View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by DigitalCommons@Pace

Pace University
DigitalCommons@Pace

Science | Elementary School

7-1-2009

Grades 3-5 Pollution

Amy Silviotti
Pace University

Follow this and additional works at: http://digitalcommons.pace.edu/elem_sci

Part of the Science and Mathematics Education Commons

Recommended Citation
Silviotti, Amy, "Grades 3-5 Pollution" (2009). *Science*. Paper 2.
http://digitalcommons.pace.edu/elem_sci/2

This Lesson Plan is brought to you for free and open access by the Elementary School at DigitalCommons@Pace. It has been accepted for inclusion in Science by an authorized administrator of DigitalCommons@Pace. For more information, please contact rracelis@pace.edu.

Subject: Science
Topic: Pollution
Grade: Fourth

Standards: The following standards have been met within this unit:

Mathematics, Science, and Technology
Standard Four: Science

Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Students will:

- Describe the relationships among air, water, and land on Earth
- Describe the characteristics of and variations between living and nonliving things
- Describe some survival behaviors of common living specimens
- Describe the factors that help promote good health and growth in humans
- Describe how plants and animals, including humans, depend upon each other and the nonliving environment
- Identify ways in which humans have changed their environment and the effects of those changes

English Language Arts
Standard One: Language for Information and Understanding

Students will listen, speak, read, and write for information and understanding. As listeners and readers, students will collect data, facts, and ideas; discover relationships, concepts, and generalizations; and use knowledge generated from oral, written, and electronically produced texts. As speakers and writers, they will use oral and written language that follows the accepted conventions of the English language to acquire, interpret, apply, and transmit information.

Standard Two: Language for Literary Response and Expression

Students will read and listen to oral, written, and electronically produced texts and performances from American and world literature; relate texts and performances to their own lives; and develop an understanding of the diverse social, historical, and cultural dimensions the texts and performances represent. As speakers and writers, students will use oral and written language that follows the accepted conventions of the English language for self-expression and artistic creation.

Standard Three: Language for Critical Analysis and Evaluation

Students will listen, speak, read, and write for critical analysis and evaluation. As listeners and readers, students will analyze experiences, ideas, information, and issues

presented by others using a variety of established criteria. As speakers and writers, they will use oral and written language that follows the accepted conventions of the English language to present, from a variety of perspectives, their opinions and judgments on experiences, ideas, information and issues.

Standard Four: Language for Social Interaction

Students will listen, speak, read, and write for social interaction. Students will use oral and written language that follows the accepted conventions of the English language for effective social communication with a wide variety of people. As readers and listeners, they will use the social communications of others to enrich their understanding of people and their views.

The Arts

Standard One: Creating, Performing, and Participating in the Arts

Students will actively engage in the processes that constitute creation and performance in the arts (dance, music, theatre, and visual arts) and participate in various roles in the arts.

Standard Two: Knowing and Using Art Materials and Resources

Students will be knowledgeable about and make use of the materials and resources available for participation in the arts in various roles.

Hook:

When students enter the classroom in the morning, they are given a "Do Now". As everyone is working, teacher will begin to make noise pollution sounds. These sounds will include very loud, distracting noises such as moving the tables/chairs, rustling paper; using loud speakers to play unnecessary noise, etc. Teacher will be sure to make noise so that the morning greeting over the school loudspeaker cannot be heard. After doing this for the duration of the Do Now, teacher will ask students how the noise made them feel. Once it is agreed upon that it was a disturbing quality to have in the classroom, teacher will make students aware that this is called noise pollution and it affects people around the world. Teacher will explain that noise pollution can come in many different ways, including loud cars, planes, factories, etc. Teacher will then explain that there are other kinds of pollution and invite students to brainstorm what they may be. Teacher will fill in a semantic web of student ideas. Teacher will prompt, "If the noise was so disturbing to you, think of

how water pollution may disturb animals that live in water, or how air pollution may affect birds and trees. Teacher will lead the discussion about pollution and begin the unit.

Essential Questions:

- What are the causes of pollution?
- What are the consequences of the many different types of pollution on the world we live in?
- What can we do to prevent further pollution?

Understandings:
Students will:

- Know and explain the definition of pollution.
- Be able to articulate the main types of pollution, including air pollution, water pollution, land pollution, and noise pollution.
- Identify what the causes of pollution in our environment are, including individual human actions (not recycling, littering) as well as large scale actions (factory buildings, cars)
- Work with a partner or in groups and collaborate on projects that involve making others aware of the cause, effect, and prevention of pollution.
- Be able to self-express individual opinions on pollution.
- Observe the simple steps that can be taken to keep our environment clean and use this knowledge to take part in protecting the environment by volunteering in community services.
- Inform others about pollution, its negative affects, and what can be done to prevent it in various ways, including written, performance, artistic, and oral.

Pre-Assessment: Prior to beginning this lesson, students will be pre-assessed on their knowledge of pollution and other important terms associated with it. Students will take a short vocabulary matching quiz that will include the terms pollution, environment, litter, pollutant, recycle, conserve, habitat, endangered, prevent, and rainforest. Students will

then be able to answer several short answer questions about pollution. These questions include:

1. What do you think causes pollution on our earth? Give specific examples.
2. How does pollution affect our environment? Does it have a negative or positive impact? Why do you think so?
3. What are some things we can do to prevent further pollution of our earth? Give specific examples and explain why they would be good for our environment.

Tiered by:

Students will first be tiered by their ability. Their ability will be determined after the analysis of the pre-assessment quiz given by the teacher. Students will be placed in one of three groups. Students who scored high on the pre-assessment will be placed in the high group, students who scored average will be placed in the middle group, and students who scored low will be placed in the low group. These groups will be color coordinated. For no specific reason, the high group will be called "The Blue Group", the middle group will be called "The Green Group", and the low group will be called "The Red Group".

Once students have been placed in their tiered ability groups, they will have the opportunity to choose from a various range of activities on a "Pollution Contract" sheet. Students are required to complete three independent and/or paired activities throughout the unit. They have the option to choose one of three activities per essential question. For example, when studying the cause of pollution, students have three activities they can choose from that will require them to express their knowledge of the causes of pollution. This is the same for the effects of pollution and how to prevent further pollution. Each tiered ability group (blue, green, and red) will have a different set of options tailored to

their ability. In addition, there are many different options on each Pollution Contract that lends itself to student interest. The activities include all of Gardner's eight intelligences.

On the Pollution Contract, the activities in the purple squares represent the cause of pollution. The activities in the orange squares represent the effects of pollution. The activities in the teal squares represent the prevention of further pollution.

Post-Assessment:

Post-Assessment for this lesson will be completed by the teacher through the use of rubrics. Three rubrics were created for each part of the lesson. One rubric is to be used for the evaluation of the cause of pollution, one rubric is to be used for the evaluation of the effects of pollution, and one rubric is to be used for the evaluation of the prevention of further pollution. The main difference between these rubrics is the content evaluation piece. The other categories students will be scored on are effort, organization skills, and timeliness. The content portion of the rubrics helps the teacher determine if the students fully grasp the material learned in class about the cause, effect, and prevention of pollution.

In addition to the use of rubrics, assessment will be made throughout the unit and lesson based on teacher observation of the students.

Unit Outline

Day One: Pre-assessment quiz on pollution: Students will complete a vocabulary matching sheet as well as answer several short answer questions about pollution.

Day Two: Hook: Teacher will create noise pollution in the classroom. Teacher will hold a discussion with the students about how it made them feel, as well as introduce several other types of pollution, including air, water, and land. Teacher will show students several pictures of different habitats. Each habitat will have two pictures associated with it: one picture in which there is no pollution and one where pollution is abundant. Students will discuss the differences in the pictures and what the causes of the differences are.

Day Three: Read-aloud of Where does Pollution Come From? Students are split into their tiered groups and pick their first activity from their contracts to complete. For some students, this activity is ongoing and will be completed / presented within the next week.

Day Four: Show pollution videos on kids.nationalgeographic.com. The videos include information on air pollution (flowers losing their scents as a result), as well as plastic bags, water pollution, and more. Discuss what students saw in these videos. Students will make a class chart that includes air pollution, water pollution, land pollution, and noise pollution in one column and effects in another. The class will fill out the different effects they saw in the videos and from prior knowledge that these types of pollution have on the environment.

Day Five: Read-aloud of The Lorax. As a class, students will discuss the definition of pollution and how it affected each character in The Lorax. Teacher will record student responses. Class will discuss how the characters in the book feel about pollution, including the Once-ler and how his views may have changed by the end of the book.

Day Six: Students are given partners to buddy read The Great Kapok Tree. Partners will be assigned so that low level learners will receive scaffolding from higher level learners. After the reading, students will discuss with their partners how the man in the story was negatively affecting the environment. Students will regroup in their tiered sections and choose the second activity to complete. For some students, this activity is ongoing and will be completed / presented within the next week.

Day Seven: Teacher takes students on a field trip to the local recycling center. A representative of the center will give students a tour and discuss various ways they are able to help protect the environment. After the trip, students will have a discussion about what they learned and why they feel recycling is important.

Day Eight: Teacher will picture walk through Garbage and Recycling (Young Discoverers: Environmental Facts and Experiments) with the students. Students will fill out a KWL chart about recycling before reading. Teacher will read aloud the book and complete the chart with the class.

Day Nine: As a class, students will create a large A-Z book about pollution, the environment, and recycling. Each student will have the opportunity to come up with text to put in the book and draw an associated picture. Teacher will donate the book to the school library for students in every grade to read.

Day Ten: In their tiered groups, students will choose the last activity to complete. For some students, this activity is ongoing and will be completed / presented within the next week. The unit will end with a read aloud of It's Earth Day! (Little Critter). Students will be able to plant a small tree on school property as part of their contribution to helping the environment stay strong.

Name_____ Date_____

Pre-Assessment

Directions: Match each word to the correct definition. Write the letter of the word next to the definition.

A. Pollution

B. Environment

C. Litter

D. Pollutant

E. Recycle

F. Conserve

G. Habitat

H. Endangered

I. Prevent

J. Rainforest

_____. Waste material that infects air, soil, or water.

_____. The area where an organism or a community of organisms lives.

_____. A dense forest found in a tropical region with abundant rainfall.

_____. The contamination of soil, water, or the atmosphere by the discharge of harmful substances

_____. In danger of extinction.

_____. To protect from loss or harm; to avoid waste.

_____. Carelessly discarded waste.

_____. To keep from happening.

_____. To use again; to reprocess.

_____. The conditions that surround an individual; surroundings.

Name_____ Date_____

Pre-Assessment

Directions: Answer the following questions. Use complete sentences.

1. What do you think causes pollution on our Earth? Give *specific* examples.

_____

_____

_____

_____

_____

_____

2. How does pollution affect our environment? Does it have a negative impact or a positive impact? Why do you think so?

_____

_____

_____

_____

_____

_____

3. What are some things we can do to prevent further pollution on our Earth? Give specific examples and explain why they would be good for our environment.

_____

_____

_____

_____

_____

_____

Pollution Contract

BLUE GROUP

Choose an activity from each colored square group. Cut out your three choices and glue them below. You are responsible for meeting the requirements and completing these activities by _____. Have fun!

This contract belongs to: _____

Choose one product that causes pollution (plastic, smoke, cars, oil, etc). With a buddy, write and act out a skit that explains how "you" are bad for the environment.

We recently read <u>The Great Kapok Tree.</u> Pretend you are a tree in the rainforest. Write a persuasive paper to a lumberjack that wants to cut you down. Explain why it would be bad for the environment to do so

Create an illustrated advertisement for a product that may reduce pollution in your environment. Write a slogan for your product.

With one or two partners, plan a campaign that makes others aware of the causes of pollution. Create a flyer that informs what the campaign is about and where it will take place.

Walk around the perimeter of the school with a buddy. Tally the non-recyclable materials you see in a math log and report your findings to the class.

Write lyrics for and perform a song about at least three ways to prevent pollution. The music can be either from *The 12 Days of Christmas, Twinkle Twinkle Little Star, Mary had a Little Lamb,* or create your own

For one week, keep a personal log of how many non-recyclable materials you use. Then, write a paragraph explaining when you used the materials and why they negatively affect the environment.

Create a collage using non-recyclable materials that illustrates the dangers of pollution. Write a short paragraph explaining your collage. This will be presented to the class.

Write a letter to the congressman/woman detailing what you've learned about pollution as well as suggestions he/she can take to help conserve the environment.

Pollution Contract

GREEN GROUP

Choose an activity from each colored square group. Cut out your three choices and glue them below. You are responsible for meeting the requirements and completing these activities by _____. Have fun!

This contract belongs to: _____

Design a flip book that shows the progression of pollution over the years. For example, a person who used to walk everywhere may now drive a car, or the slow increase of a pile of plastic bottles. Include captions.

Create an acrostic poem using the words KAPOK TREE that explains the effect pollution has on the rainforests.

Pantomime (act out with no sound) three different ways that you can prevent pollution in the classroom.

With a partner, debate what you think the leading cause of pollution is today. Take notes and be prepared for a quick response!

How do you feel about the outcome that pollution has on the environment? Write an opinionated essay that explains your feelings. Be sure to use examples from <u>The Great Kapok Tree.</u>

Write lyrics for and perform a song about at least two ways to prevent pollution. Choose from the following tunes: *The 12 Days of Christmas, Twinkle Twinkle Little Star*, or *Mary had a Little Lamb.*

Collect five non-recyclable materials. Draw them and write one to two sentences on each about how to identify the object as non-recyclable.

Create a picture book that shows different habitats in states of pollution. Include captions. You are going to present this book to the class.

Create an informative pamphlet on simple steps one can take to reduce pollution in their homes.

Pollution Contract

RED GROUP

Choose an activity from each colored square group. Cut out your three choices and glue them below. You are responsible for meeting the requirements and completing these activities by _____. Have fun!

This contract belongs to: _____

Take or draw pictures of three things you find that cause pollution (for example: a car, factory, cigarette, etc). Label your pictures and write a sentence about how you know it causes pollution.

After reading <u>The Great Kapok Tree</u>, we have learned a lot about the different animals that live in the rainforest. Choose one animal and write about what that animal thought of the tree cutter. Draw a picture. You may use the book to help.

Write lyrics to the tune of *Happy Birthday to You* about one thing you've learned about protecting the environment.

Write a paragraph in your journal about what you think the leading cause of pollution is.

Choose one scene from <u>The Lorax</u> to act out with a buddy in front of the class. Don't forget to dress up!

Create a crossword puzzle to share with the class, including all of the important vocabulary we've learned about pollution.

Collect objects that often cause pollution. Construct a display with your objects. Write a short paragraph that explains your display. This will be presented in class.

Create a postcard that shows a polluted area (rainforest, pond, grassland, or city). On the back, write a one to two sentence description of your illustration.

With a buddy, volunteer to collect recyclable materials from the rest of the fourth grade in the school and put in the appropriate recycle bins. Keep a tally of what you collect in your math journal.

Finished Early??

Have you finished your assignment and still have time left over? First, ask yourself—Have I finished everything I need to do with my best personal effort? If the answer is yes, here are some suggestions of what you can do with your extra time……

- Read: Get your reading log out and log some reading minutes for the day!
- Respond: How do you think your assignment went? I would love to know what you think! Write down what you liked and what you think could have been improved.
- Write: We read several books during our pollution unit. Write a book report on one of them and tell me what you thought of the book.
- Practice: Take out your cursive workbook and practice your penmanship. Or, you can practice your keyboarding skills on the computer.
- Help: Help someone in your group (blue, green, or red) with their assignment.
- Create: Write a math story problem or create a puzzle for other students to solve.
- Research: Want to know more about pollution? Visit KidsforSavingEarth.org to learn more! Afterwards, write down new things you may have learned.
- Illustrate: Draw illustrations for a story you have written.
- Use: Use your imagination and creativity to challenge yourself!

Resources

Books:

Where Does Pollution Come From? by C. Vance Cast and Sue Wilkinson

The Lorax, by Dr. Seuss

The Great Kapok Tree, by Lynne Cherry

Its Earth Day! (Little Critter), by Mercer Mayer

Garbage and Recycling (Young Discoverers: Environmental Facts and Experiments), by Rosie Harlow

Internet:

- http://www.Kids.NationalGeographic.com

This website contains many useful videos about pollution. The videos include short clips on water pollution, an alternative use to plastic bags, and more.

- http://www.KidsforSavingEarth.org

This website is a kid friendly informational site that gives students additional information about pollution. There is a section on global warming, a music section, and an animal informational section.

Professional Resources

1) Heacox, D. (2002). *Differentiating instruction in the regular classroom* (pp. 32-37).
2) Minneapolis: Free Spirit Publishing, Inc.
3) Wiener, R., ED672, Differentiating Curriculum and Instruction Packet, April 28, 2009.
4) http://www. rubistar.4teachers.org/index.php
5) http://www.nysatl.nysed.gov/standards.html
6) http://kids.yahoo.com/reference/dictionary/english

Name_____ Date_____

Personal Log

Keep a personal log of how many non-recyclable materials you use in one week. Write a paragraph explaining when you used the materials and why they negatively affect the environment.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.	2.
3.	3.	3.	3.	3.	3.	3.
4.	4.	4.	4.	4.	4.	4.
5.	5.	5.	5.	5.	5.	5.
6.	6.	6.	6.	6.	6.	6.
7.	7.	7.	7.	7.	7.	7.
8.	8.	8.	8.	8.	8.	8.
9.	9.	9.	9.	9.	9.	9.
10.	10.	10.	10.	10.	10.	10.

_____

_____

_____

_____

_____

_____

_____

Date_____

Dear_____,

Sincerely,

_____

Name_____ Date_____

Collect five non-recyclable materials. Draw them and write one to two sentences on each about how to identify the object as non-recyclable.

Object One:

How I know this is non-recyclable:

_____

_____

_____

_____

_____

Name_____ Date_____

Create an acrostic poem using the words KAPOK TREE that explains the effect pollution has on the rainforests.

K_____

A_____

P_____

O_____

K_____

T_____

R_____

E_____

E_____

Grading Rubric: The Causes of Pollution (Purple Squares)

Student Name: _____

CATEGORY	4 (Outstanding)	3 (Satisfactory)	2 (Unsatisfactory)	1 (Incomplete)
Content	Student displayed strong knowledge of the causes of pollution. Student used vocabulary terms including pollution, litter, environment, and waste to express his/her ideas of what and where pollution comes from. Student suggested ideas not discussed in class about the possible causes of pollution.	Student displayed knowledge of the causes of pollution. Student used some key vocabulary terms from the pollution unit. Student was able to express his/her feelings about pollution using material discussed in class.	Student displayed little knowledge of the causes of pollution. Student used little to no vocabulary from the unit. Student was not able to express his/her opinions about pollution or what causes it.	Student did not complete the required assignment. Student used no vocabulary. Student did not express the causes of pollution.
Effort	Student put enormous care into and displayed genuine effort of his/her best work. In presentations, student was animated and expressive.	Student displayed effort in completing the assignment. In presentations, student was expressive in front of the class.	Student displayed little to no effort in completing the assignment. Student's best work was not shown in completion of the assignment. In presentations, student was not animated or expressive.	Student displayed no effort in completing the assignment. Student did not hand in a full assignment. In presentations, student was not animated or expressive.
Organization	Student's assignment was well organized and neat. Student checked for and edited grammar and spelling errors. Student showed creativity in his/her completed assignment.	Student's assignment was organized and neat. Some grammar and spelling errors remain.	Student's assignment is not organized or neat. Many grammar and spelling errors remain in the completed assignment.	Student's assignment is not organized or neat. Student did not check for grammar or spelling errors.
Timely	Student handed in the assignment on or before the appropriate date.	Student handed in the assignment one day late.	Student handed in the assignment two to three days late.	Student did not hand in a completed assignment.

Grading Rubric: The Effects of Pollution (Orange Squares)

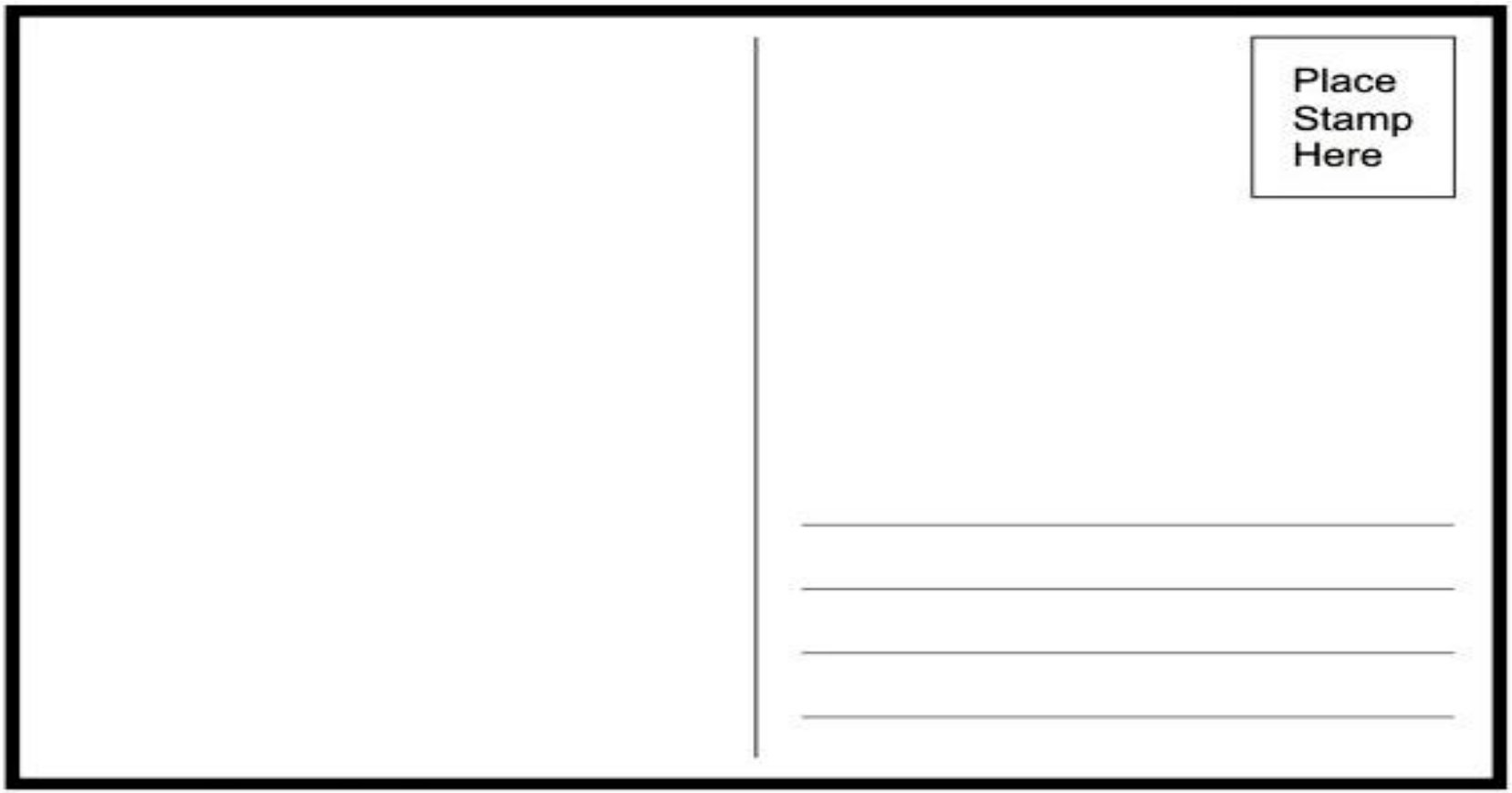
Student Name: _____

CATEGORY	4 (Outstanding)	3 (Satisfactory)	2 (Unsatisfactory)	1 (Incomplete)
Content	Student displayed strong knowledge of the effects of pollution. Student used vocabulary terms including global warming, endangered, extinct, habitat, and pollutant. Student used ideas not discussed in class and thought 'outside of the box' to explain the effects of pollution.	Student displayed knowledge of the effects of pollution. Student used some key vocabulary terms from the pollution unit. Student was able to express his/her feelings about the effects of pollution using most of the material discussed in class.	Student displayed little knowledge of the effects of pollution. Student used little to no vocabulary from the unit. Student was not able to express his/her opinions about pollution or the outcome of it has on the environment.	Student did not complete the required assignment. Student used no vocabulary. Student did not express the effects of pollution.
Effort	Student put enormous care into and displayed genuine effort of his/her best work. In presentations, student was animated and expressive.	Student displayed effort in completing the assignment. In presentations, student was expressive in front of the class.	Student displayed little to no effort in completing the assignment. Student's best work was not shown in completion of the assignment. In presentations, student was not animated or expressive.	Student displayed no effort in completing the assignment. Student did not hand in a full assignment. In presentations, student was not animated or expressive.
Organization	Student's assignment was well organized and neat. Student checked for and edited grammar and spelling errors. Student showed creativity in his/her completed assignment.	Student's assignment was organized and neat. Some grammar and spelling errors remain.	Student's assignment is not organized or neat. Many grammar and spelling errors remain in the completed assignment.	Student's assignment is not organized or neat. Student did not check for grammar or spelling errors.
Timely	Student handed in the assignment on or before the appropriate date.	Student handed in the assignment one day late.	Student handed in the assignment two to three days late.	Student did not hand in a completed assignment.

Grading Rubric: The Prevention of Pollution (Teal Squares)

Student Name: _____

CATEGORY	4 (Outstanding)	3 (Satisfactory)	2 (Unsatisfactory)	1 (Incomplete)
Content	Student displayed strong knowledge of the prevention of future pollution. Student used vocabulary terms including recycle, reduce, reuse, environment, conserve and prevent. Student used ideas not discussed in class and expressed alternative ways to prevent pollution.	Student displayed knowledge of pollution. Student suggested appropriate ways to reduce/prevent pollution. Student used some key vocabulary terms from the pollution unit. Student was able to express his/her feelings about the prevention of pollution using most of the material discussed in class.	Student displayed little knowledge of the prevention of further pollution. Student used little to no vocabulary from the unit. Student was not able to express his/her opinions about pollution or how to prevent it.	Student did not complete the required assignment. Student used no vocabulary. Student did not express how to prevent further pollution.
Effort	Student put enormous care into and displayed genuine effort of his/her best work. In presentations, student was animated and expressive.	Student displayed effort in completing the assignment. In presentations, student was expressive in front of the class.	Student displayed little to no effort in completing the assignment. Student's best work was not shown in completion of the assignment. In presentations, student was not animated or expressive.	Student displayed no effort in completing the assignment. Student did not hand in a full assignment. In presentations, student was not animated or expressive.
Organization	Student's assignment was well organized and neat. Student checked for and edited grammar and spelling errors. Student showed creativity in his/her completed assignment.	Student's assignment was organized and neat. Some grammar and spelling errors remain.	Student's assignment is not organized or neat. Many grammar and spelling errors remain in the completed assignment.	Student's assignment is not organized or neat. Student did not check for grammar or spelling errors.
Timely	Student handed in the assignment on or before the appropriate date.	Student handed in the assignment one day late.	Student handed in the assignment two to three days late.	Student did not hand in a completed assignment.

Name_____ Date_____

Create a postcard that shows a polluted area (rainforest, pond, grassland, or city). On the back, write a one to two sentence description of your illustration.