students can graph the findings and determine if there is any kind of statistical relationship between the amount of litter in the soil and the overall quality of soil.

29. Service-Learning Connection

Preparation. Students write letters to the teachers and the principals of local elementary schools describing how soil quality is analyzed and offering to come to the school to teach fourth- and fifth-grade students how to determine the quality of the soil on their school grounds. The seventh-grade students prepare pamphlets about the effects of litter on soil and the need for litter control.

Service. A group of selected seventh-grade students go to the elementary schools and work with fourth- and fifth-graders to determine the quality of the soil on their school grounds. They demonstrate how to conduct the tests and let the elementary students practice running the tests. Using a disposable camera, students take pictures of the activity. Upon completing the activities, the seventh-grade students emphasize the importance of litter control and demonstrate to the younger students what litter does to the soil. The seventh-graders leave their pamphlets for students to share with their parents.

Reflection. Upon completing the visits to the elementary schools, students discuss and compare their experiences with each other. They write articles for the local newspaper and/or the school newspaper about their experiences. They also write to the elementary students encouraging them to continue their work and to emphasize to their friends the importance of not littering.

Celebration. Students celebrate their experience by creating a bulletin board outside the classroom displaying the pictures they took of their work with the younger students.

Care for Our Habitat

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|--------------------------|-----------|
| Content Area: | Science |
| Grade Level: | Grade 7 |
| Time to Complete: | Two weeks |

30. South Carolina Curriculum Standards Addressed

SCIENCE

Grade 7

II. Life Science

D. Populations and Ecosystems

- 1.a. Describe the characteristics of populations.
- 1.b. Distinguish between populations and communities.
- 1.c. Distinguish between habitats and niches.
- 1.d. Differentiate between an ecosystem and a biome.

III. Earth Science

A. Structure of the Earth System

- 7.e. Distinguish between renewable and nonrenewable resources and examine the importance of their conservation.

31. Brief Description of Lesson/Activity

In this lesson, students complete a science unit on ecosystems, habitats, and populations, with special emphasis on the intricate balance that exists within a natural habitat. They then research a specific natural habitat, examine the concepts of “renewable” and “nonrenewable” resources, and consider ways that natural habitats can be negatively impacted by human beings.

32. Focus Questions for Students

1. What is the difference between a biotic and an abiotic environment?
2. What is a habitat?
3. Can habitats overlap? What are some examples?
4. How do your own actions negatively affect your habitat?
5. What are some examples of renewable and nonrenewable resources?

33. Culminating Assessment

After researching specific habitats, student groups present their findings in oral reports to the class. After charting specific examples of renewable and nonrenewable resources and discussing how natural habitats are negatively and positively affected by human behavior, they use what they have learned in decorating grocery bags for Earth Day.

34. Materials, Equipment, and/or Resources Needed

- science textbook
- grocery bags

Web sites:

San Diego Earth Times On-Line

- <http://www.sdearthtimes.com>

Earth's Birthday Project

- <http://www.earthsbirthday.org>

35. Teacher Preparation

1. Research the origin of Earth Day.
2. Get bags from local grocery stores.
3. Locate and bring in examples of renewable and nonrenewable resources.

36. Procedures

| Teacher Activity | Student Activity | Assessment |
|--|---|---|
| Prepare the science unit on ecosystems, habitats, and populations, putting special emphasis on the intricate balance that exists within a natural habitat. | | |
| Begin the unit on ecosystems, habitats, and populations by clearly defining these key terms: "ecosystem," "population," "habitat," "niche," "biome," "producer," "consumer," and "decomposer." | Students take notes on the key terms and their definitions. | Student participation in the note-taking activity |
| Assign and give the chapter test on ecosystems and habitats. | Students take a chapter test on ecosystems and habitats. | Test on ecosystems and habitats |
| Lead the class in a discussion of the focus questions. | Students discuss their responses to the focus questions. | Student participation in the discussion |

| Teacher Activity | Student Activity | Assessment |
|--|--|--|
| <p>Divide the students into groups and assign each group a specific habitat to research. They should begin their investigation by determining what particular organisms live in that habitat.</p> <p>Tell the class that at the end of one week, each group will present their research to the class.</p> | <p>Working in groups, the students locate information about their assigned habitat. One week later, they present their research findings to the class.</p> | <p>Group presentations and information about assigned habitats</p> |
| <p>Define “renewable” and “nonrenewable” resources and instruct students in charting specific examples of such resources. Have students consider why we need to conserve and preserve our resources.</p> | <p>Students chart specific examples of renewable and nonrenewable resources.</p> | <p>Chart with examples of renewable and nonrenewable resources</p> |
| <p>Lead the students in a debate or discussion about how natural habitats can be negatively impacted by human beings. Prompt students to think about how their behavior positively and negatively impacts their own habitat. For example: “Do you litter?” “Do you dispose of their trash properly?” “Do you recycle regularly?”</p> | <p>Students discuss how habitats can be negatively impacted. They then discuss how they can positively and negatively impact own habitat.</p> | <p>Student participation in the discussion</p> |
| <p>Tell the class they will use the ideas from their discussion to create slogans for Earth Day and will decorate a grocery bag for the occasion.</p> | <p>On the basis of their ideas about how they can positively and negatively impact own habitat, students create slogans for Earth Day and decorate a grocery bag.</p> | <p>Earth Day slogans and decorated grocery bags</p> |

37. Differentiation of Instruction

Special-needs students can record habitat information or draw examples of the organism. These students can copy a message onto the bags as a service project, or they can be given a bag and asked to color in a preprinted message. Advanced students can identify specific species that are being harmed in the community or are endangered.

38. Service-Learning Connection

Preparation. Discuss with the students various advertising techniques. Provide current examples from television and print ads. Examine what makes certain advertisements more effective than others. Obtain paper grocery bags from local grocery stores. Have students decorate the bags with slogans that convey messages to the public about natural habitats and the Earth and that describe how we should treat the Earth—not littering, for example. (If the bags have store logos on the front and back, the bag can be opened and the side parts used.)

Service. Students deliver the bags back to the grocery stores for use during Earth Day. Photographs are made of the students presenting their bags to the local store manager. (If transportation is a problem, pictures can be made of the students with their bags at the school. Perhaps the managers of the grocery stores could even come to the school.) Students are encouraged to visit one of the grocery stores on Earth Day. (Ideally, photographs are taken of the students with the customers who are receiving the bags the particular students made.)

Reflection. Students discuss how successful their project was in promoting awareness of Earth Day and environmental concerns. They also consider other methods for spreading information about taking care of the Earth.

Celebration. The photographs of the students presenting their decorated bags to the store managers are displayed on the classroom bulletin board. If snapshots have been taken of the customers receiving one of these bags or of the students and the customers together, those are also posted.

People and Trash

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|--------------------------|-----------|
| Content Area: | Science |
| Grade Level: | Grade 7 |
| Time to Complete: | Two weeks |

39. South Carolina Curriculum Standards Addressed

SCIENCE

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

- 1.a.1. Observe patterns of objects and events.
- 1.a.2. Distinguish between qualitative and quantitative observations.
- 1.b.1. Arrange data in sequential order.
- 1.b.2. Use scientific (e.g., field guides, charts, periodic tables, etc.) and dichotomous keys for classification.
- 1.d.1. Make inferences based on observations.
- 1.e.1. Predict the results of actions based on patterns in data and experiences.
- 2.b. Pose questions and problems to be investigated.
- 2.c. Obtain scientific information from a variety of sources (such as Internet, electronic encyclopedias, journals, community resources, etc.).
- 2.d. Distinguish and operationally define independent (manipulated) and dependent (responding) variables.
- 2.e. Manipulate one variable over time with repeated trials and controlled conditions.

II. Life Science

B. Regulation and Behavior

- 3.a. Evaluate behaviors to determine if they are inherited or learned.

40. Brief Description of Lesson/Activity

In this lesson, students complete a unit on animal responses to environmental stimuli and then observe and document people's behavioral responses to litter.

41. Focus Questions for Students

1. How do different species respond to various stimuli?
2. How are scientific data collected, measured, and reported?
3. What do you need to consider when setting up an experiment that relies on observation of human behavior? What are some variables you should consider?
4. Can we predict human responses accurately?

42. Culminating Assessment

Students complete their observations, report the data collected from their inquiry, and write up what they observed about human behavior with regard to littering.

43. Materials, Equipment, and/or Resources Needed

- science textbook
- notepads and pencils

44. Teacher Preparation

Acquire and organize the necessary items.

45. Procedures

| Teacher Activity | Student Activity | Assessment |
|--|--|---|
| Teach a unit on environmental stimuli and the ways that species react to these stimuli, both positively and negatively. | Students complete unit on environmental stimuli. | Unit test on environmental stimuli |
| Introduce the focus questions and lead the class in a discussion of their responses. | Students discuss their responses to the focus questions. | Student participation in the discussion |
| <p>Explain to the students that they are to conduct a scientific investigation in which they will observe and measure people's behavioral responses to litter. Their inquiry will focus on this key question: "Are people more likely to litter if the area around them already has trash on the ground?"</p> <p>Demonstrate and explain an example of a scientific inquiry and suggest further questions for the students to consider when conducting their investigation.</p> <p>Divide the class into three or four groups and explain that each group will need to develop a plan to carry out the observation and measurement phase of their inquiry.</p> | | |

| Teacher Activity | Student Activity | Assessment |
|---|---|----------------------------|
| <p>Assign each group an observation area such as a school hallway, the school grounds, or a local park.</p> <p>Guide students in their planning by discussing possible scenarios they can use as a basis for their observation. For example, one student can hand out a meaningless flyer as people leave a grocery store. The student group then observes and records what the people do with the flyer. Do they throw it down on the ground, or do they find the nearest trash can?</p> <p>Here are some other situations that student groups could use to observe behavioral responses to litter:</p> <ul style="list-style-type: none"> • If a trash can is overflowing with trash, do people try to place their own trash in the trash can, on the ground near the trash can, or on the ground away from the trash can? • If litter is spread across an area, does anyone try to pick up the trash? Does the litter cause people to be more inclined to throw their trash on the ground? Do people step over the trash? Do they comment on the trash? • If an area is perfectly clean, do people tend to use the trash can more often than they do when the area is already littered? | | |
| <p>Have each student group submit its observation plan in writing.</p> | <p>Students work in their groups to develop their plans to observe and measure a person's behavioral response to litter. Each group then turns in its plan as a written report.</p> | <p>Written group plans</p> |

| Teacher Activity | Student Activity | Assessment |
|--|---|---|
| Send each group of students to their designated area at the appropriate time. Have the students observe and record human behavior at that site for approximately 30 minutes. | Students go to their designated area and observe human behavioral responses to litter, and record their observations. | Student participation in the assigned activity |
| Guide each student group in writing a summary report that can be shared with other students by way of the school newspaper. These reports should describe the purpose of the inquiry, the location, the specific scenario used, the results observed, and the conclusions reached. | Students work in their groups to write their summary reports. | Written summary reports of human behavioral responses to litter as an external stimulus |

46. Differentiation of Instruction

Special-needs students can participate through observation and oral input. Advanced students can create additional litter-related scenarios that can be staged at the school.

47. Service-Learning Connection

Preparation. Students complete the observation experiment and discuss what they have learned. They then select a high-traffic area that is in need of beautification—perhaps the school blacktop, a nearby shopping center, or a road near the school. Students brainstorm the best way to beautify the area and explore the possibility of partnering with a local store to share in the cost of supplies.

Service. Students work to beautify the area they select. They take “before” and “after” pictures of the selected area.

Reflection. Students examine their “before” and “after” pictures to determine the impact of their project. They also discuss ways to promote the continued maintenance of the area, such as providing additional trash cans.

Celebration. The students celebrate in a way that is appropriate for the area they have chosen to beautify. For example, if they chose to clean a park, an afternoon of fun in that park is arranged for the students and their parents. If they cleaned an area around the school, a picnic is held at that location.

Do We Have a Healthy School with All This Litter?

| | |
|--------------------------|-----------------------------|
| Content Areas: | Science, Health |
| Grade Level: | Grade 7 |
| Time to Complete: | Three to five class periods |

48. South Carolina Curriculum Standards Addressed

SCIENCE

Grade 7

II. Life Science

A. Structure and Function in Living Systems

- 1.b. Classify organisms as single-celled (e.g., bacteria, algae, protozoa, and certain fungi) or multicellular (e.g., animals [vertebrate/invertebrate]).
- 1.d. Analyze the use of single-celled organisms in industry and in the production of food and problems single-celled organisms can cause for humans.
- 5.c. List common diseases caused by viruses (e.g., polio, measles, smallpox), bacteria (e.g., tetanus, strep throat), and protists (e.g., malaria).

HEALTH

I. Personal Health and Wellness

Standard 2: Access valid health information, products, and services.

By the end of grade eight, students should be able to

- demonstrate the ability to access resources and services that promote a safe and healthy environment

Standard 5: Use interpersonal communication skills to enhance health.

By the end of grade eight, students should be able to

- demonstrate effective verbal and nonverbal communication skills to enhance health and access personal health services

Standard 6: Use goal-setting and decision-making skills to enhance health.

By the end of grade eight, students should be able to

- predict how decisions regarding health behaviors have consequences for the self, for others, and for the environment

Standard 7: Demonstrate the ability to advocate for personal, family, and community health.

By the end of grade eight, students should be able to

- demonstrate the ability to influence and support others in promoting a healthy environment
- demonstrate the ability to use a variety of methods to disseminate valid health information

49. Brief Description of Lesson/Activity

In this lesson, students clean up litter from their school grounds and then conduct a microscopic study of the litter to identify what kind of organisms are growing in it. They also discover the types of health problems that can occur as a result of such organisms and as a result of litter in general.

50. Focus Questions for Students

1. Does our school have a litter problem? Are some areas of our school grounds more littered than others?
2. What kinds of litter do we most frequently see on our campus?
3. What kinds of organisms might be growing in the litter at our school?
4. What kinds of health problems can occur as a result of such organisms?
5. What kinds of health problems can occur as a result of the litter in general?

51. Culminating Assessment

Students use what they learn through their research to create pamphlets and posters informing the faculty, staff, and student body about the health risks associated with litter and the problem that exists at their own school and emphasizing the need to for reducing litter at the school. Student journal entries for the lesson are assessed for concepts and critical-thinking skills.

52. Materials, Equipment, and/or Resources Needed

- gloves, Ziploc bags
- microscopes, slides, Sterigel medium, petri dishes, and other equipment needed to conduct a microscopic investigation of litter samples
- markers to label and date specimens
- computers with Internet access

Web sites:

Life Science Connections

- <http://vilenski.org/science/safari/menu/index.html>

Franklin Institute's "Living Things" site

- <http://www.fi.edu/tfi/units/life/>

53. Teacher Preparation

1. Collect and organize the necessary items and information.
2. Determine which areas of the school grounds you will assign to your student groups to collect litter samples.
3. *(Optional)* Invite a health specialist such as a physician, a staff member at the Department of Health and Environmental Control, or Clemson Extension agent to speak to the students about health problems resulting from litter. A biologist from your local high school or microbiologist from an area college can also help identify some of the organisms that may be found in the cultures.
4. *(Optional)* Have reference books on hand to help identify the organisms.

5. (*Optional*) Have samples of organisms that may be found set up prior to beginning the investigation.

54. Procedures

| Teacher Activity | Student Activity | Assessment |
|---|---|---|
| Write the focus questions on the board. Have the students write their answers in their journals. | Students respond to the focus questions in their journals. | Journal entries answering focus questions |
| Divide the class into groups and assign each group a specific area of the school grounds for collecting litter samples. | | |
| Have the student groups collect small samples of litter in their assigned areas. Explain that they are to save any bits of paper and any moisture that have collected in the cans. Each sample should be placed in a Ziploc bag, and the bag should then be sealed. | Using gloves, students collect pieces of litter from their assigned areas. They place their collected samples in separate Ziploc bags and seal the bags. | Student participation in the litter-collecting activity |
| When the groups return to the classroom, lead the class into conducting a scientific investigation into what microscopic organisms are living in the litter samples. Review all the lab methodology and safety rules. | Students set up microscopes, slides, Sterigel medium, petri dishes, and other equipment needed to conduct a microscopic investigation of the litter samples they have collected. | Student participation in the lab exercise |
| <p>Have students put on their gloves and cut up pieces of the litter, being careful not to destroy any of the accumulations of dirt, liquids, or molds that may be on the specimens.</p> <p>Have students then examine the pieces of litter under a microscope, identifying any biotic life and abiotic factors they observe. They are to record in their journals all the observations they make. They are also to draw diagrams of what they observe.</p> | Students conduct a microscopic examination by preparing slides of the pieces of litter and any accumulations found on the litter. They record their observations in their journals. | Journal entries with diagrams, notes, and observations |

| Teacher Activity | Student Activity | Assessment |
|---|--|--|
| <p>Demonstrate how students are to prepare cultures of their litter samples by using Sterigel or a similar medium that can be grown in a petri dish. Make sure that the petri dishes are sealed and not reopened once they are prepared. Each culture is to be labeled with the time, the date, and the location where the litter sample was found.</p> <p>Have a warm dark place set up for the cultures to grow. Tell the students to check the growth after twenty-four and forty-eight hours. Provide books on the identification of different organisms.</p> | <p>Students prepare cultures of their litter samples. They record observations of growth after twenty-four and forty-eight hours.</p> | <p>Properly prepared cultures samples and recorded observations</p> |
| <p>Each group of students is then to prepare an oral report on their observations and findings and present the report to the class as a whole.</p> | <p>Student groups share their lab findings in oral reports to the class.</p> | <p>Oral reports on lab findings</p> |
| <p>Lead the class in a discussion of the groups' findings. What kinds of organisms were observed? Did anyone find mosquito larvae? Mold? Single-cell organisms?</p> | <p>The class discusses the groups' findings.</p> | <p>Student participation in the discussion of findings and conclusions</p> |
| <p>Direct student groups now to research what kind of health problems can be caused by the types of litter and organisms they found. Have them use the Internet and other resources in the library media center to identify some potential health problems that can result from litter. (You may want to have a DHEC staff member or a health specialist as a guest speaker.)</p> | <p>Students with in their groups conduct research on the type of health problems that can result from the litter found on the school yard.</p> | <p>Student participation in the research activity</p> |

| Teacher Activity | Student Activity | Assessment |
|---|--|--|
| Tell the student groups that they are to present their findings and conclusions in oral reports to the class. | Student groups give oral reports to the class on their research findings and conclusions. | Oral reports on research findings |
| Lead the class in discussing what they can do to educate other students about the health risks associated with litter and to make them aware of the problem as it exists at their own school. | Students discuss ways to educate other students about the health risks associated with litter and to make them aware of the problem as it exists at their own school. | Student participation in the discussion |
| Direct students to prepare pamphlets and posters to distribute to the students, faculty, and staff at their school. The pamphlets and posters must utilize the facts regarding the health risks associated with litter that students have learned through their research (such as the specific diseases that can be caused by the kinds of litter they found) and must show the need to reduce littering at their school. | Students create pamphlets and posters that utilize the facts about litter that they learned through their research. They distribute the pamphlets and posters to the faculty, staff, and other students at their school. | Student participation in creating and distributing the pamphlets and posters |
| Have students turn in their journals for assessment of concepts and critical-thinking skills. | Students review their journals to make sure their entries are complete. They turn in journals for assessment of concepts and critical-thinking skills. | Completed journal entries |

55. Differentiation of Instruction

Special-needs students who are unable to complete the lab individually can work with a partner. If necessary for accommodation, the teacher can prepare slides and cultures for a whole-class or small-group activity; special-needs students can complete the slide and culture at the same time. Advanced students can detail their findings and the need to reduce litter at school by preparing a videotape or a PowerPoint presentation for other grade levels or other schools.

56. Service-Learning Connection

Preparation. Students prepare pamphlets and posters demonstrating the need to change the habit of littering in the school. The pamphlets and posters focus on the impact of litter on health and contain facts that students learned as a result of their study of litter and potential diseases. Students design and distribute a form to survey student and community attitudes. The survey form contains such statements as "Littering can cause health problems within our school and community" and asking respondents to indicate that they "strongly agree," "agree," "don't know," "disagree," or "strongly disagree."

Service. Students conduct their survey of their school and community prior to distributing their pamphlets and posters. Two or three weeks after their pamphlets and posters were distributed, students conduct a second survey to determine if attitudes have changed.

Reflection. Upon completing the project, students analyze the results of the surveys they conduct before and after their pamphlet and poster campaign. They also discuss how the campaign progressed and how to improve their project as a whole.

Celebration. Students write articles for the school newspaper about their project and its results.

What Effect Does Litter Have on the Texture and Composition of Soil?

Content Areas: Science, Health
Grade Level: Grade 7
Time to Complete: Two class periods

57. South Carolina Curriculum Standards Addressed

SCIENCE

Grade 7

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

- 1.b.2. Use scientific (e.g., field guides, charts, periodic tables, etc.) and dichotomous keys for classification.
- 1.c.1. Select and use appropriate tools (e.g., metric ruler, graduated cylinder, thermometer, balances, spring scales, stopwatches) and units (e.g., meter, liter, Celsius, gram, Newton, second) to measure to the unit required in a particular situation.
- 2.b. Pose questions and problems to be investigated.
- 2.g. Organize data in tables and graphs.
- 2.h. Analyze data to construct explanations and draw conclusions.
- 3.a. Select and use appropriate tools and technology (such as calculators, computers, probes, thermometers, balances, spring scales, microscopes, binoculars, and hand lenses) to perform tests, collect data, and display data.

III. Earth Science

A. Structure of the Earth System

- 2.a. Discuss how climatic conditions affect the development of soils.
- 2.b. Analyze soil properties that can be observed (soil profile, composition, texture, particle size) and measured (permeability, temperature, pH, moisture) to predict soil quality.
- 2.d. Evaluate ways in which human activities have affected soil and the measures taken to control the impact (silt fences, ground cover, farming, land use, nutrient balance).
- 4.d. Analyze how chemical hazards (pollutants in air, water, soil, and food) affect populations and ecological succession.
- 7.a. Compare and contrast the abiotic factors that affect population growth and size (quantity of light, water, range of temperatures, soil compositions).
- 7.f. Evaluate the effects of human population on air, water, and land.
- 7.g. Analyze the benefits of solid waste management (reduce, reuse, recycle).

HEALTH

I. Personal Health and Wellness

Standard 4: Analyze the influence of personal beliefs, culture, mass media, technology, and other factors on health.

By the end of grade eight, students should be able to

- analyze the influence of technology and the environment on personal health

58. Brief Description of Lesson/Activity

In this lesson, students investigate the characteristics of soil texture and composition by conducting two tests in which comparisons are made between uncontaminated soil and soil that has been contaminated by litter.

59. Focus Questions for Students

1. What is soil?
2. What is living in the soil?
3. What effect can litter have on the texture and composition of soil?
4. What effect can contaminated soil have on human health?
5. What happens if the litter is not removed and stays in the soil?
6. What are some problems that may occur if litter is not removed?

60. Culminating Assessment

After completing their investigations, student groups record their findings and conclusions on wall charts and make oral presentations to the class. Using what they learned from the two investigations, students write reflections in their journals. They define the terms “soil texture” and “soil composition,” describe what they have discovered about soil composition and texture, and explain what impact litter has on the composition and texture of soil. They also identify the abiotic and biotic factors they observed and describe what effect contaminated soil can have on human health. In addition, they propose possible solutions to the litter problem.

61. Materials, Equipment, and/or Resources Needed

- chart paper and markers
- shovels, buckets, and gloves for collecting soil and litter from the school grounds
- four samples taken from the top 8 inches (20 cm) of the soil on the school grounds for each student group (see specific quantities below): two uncontaminated samples and two samples contaminated with litter that has been collected from the school grounds or a roadside area, cut into small pieces, and mixed into the soil

For soil composition test:

- two 4-cup (1 liter) mason jars with lids per student group
- 125 ml of uncontaminated soil for one jar per group
- 125 ml of contaminated soil for one jar per group

For each jar per group:

- 750 ml of water
- squirt of dishwasher gel or powder or TSP (trisodium phosphate)

For soil texture analysis:

- 100 ml of uncontaminated soil per group
- 100 ml of contaminated soil per group (see above)

Web sites:

Kid's Valley Garden's "Soil: A Dirty Business" page

- <http://www.raw-connections.com/garden/maint/soil.htm>

NASA's "Soil Science Education Home Page"

- <http://ltpwww.gsfc.nasa.gov/globe/>

62. Teacher Preparation

1. Gather the necessary items and information.
2. You may want to take a soil sample to your local Clemson Extension office or a local nursery for an authentic analysis before your students begin their own testing. Do not release this information to your students but rather use it to monitor and guide your students' work.
3. Become familiar with the directions for testing the soil. You may want to make a copy of the directions for each group of students.
 - For the **soil composition test**, add 125 ml of contaminated soil to one jar and 125 ml of uncontaminated soil to the other jar and then follow the directions at <<http://www.raw-connections.com/garden/maint/soiltest.htm>>.
 - For the **soil texture analysis**, use the dichotomous key on the "Texture by Feel Guide" page at <<http://ltpwww.gsfc.nasa.gov/globe/tbf/tbfguide.htm>>. The guide's cover page, "Texture by Feel," is also helpful; you can access it at <<http://ltpwww.gsfc.nasa.gov/globe/tbf/txtbyfel.htm>>.



63. Procedures

| Teacher Activity | Student Activity | Assessment |
|--|---|---|
| <p>Guide students into a discussion of the focus questions and an exploration of what soil is and what lives in the soil. This discussion will lead students into the subject of investigating soil composition and soil textures to determine soil quality.</p> | <p>Students discuss their responses to the focus questions.</p> | <p>Student participation in the discussion</p> |
| <p>One week prior to running the soil composition test, have students collect the soil samples and the litter from the school grounds and mix the bits of litter into the soil that is to be used as the contaminated sample.</p> | <p>Students collect soil and litter from the school grounds.</p> | <p>Student participation in the activity</p> |
| <p>Explain to the students that they are to conduct a soil composition test and then to write individual lab reports in their journals. The lab report must include</p> <ul style="list-style-type: none"> • the materials used to conduct the test, • the procedure that was followed, • the results of the tests, and • the conclusions they reached on the basis of the test results. | | |
| <p>Provide the students with materials and directions for conducting a soil composition test. Have them work in their groups to conduct the test.</p> | <p>Students work in groups to conduct soil composition tests. They then write their individual lab reports in their journals.</p> | <p>Student participation in the soil testing activity</p> <p>Written lab reports detailing the soil composition testing and the conclusions the students have reached</p> |
| <p>Tell the students they will now be conducting a soil texture investigation by using the</p> | | |

| Teacher Activity | Student Activity | Assessment |
|--|---|---|
| <p>dichotomous key on the “Texture by Feel Guide” Web page (the address is in section F, above). Tell the students that they must note any observations about texture differences and the biotic and abiotic materials found in both the uncontaminated and the litter-contaminated samples.</p> <p>Explain to the students that after completing this test, they must write a second lab report in their journals. The report must cover the same points that their first lab report covered, detailing the testing process and the conclusions to which it led them.</p> | | |
| <p>Provide the students with materials and directions for conducting a soil texture analysis. Have them work in their groups to conduct the test.</p> | <p>Students work in groups to conduct the soil texture analysis. They then write their individual lab reports in their journals.</p> | <p>Student participation in the soil analysis activity</p> <p>Written lab reports detailing the soil texture analysis composition testing and the conclusions the students have reached</p> |
| <p>Make the following assignment: all student groups are to prepare an oral report of their findings and present their report to the class. Each group is also to prepare a wall chart showing its findings and conclusions.</p> | <p>Each group prepares an oral report of its findings and also puts its findings and conclusions on a wall chart. Student groups then present their reports to the class.</p> | <p>Wall charts with findings and conclusions</p> <p>Completed group report of findings</p> |
| <p>Lead the class in a discussion of the groups’ overall findings and guide them into drawing a conclusion with regard to the effect that contaminated soil can have on human health.</p> | <p>Students participate in the discussion and arrive at a class conclusion with regard to the effect that contaminated soil can have on human health.</p> | <p>Student participation in the discussion</p> |

| Teacher Activity | Student Activity | Assessment |
|--|---|------------------------|
| <p>Direct students to reflect on what they have discovered about soil composition and texture by writing in their science journals. Tell the class that in their journal entries, they must define the terms “soil texture” and “soil composition,” identify any abiotic and biotic factors they have observed, and describe what effect litter has on the soil composition and texture. They must also propose solutions to the litter problem.</p> | <p>Students write their reflections in their journals.</p> | |
| <p>Have students turn in their journals for assessment of concepts and critical-thinking skills.</p> | <p>Students review their journals to make sure they are complete. They turn in the journals for assessment.</p> | <p>Journal entries</p> |

64. Differentiation of Instruction

Special-needs students can be paired with other students to complete the activity. In addition, special-needs students can be given blank lab reports to complete and discuss as part of a whole-group discussion. As a means of accommodating the varying ability levels that may exist within a class, students can be given the questions at the beginning of the lesson, and each group can focus on one question during the investigations. Advanced students can conduct additional tests on the soil in their neighborhoods.

65. Extension to Other Content Areas

Mathematics. The class can graph the results of the data collected in the activities.

Social Studies. Students can research such questions as these: "Why is there so much focus on the litter problem in South Carolina?" "What are the history and purpose of organizations like PalmettoPride and Keep America Beautiful?"

Language Arts. Students can write letters to the local conservation board and the Clemson Extension Service asking for information about how students can help with the litter problem.

66. Service-Learning Connection

Preparation. After completing the activity and drawing conclusions about the effect of litter on the soil at their own school, students partner with another class at an area school. The students share with the class what they learned about soil texture and composition and the effect that litter has on soil. In addition to providing information, the students offer to collect and test soil samples at this school and send the class the results.

Service. Students collect samples from littered and relatively unlittered areas of the school grounds. They label the samples and map their location. After completing the tests, the students consider the effect that littering has had on the campus soil. Students write up and return the test results to the participating class along with suggestions on how to attack the litter problem at their school.

Reflection. Upon completing the analysis and returning the information to the participants, students write to the local newspaper and the school newspaper about their project, emphasizing the importance of not littering and the success of teaching others about the litter problem.

Celebration. After returning to share the results with the other class, the students have a pizza party and invite the school administrators to participate and learn about the project.

Trash, Trash, and Trash!

| | |
|--------------------------|---------------------------|
| Content Area: | Science |
| Grade Level: | Grade 7 |
| Time to Complete: | Approximately three weeks |

67. South Carolina Curriculum Standards Addressed

SCIENCE

Grade 7

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

- 1.c.1. Select and use appropriate tools (e.g., metric ruler, graduated cylinder, thermometer, balances, spring scales, stopwatches) and units (e.g., meter, liter, Celsius, gram, Newton, second) to measure to the unit required in a particular situation.

III. Earth Science

A. Structure of the Earth System

- 7.f. Evaluate the effects of human population on air, water, and land.
- 7.g. Analyze the benefits of solid waste management (reduce, reuse, recycle).

68. Brief Description of Lesson/Activity

According to the Environmental Defense Fund, the average American generates three and a half pounds of garbage a day. This comes to a total of a half-ton of garbage per year for every American. In his or her lifetime, one person could generate as much as forty-five tons of garbage.

Because many items of trash can be reused or recycled, we can measurably reduce the amount of garbage that must be disposed of. The first step in reducing the amount of trash that is thrown away, however, is to realize how much is being created in the first place. In this activity, therefore, students will assess the amount of garbage that is generated by their school in a typical week.

69. Focus Questions for Students

1. How does trash affect our environment?
2. How can we reduce the amount of trash we produce in our classrooms and at home?
3. What are some items of trash that can be reused or recycled?

70. Culminating Assessment

After assessing the amount of garbage that is generated by their school in a typical week, students produce radio infomercials promoting recycling and reuse. They “broadcast” their infomercials to the student body during the morning announcements for a two-week period and then repeat their trash collecting and weighing effort to determine the impact of their school “radio” campaign.

71. Materials, Equipment, and/or Resources Needed

- spring scale
- trash bags (different colors if possible)
- gloves

72. Teacher Preparation

1. Assemble the necessary items.
2. Inform the custodial staff that the students themselves will dispose of their classroom trash in the afternoons for one week.

73. Procedures

| Teacher Activity | Student Activity | Assessment |
|--|---|---|
| Engage the students in a discussion about the focus questions and the amount of trash that is generated daily. Brainstorm with students a list of things they throw away on a daily basis. | Students discuss their responses to the focus questions and the amount of trash that is generated every day. They make a list of items they throw away daily. | Student participation in the activity |
| Explain to the students that they will be weighing the amount of trash that is generated by their school. Lead the class in a discussion of the different types of measurement tools and guide students toward the spring scale as the appropriate tool for them to use to determine the weight of the trash they collect. | Students identify the spring scale as the measurement tool they will be using. | |
| Divide the class into groups and assign each group a classroom or other specific area where they are to collect trash. Give each group two trash bags (different colors, if possible)—one for items that are recyclable or reusable and one for items that are not recyclable or | Wearing gloves, students gather trash in designated areas, sorting it by putting it in the appropriate bag. | Student participation in the trash gathering and sorting activity |

| Teacher Activity | Student Activity | Assessment |
|--|---|--|
| reusable. | | |
| <p>Allow the students an opportunity each day to weigh the amount of trash they have collected. Have students calculate the average weight of garbage for each class and then divide the average weight by the number of students and teachers in the classrooms. This will tell them how much garbage, on an average, that each person is generating.</p> <p>Have students log their findings for one week.</p> | <p>Students weigh the amount of trash and recyclables collected, calculate the average, and log the weights.</p> | <p>Student participation in the weighing, calculating, and logging activity</p> |
| <p>Discuss with the class the importance of reuse and recycling. Explain the impact of radio and television infomercials and newspaper ads promoting recycling.</p> | <p>Students discuss reuse and recycling and the impact of television and newspaper campaigns on that subject.</p> | <p>Student participation in the discussion</p> |
| <p>Have students produce audio infomercials promoting reuse and recycling. Arrange for students to “broadcast” their infomercials to the student body during the morning announcements.</p> | <p>Students produce infomercials promoting recycling and reuse. They then “broadcast” their ads to the student body during the morning announcements for two weeks.</p> | <p>Reuse and recycling infomercials</p> |
| <p>To determine the impact of the students’ infomercials on their schoolmates’ behavior, have the class repeat the trash gathering and weighing process described above and compare the amounts before and after the infomercials were “broadcast.”</p> | <p>Students repeat the trash gathering and weighing process and log their results.</p> | <p>Student participation in the second round of trash gathering, weighing, and logging process</p> |

| Teacher Activity | Student Activity | Assessment |
|------------------|------------------|------------|
| | | |

74. Differentiation of Instruction

Special-needs students can work with partners in collecting the trash, weighing it, and maintaining the daily log. Advanced students can compile the daily logs of each student group into one total for the class and compare the results before and after the “broadcasts” of the students’ recycling and reusing infomercials.

75. Extension to Other Content Areas

Mathematics. The students can graph on a single grid the amount of trash generated during both weeks. They can also calculate the difference between the two weeks.

Language Arts. Students write reports about their results, explaining the impact that the students’ infomercials may or may not have had.

76. Service-Learning Connection

Preparation. The students complete the trash collection and weighing activity and learn the amount of trash that is generated at their school on a daily and weekly basis.

Service. Through their infomercial “broadcasts,” the students help their classmates and the school staff realize how much trash is generated on a daily and weekly basis. The students challenge other classes to reduce the amount of trash they create.

Reflection. The students gather in small groups to discuss why it is important to reduce the amount of trash that we produce.

Celebration. The students monitor selected classes at their school for a week by gathering and weighing their trash. The students later host a pizza party for the class that most significantly reduced the amount of trash it generated.

Pollution

Content Area: Science
Grade Level: Grade 7
Time to Complete: One class period

77. South Carolina Curriculum Standards Addressed

SCIENCE

Grade 7

III. Earth Science

- A. Structure of the Earth System
- Infer how air pollution affects people and the environment.
 - Infer how air pollution affects the human body.
 - Analyze how air pollution can be reduced.
 - Analyze how chemical hazards (pollutants in air, water, soil, and food) affect populations and ecological succession.

78. Brief Description of Lesson/Activity

The students conduct research to understand the different forms of pollution that exist in South Carolina, the effects of pollution on the environment and on human beings, and the most effective ways to reduce the amount of pollution in our state.

79. Focus Questions for Students

- What is pollution?
- What different forms of pollution are there?
- How are the various forms of pollution a type of litter?
- How does pollution affect human beings?
- How does pollution affect the environment?
- What are the most effective ways to reduce the amount of pollution in our state?

80. Culminating Assessment

Students use their findings to create posters explaining solutions to specific pollution problems in South Carolina. They share their work in oral presentations to the entire class and distribute their posters throughout their school and community.

81. Materials, Equipment, and/or Resources Needed

- computers with Internet access
- poster board
- markers, crayons, paints
- paper for making pamphlets

82. Teacher Preparation

1. Assemble the necessary items.
2. Become knowledgeable about the air pollution problems in South Carolina and in your own county.
3. Become familiar with the effects of pollution on human beings.

83. Procedures

| Teacher Activity | Student Activity | Assessment |
|---|--|---|
| Lead the class in a discussion of the focus questions. Discuss the major causes of air, soil, and water pollution such as improper waste disposal, automobiles, and chemical plants. Explain to the students that polluting is an everyday occurrence. | Students respond to focus questions and participate in a class discussion. | Student participation in the discussion |
| Divide the class into groups and assign each group to use the Internet and other resources in the library media center to locate information on the pollution problem in South Carolina. Tell the students that they are researching specifically to determine how each type of pollution affects people and the environment. | Students work in groups to locate information on the various forms of pollution in our state and their impact on human beings and the environment. | Student participation in the research activity |
| Explain to students how to use a chart format to organize and record their findings. Tell them that each group of students will be asked to use their chart to report their findings to the class. | Using a chart format, student groups record how each type of pollution affects people and the environment. They then use their charts to report their findings in a presentation to the rest of the class. | Student participation in creating the charts and in the oral presentation of group findings |
| Have students now do further research to determine what can be done to reduce each type of pollution they have previously identified. | Students work in groups to research ways to reduce each form of pollution they have previously identified. | Student participation in the research activity |
| Have student groups use their | Students work in groups to create | Posters and oral presentations |

| Teacher Activity | Student Activity | Assessment |
|---|---|--|
| findings to create posters explaining solutions to specific pollution problems and then share their work in oral presentations to the entire class. | posters that describe solutions to specific pollution problems. They then share their work in oral presentations to the entire class. | |
| Have the groups distribute their posters throughout their school and community. | Students distribute their posters throughout their school and community. | Student participation in the distribution of the posters |

84. Differentiation of Instruction

Special-needs students can be given selected articles on pollution and can be assisted in locating and listing examples and in completing the chart. Advanced students can research current periodicals for information on the steps being taken by factories and car manufacturers to reduce pollution.

85. Extension to Other Content Areas

Art. The students can draw pictures to illustrate ways to reduce pollution.

Language Arts. The students can write letters to environmental control officials describing the ways that pollution affects their own lives.

86. Service-Learning Connection

Preparation. Students complete research on air, water, and soil pollution in our state and the various ways that we can address these problems. They then design age-appropriate oral presentations, with visuals such as posters and charts, to give to elementary school classes.

Service. The students make their presentations at local elementary schools.

Reflection. After making their presentations, the students discuss and contemplate the impact of what they learned from the experience.

Celebration. The students plan and host an Earth Day celebration for the elementary students.

Used Motor Oil

Content Areas: Science, Social Studies

Grade Levels: Grades 6, 7, and 8

Time to Complete: Two weeks

87. South Carolina Curriculum Standards Addressed

SCIENCE

Grade 6

IV. Physical Science

A. Properties and Changes of Properties in Matter

- 1.e. Apply properties of different densities to oil spill pollution problems and life in frozen lakes and to other real world situations.

Grade 7

III. Earth Science

A. Structure of the Earth System

- 2.d. Evaluate ways in which human activities have affected soil and the measures taken to control the impact (silt fences, ground cover, farming, land use, nutrient balance).
- 4.d. Analyze how chemical hazards (pollutants in air, water, soil, and food) affect populations and ecological succession.
- 7.g. Analyze the benefits of solid waste management (reduce, reuse, recycle).

SOCIAL STUDIES

II. Power, Authority, and Governance: Government/Political Science

- 8.7 The learner will demonstrate an understanding of government, its origins and functions, including civic life and politics.
- 8.7.3 explain the importance of personal responsibilities and civic responsibilities in the operation of a democracy

88. Brief Description of Lesson/Activity

According to the U.S. Environmental Protection Agency, an estimated 200 million gallons of used motor oil is improperly disposed of each year in the United States by being dumped on the ground, tossed in the trash (ending up in landfills), and poured down storm sewers and drains. Used oil is insoluble, persistent, slow to degrade, sticks to everything from beach sand to bird feathers, and can contain toxic chemicals and heavy metals that pose a health threat to humans, plants, and animals. This activity specifically examines the potential environmental effects and legal consequences of improperly disposing of used motor oil and the environmental and economic benefits of recycling the used oil.

89. Focus Questions for Students

1. Do your family members change their own oil, or do they take their cars and equipment to a service station?
2. Why do we have to dispose of used motor oil carefully?
3. What happens if used motor oil is poured onto the ground or into a water source?
4. Why is improperly disposing of motor oil, used oil filters, and used oil containers a form of littering?
5. How do you properly dispose of used motor oil?
6. What are the economic and environmental benefits of recycling used motor oil?
7. Why are there laws prohibiting the improper disposal of used motor oil?

90. Culminating Assessment

Students conduct research on the environmental and economic benefits of recycling used motor oil and the environmental and legal consequences of improperly disposing of it. They also identify oil recycling centers on a map of their local area.

91. Materials, Equipment, and/or Resources Needed

- poster board or chart paper
- computers with Internet access
- a copy of a map of the local area for every student group

Web sites:

“Used Motor Oil Recycling” (Web page of the Office of Solid Waste Reduction and Recycling at the Department of Health and Environmental Control (DHEC)—click on the name of your county for full information on local used motor oil collection and recycling sites)

- <http://www.scdhec.net/eqc/lwm/recycle/html/oil.html>

South Carolina Recycles newsletter and other publications from DHEC’s Office of Solid Waste Reduction and Recycling

- <http://www.scdhec.net/eqc/lwm/recycle/html/pubs.html#>

92. Teacher Preparation

1. Assemble the necessary items and information.
2. Become familiar with proper used motor oil disposal and recycling techniques.
3. Become familiar with proper used motor oil disposal and recycling procedures in South Carolina as well as the South Carolina Solid Waste Disposal Act of 1991, which prohibits the disposal of used motor oil in county and municipal landfills, and the federal Pollution Control Act, which makes dumping oil—“oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil” (33 U.S.C. § 1321(a)(1))—on the ground and in waterways illegal throughout the United States.

93. Procedures

| Teacher Activity | Student Activity | Assessment |
|---|---|---|
| <p>Lead the class in a discussion of the focus questions and familiarize them as needed with such terms as “economic impact” and “environmental effect.” Survey class members to determine whether the oil in their family automobile oil is changed at home or at a service station. Record their answers on chart paper. (If any students say that they do not know whether their families do their own oil changes or not, tell them to ask when they go home after school and report the answer the next day). Compute the percentage of families who perform their own oil changes. Record the percentage on the chart paper</p> <p>Follow up by asking the class this question: if your family members do change their own oil, where do they take the used oil for recycling? (Again, if necessary, have students ask their parents and report back the next day.)</p> | <p>Students discuss their responses to the focus questions and respond to the teacher’s question concerning oil changes at home (or ask their parents if necessary and report back the next day).</p> | <p>Student participation in the activity</p> |
| <p>Have students use the Internet and other resources in the library media center to conduct research on the environmental and economic benefits of recycling and the environmental and legal consequences of improperly disposing of used motor oil. Have them also locate information on programs in South Carolina (such as Santee Cooper’s GOFER program) that promote the recycling of used motor oil, oil filters, and empty oil containers. Tell the students that they are to write up their findings to share with the rest of the class.</p> | <p>Student conduct research on the environmental and economic benefits of recycling and the environmental and legal consequences of improperly disposing of used motor oil. They write up a report on their findings to share with the rest of the class.</p> | <p>Student participation in the research activity and written reports of findings</p> |

| Teacher Activity | Student Activity | Assessment |
|---|--|---|
| <p>Have students share their research findings orally with the class as a whole. Use the students' reports to compile a list of the benefits of recycling and the consequences of improperly disposing of used motor oil. Record the list on the board or on chart paper.</p> | <p>Students share their research findings orally with the class as a whole. They participate in compiling a list of the benefits of recycling and the consequences of improperly disposing of used motor oil as the teacher records the list on the board or on chart paper.</p> | <p>Student participation in the activity</p> |
| <p>Divide the class into groups. Have students work in their groups to create a list of oil recycling outlets in their community. You might also allow them to contact local recycling centers, garages, or automotive service centers to inquire whether they accept used motor oil. (Any contact your students have with outside sources should be carefully monitored.)</p> <p>Provide every group with a map of the local area. Have the students plot the locations of used motor oil recycling centers that their group has identified. In addition, have every student in the group locate and mark his or her residence on the map. Have them compare the locations and estimate the distances between their homes and the recycling centers.</p> <p>Encourage students to share this information with their parents.</p> | <p>Student groups create a list of recycling outlets in their community. They then transfer that information to a map of the area, identify the location of their own homes on the map, and estimate distances.</p> <p>Students share this information with their parents</p> | <p>Student participation in the activity and completed maps</p> |
| <p>Lead the class in a discussion of the original focus questions. Ask them to compare the answers they give now with the answers they gave originally.</p> | <p>Students discuss their responses to the focus questions, comparing their answers today with those they gave at the outset of the lesson.</p> | <p>Student participation in the discussion</p> |

94. Differentiation of Instruction

Special-needs students can work with partners to complete the research. Advanced students can design a schoolwide survey regarding used motor oil recycling and disposal.

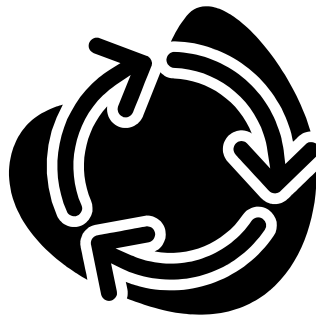
95. Service-Learning Connection

Preparation. The students complete their study of the legal and environmental consequences of improperly disposing of used motor oil. They go to the “Used Motor Oil Recycling” page of DHEC’s Office of Solid Waste Reduction and Recycling on-line at <<http://www.scdhec.net/eqc/lwm/recycle/html/oil.html>> for information on local oil recycling outlets.

Service. Using the information from their research as well as what they learned from the activity itself, student groups design an informational pamphlet detailing why and how people who change their own oil should properly dispose of used motor oil, used oil filters, and empty oil containers. These pamphlets can be designed and produced on the computer, and copies can be made to distribute to parents. The students can also distribute the pamphlets at a PTO/PTA meeting.

Reflection. The students discuss the effects of improperly disposing of used motor oil disposal and draw pictures depicting possible consequences.

Celebration. The teacher posts the students’ pictures outside the classroom. The PTO/PTA recognizes the students’ efforts.



One Man's Trash Is Not Another Man's Treasure

Content Area: Science
Grade Levels: Grades 6, 7, and 8
Time to Complete: Two class periods

A. South Carolina Curriculum Standards Addressed

SCIENCE

Grades 6 and 7

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

6.a. Analyze different ideas and explanations to consider alternative ideas.

Grade 7

III. Earth Science

A. Structure of the Earth System

7.g. Analyze the benefits of solid waste management (reduce, reuse, recycle).

Grades 7 and 8

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

7.a. Use drawings, written and oral expression to communicate information.

Grades 6–8

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

1.b.2. Use scientific (e.g., field guides, charts, periodic tables, etc.) and dichotomous keys for classification.

2.c. Obtain scientific information from a variety of sources (such as Internet, electronic encyclopedias, journals, community resources, etc.).

2.h. Analyze data to construct explanations and draw conclusions.

B. Brief Description of Lesson/Activity

In this activity, students explore the concepts of recycling and reuse by investigating the forms of trash that are generated by a typical household and then considering the issue of the proper disposal of those kinds of trash items.

C. Focus Questions for Students

1. How much trash does your family produce in one day?
2. Who is responsible for disposing of the trash at your house?
3. How can you determine if an item of trash can be recycled or reused?
4. What are the most effective ways to handle the various types of waste that we generate?

D. Culminating Assessment

The students write a short paper on recycling and reuse from their point of view. They also produce pamphlets informing families about how to dispose of trash effectively and efficiently. They give the pamphlets to their parents and their neighbors.

E. Materials, Equipment, and/or Resources Needed

- trash brought from students' homes for one day
- gloves, face masks
- sorting bags or small boxes labeled "Recyclable," "Reusable," and "Neither Recyclable Nor Reusable"
- information on local recycling standards (You can start by going to the "S.C. County Recycling Programs" page of the Office of Solid Waste Reduction and Recycling at the Department of Health and Environmental Control [DHEC] at <http://www.scdhec.net/eqc/lwm/recycle/html/counties.html>. Click on your county on the map.)
- paper, pens, and markers, or computers with graphics software, for making pamphlets

F. Teacher Preparation

1. Assemble the needed items and information.
2. Make a copy of the "Household Trash Survey" form (provided below) for each student.
3. Make an assignment chart specifying which day each student will bring in litter from home.



G. Procedures

| Teacher Activity | Student Activity | Assessment |
|---|--|--|
| <p>Introduce the lesson by discussing the concepts of recycling and reuse and explaining the recycling standards currently in place in your city and county. Lead the class in a discussion of the focus questions. Help the class to see the relevance of this lesson by relating it to their everyday circumstances.</p> | <p>Students discuss their responses to the focus questions and begin to examine how the litter problem directly impacts their lives.</p> | <p>Student participation in the discussion</p> |
| <p>Make assignment charts for the class designating a day for each student or group of students to bring in bags of trash they collect from home.</p> | <p>Students bring in bags of trash they have collected from their homes.</p> | <p>Student participation in collecting the trash from home and bringing it to school</p> |
| <p>Each day, open the bags of trash that students bring from home. Pass out the gloves (and masks for those who need them) and have the students sort the trash according to (1) items that are recyclable, (2) those that are reusable, and (3) those that are neither recyclable nor reusable.</p> | <p>Wearing gloves (and masks if needed), students follow the teacher directives and sort the trash that they and their classmates have brought in.</p> | <p>Student participation in sorting the trash</p> |
| <p>Pass out copies of the “Household Trash Survey” form (provided below) and explain how students are to complete it.</p> | <p>Students record on the “Household Trash Survey” form information on the type of trash they have collected.</p> | <p>Student participation in completing the “Household Trash Survey” forms</p> |
| <p>Explain to the students that they are to write a short paper in which they describe what they have observed with regard to the items of trash that were brought to class.</p> <p>Direct them in considering the following questions:</p> <ul style="list-style-type: none"> • What percentage of our household trash is recyclable? • How many items that we | <p>Students listen and take notes in preparation for writing their short papers.</p> | <p>Student participation in the class activity</p> |

| Teacher Activity | Student Activity | Assessment |
|---|--|------------------------------------|
| <p>throw away are actually reusable?</p> <ul style="list-style-type: none"> • What problems can arise if trash is not properly disposed of? • Do we waste when we dispose of items that could be recycled or reused? | | |
| <p>Assist students in outlining the short paper; then guide them through the writing process.</p> | <p>Students begin their rough drafts by outlining the main points they want to make. They then complete the writing of the final drafts of their papers and hand them in for assessment.</p> | <p>Short papers</p> |
| <p>Divide the class into groups and explain what needs to be considered in the creation and development of a “trash awareness” pamphlet. Provide each group with materials to make their pamphlets. (The Department of Health and Environmental Control has some informational flyers that the students can refer to in designing their own.)</p> | <p>Students create “trash awareness” pamphlets to take home to their parents and give to their neighbors to inform families about how to dispose of trash effectively and efficiently.</p> | <p>“Trash awareness” pamphlets</p> |

H. Differentiation of Instruction

Special-needs students can complete the activity with partners. Advanced students can locate additional information on recycling and can implement a recycling program within the classroom and/or school.

I. Extension to Other Content Areas

Language Arts. Information worksheets such as “WasteWise,” “Littering Isn’t Cool,” “Things You Can Do,” and “Learn to Be a Green Driver” from the Department of Health and Environmental Control can be used as springboards for students to write essays. Possible titles for other student essays are “Why We Need Garbage Persons,” “Taking Care of My Community,” and “One Piece at a Time.” These essays could be read aloud in class or placed on a bulletin board.

J. Service-Learning Connection

Preparation. After completing the activity using their at-home trash, the students organize and participate in a trash- and litter-collection effort at their school. They sort and classify what they find as “recyclable,” “reusable,” or “neither recyclable nor reusable,” and tally the results. They also research the most effective ways to dispose of trash and litter, and they investigate how their school disposes of its trash. Does the school recycle?

Service. The students create posters and write a letter to the principal detailing the kinds of trash that their school generates and giving information about how these particular items of waste are most effectively and efficiently handled.

Reflection. The students exchange thoughts about what they have accomplished with their school trash and litter collection and analysis and about what effect their pamphlets and their letter to the principal have had or will have in the future.

Celebration. The students host an environmental night at the school. They serve refreshments recycled or recyclable paper products, and the principal is their honored guest.

How Long Is Too Long?

Content Area: Science
Grade Levels: Grades 6, 7, and 8
Time to Complete: One week

96. South Carolina Curriculum Standards Addressed

SCIENCE

Grades 6–8

I. Inquiry

- A. Abilities Necessary to do Scientific Inquiry
 - 2.b. Pose questions and problems to be investigated.
 - 2.c. Obtain scientific information from a variety of sources (such as Internet, electronic encyclopedias, journals, community resources, etc.).
 - 2.h. Analyze data to construct explanations and draw conclusions.
 - 7.a. Use drawings and written and oral expression to communicate information.

Grade 7

II. Life Science

- D. Populations and Ecosystems
 - 2. a. Analyze the role of producers, consumers and decomposers in an ecosystem.

97. Brief Description of Lesson/Activity

How long trash and litter take to decompose into a soluble material that can be reused by the earth is an important issue. In this activity, students investigate which forms of garbage decompose best.

98. Focus Questions for Students

1. What causes a substance to break down?
2. What role does decomposition play in an ecosystem?
3. What is a landfill?
4. What is a compost pile?
5. What are some ways people abuse the land and disrupt the natural ecosystem?
6. How can people keep the land safe and productive?

99. Culminating Assessment

Students will write a final report assessing the results of their experiment to determine what kinds of garbage break down the most rapidly and the most completely.

100. Materials, Equipment, and/or Resources Needed

- three plastic containers for each group of students

- three sets of garbage: set A (vegetable peelings, bread, and food leftovers), set B (egg shells, nut shells, and paper), and set C (aluminum foil, plastic, and a penny)
- soil from the school yard
- colored pencils or markers
- aluminum foil
- books such as *Waste and Recycling*, by Barbara Taylor, and *Rubbish! The Archaeology of Garbage*, by William Rathje and Cullen Murphy.

101. Teacher Preparation

1. Gather the needed supplies.
2. Alert the janitorial staff about the dirt and smell that may accompany the project.

102. Procedures

| Teacher Activity | Student Activity | Assessment |
|--|--|--|
| Introduce the focus questions and lead the class in a discussion of their answers to these questions. | Students discuss their responses to the focus questions. | Student participation in the discussion |
| <p>Explain to the students that they will conduct an experiment to answer this important question: what kinds of garbage break down the most rapidly and the most completely?</p> <p>Explain key terms regarding scientific investigation such as “hypothesis,” “data,” “research,” “analysis,” and “conclusion.”</p> | | |
| <p>Divide the class into groups then explain the sequence of steps in the experiment that each group is to follow:</p> <ol style="list-style-type: none"> 1. Fill three plastic containers half full of dirt. Label the containers “A,” “B,” and “C.” 2. Add a little water to each container to make the soil wet but not watery. 3. Then add a different mixture of garbage to each of the containers as follows: | Students begin the experiment by following the first three steps in the procedure. | Student participation in conducting the experiment |

| Teacher Activity | Student Activity | Assessment |
|---|--|--|
| <p>“A” = vegetable peelings, bread, and food leftovers “B” = egg shells, nut shells, and paper) “C” = aluminum foil, plastic, and a penny</p> <p>Oversee and assist students as they assemble their garbage containers.</p> | | |
| <p>4. Check the three containers every day for changes. Record any changes that you see.</p> | <p>Student groups monitor their containers and record their observations each day.</p> | <p>Student participation in the daily monitoring and recording of observations</p> |
| <p>5. To be sure the soil stays damp, add a teaspoon of water each day if necessary.</p> | <p>To be sure the soil stays damp, students add a teaspoon of water each day if necessary.</p> | |
| <p>When students complete their observation logs, have them use those findings to write a report stating and explaining the conclusion they have formulated in answer to the question of what kinds of garbage break down the most rapidly and the most completely.</p> | <p>Students groups complete their observation logs and use those findings to write a report that answers the original question: what kinds of garbage break down the most rapidly and the most completely?</p> | <p>Completed observation logs and written reports including a written report with a stated answer to the original question</p> |

103. Differentiation of Instruction

Special-needs students can work with partners or in a group to conduct the experiment and complete their observation log. They can also do an oral report on their findings. Advanced students can share their findings by writing letters as official reports to the county office for solid waste storage.

104. Service-Learning Connection

Preparation. The students fill their containers with various forms of garbage, and make daily observations of the breakdown process, and formulate conclusions concerning the rates at which types of garbage breaks down. Next, students locate information on making compost and compost containers. (Clemson Extension offers an on-line booklet on composting at <<http://hgic.clemson.edu/PDF/HGIC1600.pdf>>.) The teachers provides an appropriate compost bin.

Service. The students put the garbage from their “A” and “B” containers into the compost bin and add other appropriate materials. They then give the bin to the school’s maintenance crew to make compost for plants on the campus. Students also write down the directions for making compost and distribute them to adults at school and in the community.

Reflection. The students ponder the positive effects that decomposition can have on plant and animal life as well as the negative impact of items of garbage that do not decompose.

Celebration. Students plant some flowers at the school and use the compost they made to fertilize them.

Industrial Pollution

Content Areas: Science, Social Studies

Grade Levels: Grades 6, 7, and 8

Time to Complete: One week

105. South Carolina Curriculum Standards Addressed

SCIENCE

Grade 6

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

- 5.a. Review and summarize data to show cause-effect relationships in experiments.
- 5.b. State explanations in terms of independent (manipulated) and dependent (responding) variables.
- 5.c. State hypotheses in ways that include the independent (manipulated) and dependent (responding) variables.

Grade 7

III. Earth Science

A. Structure of the Earth System

- 4.a. Infer how air pollution affects people and the environment.
- 4.b. Infer how air pollution affects the human body.
- 4.c. Analyze ways air pollution can be reduced.
- 4.d. Analyze how chemical hazards (pollutants in air, water, soil, and food) affect populations and ecological succession.

SOCIAL STUDIES

II. People, Places, and Environments: Geography

7.3 The learner will demonstrate an understanding of world culture regions.

- 7.3.14 discuss how humans and their use of technology have changed the physical environment and describe the consequences of these changes in each world region

II. Power, Authority, and Governance: Government/Political Science

8.7 The learner will demonstrate an understanding of the role of the citizen in American democracy, including personal and civic rights and responsibilities.

- 8.7.3 explain the importance of personal responsibilities and civic responsibilities in the operation of a democracy

III. Production, Distribution, and Consumption: Economics

8.9 The learner will demonstrate an understanding of the sources of income and growth in a free enterprise economy in the context of South Carolina and United States studies.

8.9.4 compare different production methods and illustrate how productivity is affected by technological change

106. **Brief Description of Lesson/Activity**

Technological and industrial advances have improved the quality of life in our country. However, some industries have created pollution that adversely affects people and animals as well as the environment. This activity attempts to make students more aware of how they can protect the environment from industrial pollution and the problems that accompany it.

107. **Focus Questions for Students**

1. What is pollution?
2. What are the different types of pollution?
3. What problem is the worst: air pollution, water pollution, or soil pollution?
4. What can industrial plants do to reduce pollution? What effect could such measures have on their productivity and profits?
5. What can we do help reduce the air, water, and soil pollution that now exists in our state?

108. **Culminating Assessment**

Students are taken on a field trip to an industrial plant to see firsthand how plant operators handle the pollution generated by their plants. Prior to the visit, students prepare questions for plant administrators regarding industrial pollution. After their visit, students share what they learned by giving oral presentations and making posters to distribute throughout their school.

109. **Materials, Equipment, and/or Resources Needed**

- poster board, paints, crayons, markers
- soap and water
- paper towels

110. **Teacher Preparation**

1. Collect the needed items.
2. Locate specific information on industrial pollution as it pertains to the industries located in your area.
3. Check your area for industries that permit school visits. Select one such industry and arrange for your class to visit its facility.

111. Procedures

| Teacher Activity | Student Activity | Assessment |
|--|--|---|
| Lead the class in a discussion of the focus questions. Write the responses to the focus questions on the board. | Students discuss their responses to the focus questions. | Student participation in the discussion |
| Assign the following homework: students are to ask their parents and neighbors for their thoughts about industrial pollution and about how to attack the problems of air, water, and soil pollution that certain industries have created. Students are then to write up the information they have gathered and hand their reports in to the teacher. | Students ask their parents and neighbors for their thoughts about industrial pollution and about how to attack the problems of air, water, and soil pollution that certain industries have created. They then write a report on the information they gather. | Student reports on their parents' and neighbors' ideas and opinions |
| Divide the class into groups and have the members of each group work together to compile their parent/neighbors reports into an oral presentation to the class as a whole. Allow them additional time for research as needed. | Students work in groups to compile their parent/neighbors reports into an oral presentation. They conduct additional research as needed. | Student participation in the activity |
| Have each group take its turn in presenting its report to the class. | Student groups make their oral presentations to the class. | Student participation in the oral presentations |
| To demonstrate the effects of air pollution, direct the students outside to wash a window, checking for debris and dirt. After a few days, have the students check the window again, using a paper towel, to see the dirt that has returned. Discuss with students the possible reasons why the window became dirty again. | Students participate in the window-washing experiment and draw conclusions based on their observation. | Student participation in the experiment |
| Prepare students for the arranged field trip to the local industrial plant by giving them additional information on the forms of pollution that industrial plants create. Your purpose is to enable | Students listen and take notes on the information the teacher gives them regarding the forms of pollution that industrial plants create. | Student participation in the note-taking activity |

| Teacher Activity | Student Activity | Assessment |
|---|--|--|
| the students to ask the plant officials relevant questions and to make connections among the facts and ideas that they will hear. | | |
| Have students work in groups to prepare a set of questions for plant administrators regarding industrial pollution. (For example, “What steps does your plant take to keep from polluting the environment?”) | Student groups prepare questions for plant administrators regarding industrial pollution. | Student participation in preparing the questions |
| Take students on the field trip to the plant. Encourage them to ask their questions of the plant administrators. | Students tour the industrial plant and ask their questions | Student participation in the tour and asking their questions |
| Upon returning from the field trip, have students work in their groups to use what they have learned about pollution from their visit to the industrial plant to prepare oral presentations to give to the class as a whole. Encourage the students to consider how pollution and litter are related. | Student groups prepare and give oral presentations on what they have learned about industrial pollution. | Student participation in the oral presentations |
| Have students now use what they have learned about pollution from their visit to the plant industrial and from the group presentations to create antilitter/antipollution posters to distribute throughout their school. | Students create antilitter/antipollution posters and distribute them throughout their school. | Student participation in making and distributing the posters |

112. Differentiation of Instruction

Special-needs students can work with partners in completing group activities and creating their posters. Advanced students can do additional research on the steps that industrial plants are taking to reduce pollution.

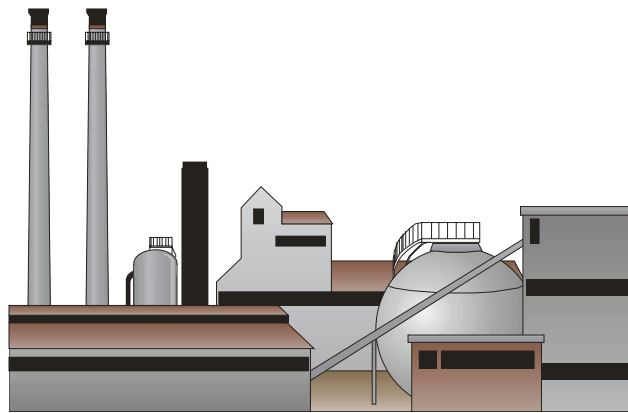
113. Service-Learning Connection

Preparation. Students complete the activities within the lesson and then develop a plan for distributing their antilitter/antipollution posters to businesses and industries in their area.

Service. Students distribute their antilitter/antipollution posters to businesses and industries in their area.

Reflection. Following their field trip to the local industrial plant, the students write letters to the plant administrators thanking them for the opportunity to visit and learn more about their efforts to reduce pollution and protect the environment.

Celebration. Plant administrators are invited to a class celebration of their collaborative efforts to prevent pollution and protect the environment.



The Impact of Litter on a Natural Habitat

Content Area: Science
Grade Levels: Grades 6, 7, and 8
Time to Complete: One class period

114. South Carolina Curriculum Standards Addressed

SCIENCE

Grade 6

II. Life Science

C. Regulation and Behavior

- 3.a. Explain the importance of fungi as decomposers and their adaptations to that role.

Grade 7

II. Life Science

D. Population and Ecosystems

- 1.c. Distinguish between habitats and niches.
- 2.c. Analyze energy flow in a food chain and its relationship to a food web.

Grade 8

II. Life Science

A. Diversity and Adaptation of Organisms

- 2.a. Suggest evidence of how species have adapted to changes in their habitats.
- 2.b. Analyze how an adaptation can increase an organism's chances to survive and reproduce in a particular habitat.

115. Brief Description of Lesson/Activity

In this activity, the students identify different kinds of habitats and describe the characteristics of each. They then integrate that information with the use of technology (the Internet), draw a food chain or food web, and determine how things would change if litter were added to the particular habitat.

116. Focus Questions for Students

1. What is a habitat?
2. What is a food chain? What is a food web?
3. What effect could litter have on a food chain?
4. What effect could litter have on a natural habitat as a whole?

117. Culminating Assessment

Students work in groups to research a specific habitat, create an example of a food chain that would exist in that habitat, and do further research to determine how litter and/or pollution would affect this food chain and ultimately affect the particular habitat as a whole. Each group then writes up its findings and shares them in a presentation to the entire class.

118. Materials, Equipment, and/or Resources Needed

- poster board, markers, crayons
- computers with Internet access
- example of a food chain or web (Two helpful Internet pages are Food Chains and Webs at <<http://www.vtaide.com/png/foodchains.htm>> and Interesting Facts about Food Chains at <http://www.arcytech.org/java/population/facts_foodchain.html>.)

119. Teacher Preparation

Locate and organize the necessary items and information.

120. Procedures

| Teacher Activity | Student Activity | Assessment |
|--|---|---|
| Review the relevant curriculum standards and then lead the class in a discussion of the focus questions. Ask students to describe their own habitat. | Students discuss their responses to the focus questions. | Student participation in the discussion |
| Have the students brainstorm to identify major types of habitats (e.g., ocean, jungle, desert, polar region) and locate them on a globe or world map. | Students identify major types of habitats and locate them on a globe or world map. | Student participation in locating habitats |
| Have the students list on poster board the major habitats they have identified. | Students list on poster board the major habitats they have identified. | Student participation in creating the list |
| Have the students conduct research on the Internet and in the library media center to identify additional habitats and to learn the characteristics of each. | Students conduct research on the Internet and in the library media center to identify additional habitats and to learn the characteristics of each. | Student participation the research activity |
| Have the students list on poster board the habitats they have identified through their research. Have them use a chart format to | Students list and describe on poster board the habitats they have identified through their research. | Student participation in creating the list and descriptions of habitats on poster board |

| Teacher Activity | Student Activity | Assessment |
|---|--|--|
| describe on the poster board the characteristics of each habitat, including the types of animals and other organisms that live there. | | |
| Divide the class into groups and have each group select one habitat to research further. Each student in the group is to write a brief report on what he or she has learned from the research. | Student groups select one habitat to research more thoroughly. Each member writes a brief report on what he or she has learned. | Completed research and written reports |
| Furnish student groups with an example of a food chain or web. Then have the students work in their group to draw the food chain for their chosen habitat. (This task may require some additional research.) | Students work in their groups to create food chains or webs for their chosen habitat. | Completed food chain or webs |
| Make the following assignment: student groups are to conduct research to determine how litter and/or pollution would affect this food chain and ultimately affect the particular habitat they have researched. Each group is to write up its findings and share them in a presentation to the entire class. | Student groups conduct research to determine how litter and/or pollution would affect this food chain and ultimately affect the particular habitat they have researched. Each group then writes up its findings and shares them in a presentation to the entire class. | Oral presentations |

121. Differentiation of Instruction

Special-needs students can work with partners or in a small group to locate information on habitats. Advanced students can create a detailed food web.

122. Service-Learning Connection

Preparation. The students complete their research on different habitats and determine the effect that litter could have on the food chains in particular habitats. The teacher makes plans for the students to participate in the Adopt-a-Landing program sponsored by the Department of Natural Resources (DNR). (Details about the program as well as specific contact information are available on-line at <<http://water.dnr.state.sc.us/water/envaff/river/educate/aalandng.html>>). As the DNR explains on its Web site, Adopt-a-Landing is designed to clean up and promote the stewardship of boat ramps along the state's rivers and lakes and is also intended to educate the public concerning the harmful effects that litter has on the environment.

Service. Once a site is located, the students participate in cleaning up the boat landing several times throughout the school year.

Reflection. The students share how they felt after participating in the cleanup project.

Celebration. The teacher takes pictures of the students participating in the cleanup project. The pictures are published in the school newspaper or yearbook or are compiled into a scrapbook to share with parents at the next open house event. The DNR, in recognition of the students' involvement in the program, will erect a sign at the landing bearing the name of the school and the class as the adopting group.

Litter: A Dollars and Sense Issue

Content Areas: Science, Social Studies

Grade Levels: Grades 6, 7, and 8

Time to Complete: Eight to ten class sessions

123. South Carolina Curriculum Standards Addressed

SCIENCE

Grades 6, 7, and 8

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

1.a.1. Observe patterns of objects and events.

1.d.1. Make inferences based on observations.

1.e.1. Predict the results of actions based on patterns in data and experiences.

2.b. Pose questions and problems to be investigated.

Grade 7

III. Earth Science

A. Structure of the Earth System

7.d. Examine how materials are reused in a continuous cycle in ecosystems.

7.e. Distinguish between renewable and nonrenewable resources and examine the importance of their conservation.

SOCIAL STUDIES

IV. Production, Distribution, and Consumption: Economics

7.5 The learner will demonstrate an understanding of national economies and economic policies.

7.5.3 explain how governments raise revenue and state examples of economic goods and services that they provide

8.11 The learner will demonstrate an understanding of the state and national economy and economic policies.

8.11.3 identify the principal sources of income and expenditures of federal, state, and local government

124. Brief Description of Lesson/Activity

In this lesson, students examine the litter problem from an economic perspective. Students are led to consider what happens to trash and the costs associated with collecting trash, cleaning up litter, and recycling waste products. At the conclusion of the lesson, students should have a deeper understanding of the economic impact of the litter problem.

125. Focus Questions for Students

1. What happens to trash? Where does it all go?
2. What kinds of litter do we have in and around our school? Do we have a litter problem?
3. How are trash and litter managed at our school? In our community?
4. What are the average yearly costs associated with trash collection and recycling programs in our state?
5. What are the average yearly costs associated with litter cleanup in South Carolina? Who covers these costs?
6. What kinds of trash and litter are recyclable or reusable?
7. What kinds of trash and litter are biodegradable?
8. Why are recycling and reuse important for South Carolina's economy?

126. Culminating Assessment

After student groups conduct research and complete the "How to Be a Litter Detective" worksheet, they give oral presentations to the entire class in which they examine the issue of waste and litter at their school from the economic perspective.

127. Materials, Equipment, and/or Resources Needed

- litter collection bags, gloves
- boxes for sorting collected litter
- computers with Internet access
- copies of the "How to Be a Litter Detective" sheet (provided below) for every student group
- information about how trash is handled in your area and the average yearly costs associated with local trash collection and recycling programs. (You can start by going to the "S.C. County Recycling Programs" page of the Department of Health and Environmental Control's Office of Solid Waste Reduction and Recycling at <<http://www.scdhec.net/eqc/lwm/recycle/html/counties.html>>. Click on your county on the map.)

128. Teacher Preparation

1. Acquire and organize the needed items and information.
2. Reproduce the "Where Does Trash Go?" (provided below) handout as an overhead transparency.
3. Make a copy of the "How to Be a Litter Detective" sheet (provided below) for every student group.
4. Determine the areas around the school that are to be used for litter collection.

129. Procedures

| Teacher Activity | Student Activity | Assessment |
|---|---|---|
| <p>Introduce the lesson by leading the class in a discussion of the focus questions. Have students record their answers to the focus questions in their journals.</p> <p>Tell the students that they will soon use the Internet and other resources in the library media center to research focus questions 4 through 9 in more depth. Explain that the final product of their investigation will be oral presentations in which they examine the issue of waste and litter from an economic perspective.</p> | <p>Students discuss their responses to the focus questions. They then write answers to the focus questions in their journals.</p> | <p>Student participation in discussing and recording in their journals the answers to the focus questions</p> |
| <p>Have students consider what happens to their trash. Show them the “Where Does the Trash Go?” (provided below) as an overhead transparency. Provide students with specific information about how trash is handled in their area and the average yearly costs associated with local trash collection and recycling programs in your community.</p> | <p>Students discuss what they think happens to their trash on a weekly basis. They view and discuss the “Where Does the Trash Go?” transparency and take notes on the additional information provided by the teacher.</p> | <p>Student participation in the classroom activity</p> |
| <p>Divide the class into groups and have the groups now use the Internet and other resources in the library media center to research focus questions 4 through 9. Have each group select a reporter to write up the final answers to the questions.</p> | <p>Students now work in groups to use the Internet and other resources in the library media center to research the focus questions. They select a reporter to record final answers for their group.</p> | <p>Student participation in the research activity</p> |
| <p>When the groups have completed their research, give each group a copy of the “How to Be a Litter Detective” sheet and tell them to complete “Part 1” on the sheet by</p> | <p>Student groups go to their designated areas to conduct “Part 1” of their investigation by following the directions on the sheet.</p> | <p>Student participation in the “Litter Detective” activity</p> |

| Teacher Activity | Student Activity | Assessment |
|--|--|--|
| going to the designated area for litter collection. Specify the amount of time they are to spend there. | | |
| When the groups return to the classroom, have them complete “Part 2” of the “How to Be a Litter Detective” sheet. Have each student group again select a reporter to record their answers to the questions on the sheet. | The student groups work to complete “Part 2” of the “How to Be a Litter Detective” sheet. Each group selects a reporter to record its answers to the questions on the sheet. | |
| When class reconvenes, have the groups share with the class their answers to the questions on the “Litter Detective” sheet. | Student groups share and discuss their answers to the questions on the “Litter Detective” sheet. | Student responses to the “Litter Detective” questions; student participation in the discussion |
| Have all student groups now complete “Part 3” of the “Litter Detective” sheet by preparing oral presentations in which they examine the issue of waste and litter from an economic perspective. Tell students, as a part of their preparation, to revisit all the focus questions and compare their answers to these questions before and after doing their research and “detective” work. | Students work in groups to prepare their oral presentations. | Student participation in the group work |
| Have students give their presentations. | Student groups give their presentations. | Group presentations |

130. Differentiation of Instruction

Special-needs students can be placed in groups with other students so that they can receive assistance as needed. In addition, the teacher can accommodate these students by providing them written notes and by seating them closer to the front of the classroom. Advanced students can do a cost analysis regarding what the state of South Carolina spends on litter cleanup in comparison with what other states spend for that purpose.

131. Service-Learning Connection

Preparation. The teacher secures permission from school officials for students to establish a recycling center at the school. Students generate ideas about how to establish and successfully maintain a school recycling program. Students then promote the recycling center and encourage faculty and students to be more aware about how they are disposing of their trash. This campaign is carried out with posters and public announcements.

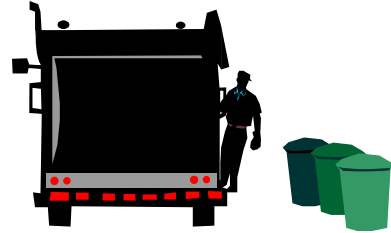
Service. The students establish and supervise an on-site recycling center for the school. In addition to the usual items that are thrown away, the recycling center also accepts packaging from boxes sent to the school, used computer supplies, beverage cans, and food containers from the cafeteria.

Reflection. Students form discussion groups and invite school administrators to participate in a forum to consider the issues of litter, recycling, and overpackaging. Selected students share information from their “Litter Detective” worksheets and their research.

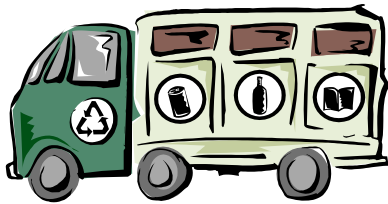
Celebration. The students host a “Recycle and Reuse” party for another class. For such a party, the hosts use only items that can be recycled or reused.

Where Does the Trash Go?

An average family of four throws away about 120 pounds of garbage each week. In many areas, every household has a “Herbie Curbie” container or bags where trash is held for collection by garbage trucks that come by on a regular basis.



Garbage is picked up by large garbage trucks.



In some areas, recyclables are also picked up by trucks.

In other areas, families are responsible for taking their trash to drop-off locations.



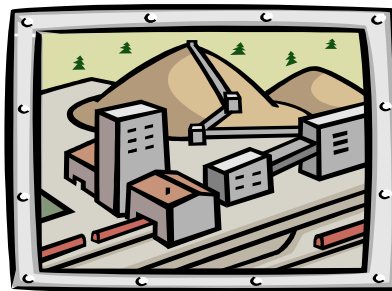
Recyclables are taken to recycling centers.



In some areas, garbage trucks pick up the waste and take it to a transfer station where the waste is compacted to make it smaller. The waste is then loaded into trucks and transported to a landfill.



At the landfill, the garbage goes into special lined areas that prevent the waste from polluting the surrounding land and water. Each day's garbage is buried and then covered with an additional layer of soil.



How to Be a Litter Detective



Work as a member of your student group to follow the steps that make you a litter detective!

PART 1

1. Go the area at your school that your teacher has designated as your group's litter pickup zone.
2. Wearing gloves, pick up litter in your designated area. (Do not pick up any sharp objects or unidentifiable items; simply record and report these items to your teacher.)
3. Return to the classroom to examine the contents of your litter bags.

PART 2

Examine and sort the items of litter you have collected. Then answer the following questions (have your reporter write down the answers):

1. What three specific items most frequently appeared as litter in your pickup zone?
2. Are all three of these items made of paper? Are any of the items you picked up made of wood, fabric, metal, or glass?
3. Do any of the items you collected represent a potential health hazard?
4. Roughly what percentage of the items you collected are recyclable or reusable? What percentage are neither recyclable nor reusable?
5. Is it possible for you to determine what age group is most responsible for the litter in your pickup zone? Can you tell if males or females are more responsible for the litter you collected and observed?

PART 3

Participate as a member of your group in using the results of your detective work and your research to revisit all the focus questions and give an oral presentation to the rest of the class in which you examine the issue of waste and litter from an economic perspective.

Using the Earth as an Ashtray

| | |
|--------------------------|--------------------|
| Content Areas: | Science, Health |
| Grade Levels: | Grades 6, 7, and 8 |
| Time to Complete: | One week |

132. South Carolina Curriculum Standards Addressed

SCIENCE

Grades 6–8

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

- 1.d.1. Make inferences based on observations.
- 1.e.1. Predict the results of actions based on patterns in data and experiences.
- 2.b. Pose questions and problems to be investigated.
- 2.c. Obtain scientific information from a variety of sources (such as Internet, electronic encyclopedias, journals, community resources, etc.).
- 2.h. Analyze data to construct explanations and draw conclusions.
- 4.a. Discriminate among observations, inferences, and predictions

Grade 7

III. Earth Science

A. Structure of the Earth System

- 7.f. Evaluate the effects of human population on air, water, and land.
- 7.g. Analyze the benefits of solid waste management (reduce, reuse, and recycle).

HEALTH

I. Personal Health and Wellness

Standard 6: Use goal-setting and decision-making skills to enhance health.

By the end of grade eight, students should be able to

- predict how decisions regarding health behaviors have consequences for the self, for others, and for the environment

VI. Alcohol, Tobacco, and Other Drugs (ATOD)

Standard 6: Use goal-setting and decision-making skills to enhance health

By the end of grade eight, students should be able to

- apply decision-making strategies to ATOD issues
- predict how decisions regarding ATOD use have consequences for individuals, family, and society

133. Brief Description of Lesson/Activity

This lesson takes cigarette smoking beyond a health issue and sheds light on how cigarette smoking is an environmental issue. As the Keep America Beautiful organization explains, cigarette litter is everything from a partially smoked cigarette, cigarette butts, matches and lighters to the packaging itself. Students will learn, in particular, that littered cigarette butts introduce a product to our environment that breaks down very slowly and is not completely biodegradable: cellulose acetate, a form of plastic, which cigarette filters are made of. One of the smallest pieces of litter, cigarette butts nonetheless represent over 20 percent of the litter collected in many community cleanup initiatives.

134. Focus Questions for Students

1. How can cigarette smoking be an environmental issue?
2. What are cigarettes made of and are they biodegradable?
3. How much litter is produced from cigarettes each year?
4. Do most people consider cigarette butts litter? Why or why not?

135. Culminating Assessment

Students complete research, conduct surveys, and design a presentation describing the environmental impact of cigarette use. The presentations are shared with other classes, school administrators, and their school's PTO/PTA.

136. Materials, Equipment, and/or Resources Needed

- computers with Internet access
- poster board and markers

Web sites:

Keep America Beautiful

- <http://www.kab.org/littercigs.htm>

CigaretteLitter.Org

- <http://www.cigaretteLitter.org>

Australia's Environmental Protection Agency "Facts about Litter" page

- <http://www.epa.nsw.gov.au/litter/factsaboutlitter.htm>

Public Attitudes toward Toxic Constituent Labelling on Cigarette Packages: Qualitative Research Report (64-page document published by Health Canada's Office of Tobacco Control)

- http://www.hc-sc.gc.ca/hecs-sesc/tabac/pdf/environics_496.pdf

University of British Columbia’s Waste Management “Litter Reduction Program” Web site

- <http://www.recycle.ubc.ca/litter.html>

“Philip Morris USA” (Web page on cigarette litter)

- http://www.philipmorrisusa.com/policies_practices/litter.asp

“Tobacco Giant Acknowledges Cigarette Butt Litter” (article)

- <http://www.life.ca/nl/85/butts.html>

“The No Butts about It Litter Campaign” page (contains the “Cigarette Butt Litter Fact Sheet”)

- <http://hometown.aol.com/teamstein/myhomepage/index.html>

“Cigarettes [sic] Butts as Litter” (Web page of sixth-grade students at Norfolk Collegiate Middle School in Virginia)

- <http://ncs.pvt.k12.va.us/ecoweb/belle1.html>

137. Teacher Preparation

1. Collect the necessary items.
2. Visit the Web sites listed above to become knowledgeable about the amount of litter that cigarette butts create.

138. Procedures

| Teacher Activity | Student Activity | Assessment |
|--|--|--|
| Review with students some long-term health effects that come from smoking. | Students review the long-term effects of cigarette smoking. | Student participation in the review |
| Lead the class in a discussion of the focus questions. | Students discuss their responses to the focus questions. | Student participation in the discussion |
| Using the Web sites listed above in section E, guide students in using the Internet to research facts about the connection between cigarette smoking and litter. Focus their attention on the lasting environmental effects of cigarette litter. | Students research the Internet for facts about connection between cigarette smoking and the environment. | Student participation in the research activity |
| Divide the class into small groups. Have each group design and conduct a survey of their peers about the litter created by cigarette | | |

| Teacher Activity | Student Activity | Assessment |
|--|---|--|
| smoking and the effect that this litter has on the environment. | | |
| <p>Give students some sample questions to ask: “Do your parents or any close relatives smoke?” “From your observation, how do most people discard their cigarettes?” Do you consider cigarette butts a form of litter?” “Are cigarette butts biodegradable?” “What harm can occur when someone tosses a cigarette butt on the ground?”</p> | <p>Students work in groups to develop and conduct a survey of their peers about smoking and litter.</p> | <p>Student participation in the survey activity</p> |
| <p>Have the student groups write up and turn in a summary and analysis of the results of their surveys.</p> | <p>Each student group writes up a summary and analysis of the results of its survey and turns it in to the teacher.</p> | <p>Completed surveys and written analyses and summaries</p> |
| <p>Have student groups use the results of their surveys and their individual research to develop a presentation on the impact of smoking on the environment. If possible, have them develop a PowerPoint presentation.</p> | <p>Student groups develop presentations on the impact of smoking on the environment.</p> | <p>Student participation in the development of the presentations</p> |
| <p>Have student groups give their presentations to the class as a whole. Solicit feedback from the class for ways the presentations could be improved.</p> | <p>Student groups share their presentations with their classmates and collect feedback on how to improve them.</p> | <p>Student participation in giving the presentations</p> |
| <p>Have the groups use the feedback from their classmates to revise and refine their presentations. Make sure the presentations contain factual information.</p> | <p>Student groups revise and refine their presentations.</p> | <p>Refined presentations</p> |

| Teacher Activity | Student Activity | Assessment |
|--|--|--|
| Identify school and community groups for the students to share their presentations with—school administrators, other classes, local garden clubs, for example. Support student groups as needed when they conduct their presentations. | Student groups give their presentations to interested school and community groups. | Presentations as conducted for school and community groups |

139. Differentiation of Instruction

Special-needs students can use a pre-designed survey and work with peers when using the Internet to find facts for their presentations. After completing the survey and obtaining information about cigarette litter, advanced students can design an experiment that shows what happens to a cigarette butt when it is discarded on the ground.

140. Service-Learning Connection

Preparation. After completing the research, conducting the survey, and creating a presentation, student groups design pamphlets to use in educating youth not only about the dangers of smoking but also about the litter and pollution that are associated with cigarette use.

Service. Students complete their pamphlets and distribute them. (These pamphlets can be distributed in connection with the student presentations to community and school groups.)

Reflection. After the presentations and pamphlets are complete, students think about some concrete ways, beyond education, to deter people from throwing down cigarette butts.

Celebration. Students hold a “Clean Air, No Butts about It” celebration in their classroom. They invite others who have helped with the project to join them.

Scaling Down the World to the Local Community

| | |
|--------------------------|----------------|
| Content Area: | Social Studies |
| Grade Levels: | Grades 7 and 8 |
| Time to Complete: | One week |

141. South Carolina Curriculum Standards Addressed

SOCIAL STUDIES

III. People, Places, and Environments: Geography

- 7.3 The learner will demonstrate an understanding of world culture regions.
 - 7.3.1 make and use maps, globes, graphs, charts, and models to describe and analyze the location and spatial distribution of people, places, and environments on a global scale and in the principal world culture regions
 - 7.3.7 explain how people interact with their physical environment to create distinctive regions
 - 7.3.10 describe the types and distribution of human settlement in each world region and the impact of urbanization
- 8.8 The learner will demonstrate an understanding of South Carolina and the United States in spatial terms.
 - 8.8.1 make and use maps, globes, graphs, charts, and models to illustrate and analyze location and spatial distributions of physical and cultural features in South Carolina and the United States

142. Brief Description of Lesson/Activity

After considering the various types of people and physical environments around the world, the students will study the environment of their own community and determine what areas need cleaning up.

143. Focus Questions for Students

1. Where is our community located in relation to South Carolina as a whole? Where is it located in relation to the rest of the country and the world?
2. What are the different types of physical environments found in the various regions of the world? How are they similar to one another?
3. How can you as an individual positively or negatively affect the environment of your own community?

144. Culminating Assessment

Students will write directions from the school to their own homes and be able to trace the route on a map. Students will report data about the litter status of their roads in their area and will create a chart showing the areas in their community that most need assistance with litter maintenance.

145. Materials, Equipment, and/or Resources Needed

- globe
- map of the state of South Carolina
- detailed map of your local area

146. Teacher Preparation

1. Get a globe and several maps of South Carolina for students to share.
2. Locate background information as needed on the different types of physical environments in the world.
3. Make a copy of the local map for each student in you class.
4. Be prepared with knowledge of how students can actually help in the community and how supplies can be obtained.

147. Procedures

| Teacher Activity | Student Activity | Assessment |
|---|---|---------------------------------------|
| Lead the class in a discussion of the focus questions. Have students describe the different types of physical environments that exist in the various regions of the world. Have them consider how individuals can positively and negatively affect their own environment. | Students discuss their responses to the focus questions. | Student participation in the activity |
| Prompt the students to think about how they fit into the scheme of things in the world. Have them use the globe, the state map, and the local map to find their location in the world. | After analyzing various regions of the world, the students find their community on a local map, their county on a map of South Carolina, and their nation on the globe. | Student participation in the activity |
| Have students use the local maps to write directions from the school to their own homes. | Students write directions from the school to their homes. | Written directions |
| Next, have students take turns reading their directions as the others follow along on the local map. | Students then take turns reading the directions as the other students follow along on their copies of the local map. | Student participation in the activity |

| Teacher Activity | Student Activity | Assessment |
|--|---|--|
| <p>Have students observe on their way to and from school what areas along the route to their house are extremely littered. Have them identify those areas on their local map by coloring them red. Have them use orange to indicate areas that are slightly littered and use green to indicate the areas that are litter free.</p> <p>Allow time for the students to read and show the directions to their home on the map. Let them discuss areas of concern.</p> | <p>Students will analyze the degrees of litter that exist along their routes home from school. They color code their maps accordingly.</p> | <p>Color-coded maps</p> |
| <p>Have students now transfer their color-coded information onto a chart to obtain a clear picture of all of the areas in their community that need help with the litter problem.</p> | <p>Students transfer their map data onto a chart that specifies the areas in their community that need the most help with litter cleanup.</p> | <p>Completed chart of littered areas</p> |

148. Differentiation of Instruction

Special-needs students can be allowed to highlight the route on their own maps without writing any directions. Advanced students can be asked to draw their own maps to scale rather than simply tracing their routes.

149. Service-Learning Connection

Preparation. After the mapping activity, students list all the areas of the community that have a litter problem. Students then choose one or several areas that they feel they can improve and maintain. They analyze the reasons that those areas are particularly littered, and they formulate plans for making lasting improvements in those areas.

Service. Students contact the residents of the area(s) they have chosen and describe their concerns about the litter in the area and their plans to help clean it up. (The teacher will need to determine the best way for the students to make contact with the area residents. If the children know the people in the neighborhood, they could go in pairs and talk to the residents directly. Otherwise the class will need to draft a letter that will be sent to the residents.) Local media should also be contacted about the project.

Students then implement their cleanup plans, which may consist of providing a neighbor with trash cans, helping a family pick up the litter around their home, and/or gathering a group together to clean a local park. Plans will vary depending on the

problem area and the people involved. “Before” and “after” pictures of the area(s) should be taken.

Reflection. After completing their cleanup project, students share their “before” and “after” pictures, discuss what they have accomplished, and think about ways to keep the area(s) looking nice.

Celebration. The students invite their school’s administrators and a reporter from the local newspaper to attend a pizza party and learn about the project. The students display their “before” and “after” pictures at the party for everyone to see. In addition, the teacher contacts PalmettoPride at 1-877-PAL-PRDE (toll free) or 803-758-6034 and informs the organization about the cleanup project so that the students’ “before” and “after” pictures can be posted on the PalmettoPride Web site.

Carolina Neighbors

Content Area: Social Studies
Grade Levels: Grades 7 and 8
Time to Complete: Two class periods

150. South Carolina Curriculum Standards Addressed

SOCIAL STUDIES

- III. People, Places, and Environments: Geography
 - 7.3 The learner will demonstrate an understanding of world culture regions.
 - 7.3.16 explain the different ways in which places are connected and how these connections impact economic, cultural, and political interdependence on the regional and global scales
- II. Power, Authority, and Governance: Government/Political Science
 - 8.7 The learner will demonstrate an understanding of the role of the citizen in American democracy, including personal and civic rights and responsibilities.
 - 8.7.3 explain the importance of personal responsibilities and civic responsibilities in the operation of a democracy
- IV. Production, Distribution, and Consumption: Economics
 - 8.11 The learner will demonstrate an understanding of the state and national economy and economic policies.
 - 8.11.3 identify the principal sources of income and expenditures of federal, state, and local government.

151. Brief Description of Lesson/Activity

In this lesson, students do research to learn how the litter problem impacts South Carolina, North Carolina, and Georgia and how these states are attempting to address the problem. Students then use what they have learned to compose letters to our state's leaders in which they give their ideas about how we can address the litter problem.

152. Focus Questions for Students

1. What states border South Carolina? Have you ever visited these states?
2. Have you ever noticed litter along the highway in South Carolina and its bordering states?
3. What can we do to handle the problem of litter in our state? How do our bordering states handle the problem?
4. How can litter impact the economy of a state or region? Do people want to visit or live in a littered state?
5. If litter is not controlled, how will that situation affect the quality of life in our state?

153. Culminating Assessment

Students create posters and compose letters to South Carolina's leaders detailing the litter problem in our state and offering solutions.

154. **Materials, Equipment, and/or Resources Needed**

- maps showing South Carolina, Georgia, and North Carolina
- computers with Internet access
- *The Book of the States*, vol. 35 (Chicago: Council of State Governments, 2003) Other informative books are *The Waste Crisis*, by Jenny Tesar, and *Garbage and Recycling*, by Rosie Harlow and Sally Morgan.
- poster paper and crayons or markers
- tape recorder, digital camera, or camcorder
- contact information on South Carolina leaders (The state government's Web site at <http://www.myscgov.com/SCSGPortal/static/government_tem1.html> is a good place to start.)

155. **Teacher Preparation**

Gather the needed supplies, resources, and information.

156. **Procedures**

| Teacher Activity | Student Activity | Assessment |
|--|---|--|
| Introduce the lesson by leading the class in a discussion of the focus questions, focusing particularly on the issue of how costly the litter problem can be and how greatly it can impact the economy of a state. | Students discuss their responses to the focus questions. | Student participation in the class activity |
| Help students locate South Carolina and its bordering states (North Carolina and Georgia) on a map. Present facts about South Carolina and its bordering states from <i>The Book of the States</i> . Focus the students' attention on the main sources of revenue for each of these states such as industry and tourism. Provide definitions of key terms as needed. | Students listen for facts and take notes on the information shared by the teacher. | Student participation in the class activity |
| Divide the class into small groups. Have students work in their groups to use the Internet to research organizations and programs that are addressing the litter problem in South Carolina, North Carolina, and Georgia (e.g., | Student groups research organizations and programs in South Carolina, North Carolina, and Georgia that are attempting to eliminate the problem of litter. | Student participation in the research activity |

| Teacher Activity | Student Activity | Assessment |
|---|---|---|
| <p>PalmettoPride, the North Carolina Big Sweep project, Keep Georgia Beautiful).</p> <p>Help students locate information on how much money is spent addressing the litter problem in South Carolina, Georgia, and North Carolina. If necessary, guide the students' research by giving them specific questions to answer.</p> | | |
| <p>Tell the students that each group is to turn in a written report of its findings.</p> <p>In addition, explain that the student groups are to create posters that display these findings, and they are to use these posters in an oral presentation that they will give to the entire class.</p> | <p>Each group writes up its research findings and turns in the report to the teacher. The groups then create posters and share them in an oral presentation to the class.</p> | <p>Written reports, student participation in group presentations, and posters</p> |
| <p>Ask students to consider what role they themselves can play in addressing the litter problem in South Carolina.</p> <p>Have student groups brainstorm ideas and then, using what they have learned from their research, compose letters to the state's leaders about how our litter problem can be addressed.</p> | <p>Using the information gathered through class discussions and research, students write letters and mail them to South Carolina leaders.</p> | <p>Completed letters mailed to the state's leaders</p> |
| <p>Have selected students create and record radio and television infomercials highlighting what they have learned.</p> | <p>Selected students create radio and television infomercials highlighting what they have learned and play them for the rest of the class.</p> | <p>Student participation in the infomercial activity</p> |

157. Differentiation of Instruction

Working in groups, special-needs students should be able to complete the activity. If necessary, the teacher can provide written notes for those who have difficulty taking notes; they can also dictate their ideas for a letter to a peer, who can actually write the letter. Advanced students can do research on the litter problem in other parts of the United States.

158. Service-Learning Connection

Preparation. Students gather information about the litter problems that exist in South Carolina and its bordering states, Georgia and North Carolina. The teacher locates contact information on legislators and environmental agencies in Georgia and North Carolina.

Service. The students will write letters to the legislators and environmental agencies in North Carolina, Georgia, and South Carolina, asking that states become more “litter wise” and show respect for their surroundings and generally keep America clean. These letters are mailed, and copies are published in the school newspaper or a local newspaper.

Reflection. The students will write in their journals or participate in a class discussion on what harm litter does and why South Carolina and its bordering states must develop a plan for litter control.

Celebration. After the letters are written and mailed, students have a pizza party at lunchtime. This time can also be used for students to reflect on their efforts as a group.



Litter: An Economic, Social, and Environmental Problem for South Carolinians

PART 1

| | |
|--------------------------|--------------------------|
| Content Area: | Science |
| Grade Level: | Grade 8 |
| Time to Complete: | One to two class periods |

159. South Carolina Curriculum Standards Addressed

SCIENCE

Grade 8

I. Inquiry

A. Abilities Necessary to do Scientific Inquiry

- 1.b.2. Use scientific (e.g., field guides, charts, periodic tables, etc.) and dichotomous keys for classification.
- 1.d.1. Make inferences based on observations.
- 1.e.1. Predict the results of actions based on patterns in data and experiences.
- 2.b. Pose questions and problems to be investigated.
- 2.c. Obtain scientific information from a variety of sources (such as Internet, electronic encyclopedias, journals, community resources, etc.).
- 2.g. Organize data in tables and graphs.
- 2.h. Analyze data to construct explanations and draw conclusions.
- 7.b. Create drawings, diagrams, charts, tables, and graphs to communicate data.

160. Brief Description of Lesson/Activity

This activity is the first of a two-part lesson that asks students to examine the impact of litter on South Carolina. Students are introduced to litter as a social, economic, and environmental problem through a letter written by Senator Thomas requesting their support and ideas. The activity has students consider the magnitude of the problem; then it delves more deeply into the litter issue from a scientific and environmental point of view.

161. Focus Questions for Students

1. What is litter?
2. What are some of the main sources of litter in South Carolina?
3. In what ways does litter impact our state?
4. How can litter be an environmental problem?
5. What are some ways we can convince South Carolina's citizens of the need for litter reduction?

162. Culminating Assessment

After students examine the focus questions, chart examples of litter, and survey their parents, they each record in their journals two reasons why litter needs to be disposed of properly and two insights they have gained from the parent surveys.

163. **Materials, Equipment, and/or Resources Needed**

- chart paper and markers
- sample bag of clean items of litter (or trash bags and gloves for students to collect litter from the school grounds)
- Senator David L. Thomas’s letter to South Carolina’s students:

Dear Students of South Carolina:

Your state needs your help in addressing a serious problem, litter. A great portion of the state’s economy is dependent on the recruitment of new industries, the creation of new jobs, and the continued growth of tourism. South Carolina has to be an attractive place where new industries will want to locate and where people will want to visit. Many adults are now working toward this goal from the business standpoint, but their efforts are not enough. We need help from you, our youth!

As you may know, I am chairman of PalmettoPride, which is South Carolina’s antilitter and beautification organization. We are committed to solving the very serious social, environmental, and economic problems that litter has caused and is continuing to cause in our state. We need your active involvement, your ideas and your perspective as young people, to help us accomplish this important objective. Please consider this letter as my invitation to you to join us in working to see that all South Carolinians put litter where it belongs: in the trash can!

Sincerely,
Senator David L. Thomas

164. **Teacher Preparation**

1. Assemble the necessary items.
2. Make a copy of the letter from Senator Thomas for every student.
3. Make a copy of the “Litter Analysis Chart” (provided below) for each student group.
4. Make a copy of the “Litter Survey for Parents” (provided below) for every student.

165. **Procedures**

| Teacher Activity | Student Activity | Assessment |
|---|--|---------------------------------------|
| Read the letter from Senator Thomas to South Carolina’s students. | Students listen as the letter is read. | |
| Provide the students with copies of the Senator’s letter and ask them to identify the areas of concern that are stated in the letter (namely, the social, economic, and environmental problems that are associated with litter). Next have the students consider what needs | Students determine the main points that are made in the letter and decide on some ways to address the problem. They record their thoughts in their journals. | Student participation in the activity |

| Teacher Activity | Student Activity | Assessment |
|--|--|---|
| to be done to help Senator Thomas with this problem. Have students record their ideas in their journals. | | |
| Write the focus questions on the board and ask the students to answer the questions individually in their journals. Give them three minutes to write their answers. | Students write their answers to the focus questions in their journals in three minutes. | Student participation in the activity |
| After three minutes, use the think-pair-share learning strategy: have students pair up and discuss their answers with each other. Have them then add their new insights to the answers they have written in their journals. Give them another two minutes for this task. | Student pairs share their answers with one another and then add their new insights to their journal entries. | New information in journals |
| <p>Next, use the round-robin strategy. Begin by dividing the class into five groups and have them brainstorm answers to the five focus questions. Also have students begin using the Internet to research the focus questions. While the students are brainstorming and researching, write each of the five focus questions on a separate sheet of chart paper.</p> <p>Provide each group with a different colored marker. Tape each sheet of chart paper in a different location around the room. (The chart papers should remain posted throughout the unit to guide the students' research.)</p> <p>Ask each group of students to position themselves by one of the sheets of chart paper and then to write the group's answer under the question on the sheet.</p> | Students then participate in the round-robin activity. They begin by brainstorming answers to the five focus questions and by researching the focus questions on the Internet. | Student participation in the brainstorming, Internet research, and round-robin activities |

| Teacher Activity | Student Activity | Assessment |
|---|---|--|
| <p>The groups are then to rotate to the next sheet of chart paper, read what the first group has written on it, draw a check mark next to the answers they agree with, and then add any new insights of their own.</p> | | |
| <p>When all of the groups have been to all of the charts, they return to their seats, and then the entire class engages in a discussion of the focus questions.</p> <p>Tell students to add in their journal entries any new insights they gain from the discussion. (Journals should be checked to make sure entries are being properly made.)</p> | <p>Students participate in a class discussion of each focus question and add any new insights in their journal.</p> | <p>Student participation in class discussion and completed journal entries</p> |
| <p>Tell students they are going to look at different forms of litter and analyze and classify them as they relate to the environment. To ensure a level of understanding of the terminology used in the lesson, give students a list of key terms and discuss with the class the definitions of these terms.</p> | <p>Students discuss and define the terms provided by the teacher.</p> | <p>Student definitions of terms</p> |
| <p>Put the students back in their original groups and have them take turns examining a prepared bag of litter (or have them collect litter samples from the school grounds).</p> | <p>Working with their groups, students analyze the materials in a prepared bag of litter provided by the teacher.</p> | <p>Student participation in the activity</p> |

| Teacher Activity | Student Activity | Assessment |
|--|--|--|
| <p>As each group completes its turn with the litter bag, ask that group to complete the “Litter Analysis Chart” (provided below) for recording and identifying each of the articles in the bag. Have each group of students select one member to act as their recorder for completing the “Litter Analysis Chart.”</p> <p>When all the groups have completed their charts, lead the class in a discussion of the information recorded on the charts. Put special emphasis on the issue of recycling and the proper disposal of trash and litter, discussing how the specific items listed on the charts should end up so that they will not have a negative effect on the environment.</p> | <p>Student groups complete the “Litter Analysis Chart” chart. They then determine where each item should have ended up that would have resulted in a positive impact on the environment.</p> | <p>Completed charts</p> |
| <p>In an effort to help students see how the litter problem affects their own community, ask them to consider the amount of litter they observe at school and on their way home and then complete the “Litter Survey for Parents” sheet at home with their parents.</p> | <p>Students observe the amount of litter they see in their own community and complete the “Litter Survey for Parents.”</p> | <p>Completed survey forms</p> |
| <p>Have students share what they learned from their parent surveys. Then reread Senator Thomas’s letter to the class and ask the students to write in their journals two reasons why litter needs to be disposed of properly and two insights they have gained from their parent. These ideas will be used later in part 2 of the lesson when the students actually respond to the Senator’s letter.</p> | <p>Students share the results of their parent surveys. They then record their ideas for writing their response to the Senator’s letter.</p> | <p>Student participation in the activity</p> |

| Teacher Activity | Student Activity | Assessment |
|------------------|------------------|------------|
| | | |

166. Differentiation of Instruction

Special-needs students can be paired with more advanced students to complete the activity. Advanced students can choose a common item of litter (e.g., cigarette butts) and then research what the item is composed of and the amount of time needed to break it down. (The PalmettoPride Web site at <<http://www.palmettopride.org>> has interesting information on the length of time it takes for certain items to decompose.)

167. Extension to Other Content Areas

Mathematics. The students can graph the amount and type of litter found. They can also complete an estimation chart of what kinds of litter are most abundant in their area.

Language Arts. The students can write a letter to the local newspaper describing the responses they received on the parent survey. The letters and the student journals can be graded for correct spelling, grammar, and so on.

Social Studies. The students can survey members of the community regarding their perceptions of the state's litter problem. They can also identify on a map the areas in their community where litter has accumulated. They can then consider what areas have the largest amounts of litter? Why? Does this affect the economy of the region or area? Why?

168. Service-Learning Connection

Preparation. After the students have answered the focus questions and reported the results of the parent surveys, they should have a good grasp of why there is a need to address the litter problem in South Carolina. But the other students at their school may not possess this level of awareness on the issue. The students therefore develop a survey form to assess their peers' level of understanding with regard to the litter problem. The students then follow up by determining the best way to use the results of their survey.

Service. Recognizing that people cannot help to solve a problem if they are unaware that there is indeed a problem, the students design and distribute a survey form for their middle school peers to complete regarding litter. The students collect the surveys and evaluate the results.

Reflection. Upon completing the school survey, the students share their assessments of the results and discuss the effectiveness of the activity in determining the middle school students' level of awareness.

Celebration. The students create a progressive display outside the classroom that shows the number of surveys that are returned each day, with a goal of 100 percent participation. At the completion of the project, the students celebrate their effort with an ice cream party.

Litter: An Economic, Social, and Environmental Problem for South Carolinians

PART 2

| | |
|--------------------------|--------------------------|
| Content Area: | Social Studies |
| Grade Level: | Grade 8 |
| Time to Complete: | One to two class periods |

169. South Carolina Curriculum Standards Addressed

SOCIAL STUDIES

II. Power, Authority, and Governance: Government/Political Science

8.6 The learner will demonstrate an understanding of the foundations of American democracy, including its basic principles and the foundations of the American political system.

8.6.5 describe how public policy is formed and carried out at the local, state, and national levels

8.7 The learner will demonstrate an understanding of the role of the citizen in American democracy, including personal and civic rights and responsibilities.

8.7.3 explain the importance of personal responsibilities and civic responsibilities in the operation of a democracy

8.7.5 describe the means by which Americans can monitor and influence politics and governments

IV. Production, Distribution, and Consumption: Economics

8.11 The learner will demonstrate an understanding of the state and national economy and economic policies.

8.11.3 identify the principal sources of income and expenditures of federal, state, and local government

170. Brief Description of Lesson/Activity

This lesson continues students' examination of the litter problem in South Carolina by focusing on the effects of litter on the state's economy. In the previous lesson, the students conducted a survey that allowed them to examine their parents' perceptions of the litter problem in our state. In this lesson the students take awareness to the next level as they seek to take action to help alleviate the state's litter problem. At the conclusion of the activity, students respond to Senator Thomas's request for help by writing letters to him in which they explain what they have learned about the problem and offer their ideas for possible solutions.

171. Focus Questions for Students

1. What is litter?
2. What are some of the main sources of litter in South Carolina?
3. In what ways does litter impact our state?
4. How can litter be an environmental problem?
5. What are some ways we can convince South Carolina's citizens of the need for litter reduction?

172. Culminating Assessment

After students examine the economic impact of the litter problem on South Carolina, their focus shifts to developing a plan to attack this problem. Students write letters to Senator David L. Thomas in which they detail what they have learned and outline their suggestions for controlling litter in our state.

173. Materials, Equipment, and/or Resources Needed

- computer with Internet access
- chart paper and markers

174. Teacher Preparation

Assemble the necessary items.

175. Procedures

| Teacher Activity | Student Activity | Assessment |
|--|--|---------------------------------------|
| To ensure their grasp of the concepts discussed in part 1 of the lesson, have students briefly discuss the focus questions. Direct their time and attention to question three ("In what ways does litter impact our state?") as the concentration shifts from the environmental effects of litter to the economic impact. Have students record a response to question three in their journals. | Students briefly revisit the focus questions and then write their answers to question three in their journals. | Student participation in the activity |
| Have students determine through research (or you can tell them in a class lecture) the major sources of revenue for South Carolina. Once these sources are understood, have students consider the following questions regarding the impact | Students listen and respond to the teacher's questions. | Student responses |

| Teacher Activity | Student Activity | Assessment |
|--|--|--|
| <p>that litter that could have on them. Here are some examples:</p> <ul style="list-style-type: none"> • How could litter affect South Carolina’s tourism industry? • Where is most of the litter that visitors to the state see? • How can we start to address the problem of the litter that visitors to the state most often see? <p>Lead students to the idea that items tossed from vehicles along South Carolina’s highways and roadsides constitute a significant portion of the state’s litter. Next have the students consider why people throw things from their cars and what can be done to address this problem. Are trash bags for cars a viable option?</p> | | |
| <p>Assuming that students think trash bags in cars would help reduce the amount of roadside litter, direct the class to develop a program for giving away litter bags for automobiles. Guide them in considering a distribution plan (e.g., all motor vehicle divisions can give bags to new drivers or people renewing their drivers’ licenses and tags. Tell the students to propose others who could help with distribution (e.g., city police, state troopers).</p> <p>Guide the students in considering way to cover the costs of the bag (e.g., the costs could be offset by offering businesses the opportunity to advertise their company on the bag). In addition, guide the students in considering a plan to promote the use of the bags (e.g., a countywide litter slogan contest, a countywide design contest).</p> | <p>Students listen and provide feedback.</p> | <p>Student participation in the discussion</p> |

| Teacher Activity | Student Activity | Assessment |
|--|--|--|
| <p>Assuming that students think trash bags in cars would help reduce the amount of roadside litter, direct the class to develop a program for giving away litter bags for automobiles. Guide them in considering a distribution plan (e.g., all motor vehicle divisions can give bags to new drivers or people renewing their drivers' licenses and tags. Tell the students to propose others who could help with distribution (e.g., city police, state troopers).</p> <p>Guide the students in considering way to cover the costs of the bag (e.g., the costs could be offset by offering businesses the opportunity to advertise their company on the bag). In addition, guide the students in considering a plan to promote the use of the bags (e.g., a countywide litter slogan contest, a countywide design contest).</p> | <p>Students listen and provide feedback.</p> | <p>Student participation in the discussion</p> |
| <p>Divide the class into groups. Have students work in their groups to formulate a plan and write it up as report to hand in. Their written plans should include a way to distribute the bags, pay for them, and promote the use of the bags.</p> | <p>Each student group devises a program to provide litter bags to motorists. The groups submit their plans in writing.</p> | <p>Written plans to provide litter bags to motorists</p> |
| <p>Have student groups share their plans and ideas with the class as a whole.</p> | <p>Student groups share their plans and ideas with the class as a whole.</p> | <p>Student participation in the sharing activity</p> |

| Teacher Activity | Student Activity | Assessment |
|---|--|---|
| <p>Have the students in each group work together to use what they have learned about litter in general and the litter problem in South Carolina in particular to draft a response to the letter the class received from Senator Thomas.</p> <p>Reread the each group’s letter before it is mailed. Make any changes/corrections you feel are needed. Type, or have a selected student type, all the letters in a viable form and mail them to Senator Thomas:</p> <p>Senator David L. Thomas 410 Gressette Bldg. Columbia SC 29202</p> <p>OR</p> <p>Senator David L. Thomas 23 Wade Hampton Blvd. Greenville SC 29609</p> | <p>Student groups use the information from their investigations and research to draft letters to Senator Thomas.</p> | <p>Student participation in the letter-writing activity</p> |

176. Differentiation of Instruction

Special-needs students can complete their letters to Senator Thomas by working with partners or in a small group. Advanced students can develop ideas for additional programs to increase awareness and to address the litter problem.

177. Service-Learning Connection

Preparation. Students review the findings generated in the parent survey they conducted in part 1 of the lesson. Based on what they discover, the students design a project that now actively engages them in attacking the litter problem. (Possibilities include creating a schoolwide litter patrol team, sponsoring a schoolwide cleanup day, or implementing the car litter bag project on a small scale.)

Service. Students coordinate their efforts and sponsor the agreed-upon project to attack the problem of school and community litter. The teacher documents the progress of the project by taking photographs of the students at various stages in their effort.

Reflection. Upon completing the project, students get together to look at the photographs of their project activity, review the program to analyze its effectiveness, and then make suggestions for an even more effective effort the next year.

Celebration. The teacher and the students create a scrapbook using the photographs to detail their project efforts. The scrapbook is kept in the classroom to share with visitors.